CITIES: STEERING TOWARDS SUSTAINABILITY

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Thanks to its integration in Sciences Po (University of Political Sciences), teaching and research are now an important part of IDDRI’s portfolio. This is done with the support of the Sustainable Development Centre, which works and publications are available at www.developpement.durable.sciences-po.fr

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This book is part of a series of annual publications on sustainable development (*A Planet for Life*) that started in 2007. In this overview, we take a global perspective on 2009, assess the state of collective action required to meet today’s sustainable development challenges and explain why cities have been chosen as the focus of the 2010 edition.

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SUSTAINABLE DEVELOPMENT IN 2009: A GLOBAL PERSPECTIVE

The year 2009 highlighted the many challenges of international collective action in its two complementary dimensions: crisis management and preventive action in the broad sense, including the evolution of global governance. The first aspect emerged in recovery plans responding to the economic and social crisis, as well as in the strengthening of international financial institutions and the emergence of the G-20 as an arena for top-level consultation and co-ordination. The second aspect, prevention, reaffirmed a long-standing paradox – the gap between the urgency manifest in public policy discourse and aims, and the feasibility of action at either the national or global level.

Thus expectations seem constantly plagued by disappointment – the Copenhagen Climate Summit in December 2009 was the most striking example: it typified the problems of collective action in the era of globalization and communication. Growing expectations create the necessary pressure and incentives, but high ambitions make short-term results unattainable; more achievable goals, in fact, would hardly justify the extra effort needed to initiate action. This dynamic, also present in multilateral trade negotiations, might appear as a formidable political problem: governments must implement what they propose and their success or failure depends upon achieving the stated objectives.
This culture of results certainly helps increase government efficiency, but it also leads to a reductionist vision of links between aims and outcomes. These depend on a complex chemistry between multiple actors with differing motivations; governments must guide ever-changing collective preferences and progressively anchor results achieved through laws, regulations or any kind of international agreement. However frustrating, the gap between leadership and validation seems inevitable in any dynamic perspective.

Such a viewpoint necessarily leads to an interest in agents beyond governments alone, and to a focus on the interaction between the different levels of action (individual, local, national, global). In this 2010 edition of *A planet for life*, we have put the spotlight on cities – at once the actors of sustainable development and emblems of its challenges. More than half the world’s population lives in cities, which concentrating the majority of greenhouse gas emissions. Current demographic, economic and political dynamics concentrate wealth and power around urban hubs, key nodes in the interaction between globalizing trends, societies, economic growth, climate change and protection of the environment.

From a social and environmental perspective, cities often appear as nuisance producers. While one can certainly link growing energy demand and urbanization (Salat 2009), the dialectics involved require careful scrutiny. Studies in geographic economy (Prager and Thisse 2009) illustrate the dynamics of economic polarization, a process that persists despite the spectacular drop in transport costs since the mid-nineteenth century and the near zero-cost of communications. The search for increasing returns, even to the point of congestion, drives the dynamics of agglomeration. Cities are thus central to the processes of growth, innovation and sustainable development. They are also laboratories for observing political and economic dynamics at work and for testing technical solutions and new public policies. It is therefore the type of urbanization rather than the city *per se* that which will prove decisive for sustainable development.

Yet the current evolution of cities in many regions of the world runs counter to ecological, social and economic requirements. For example, various economic, institutional and legal factors aggravate the fragmentation of cities. There is also a visible divide between the “legal” city – well-equipped, modern and productive – and the illegal or “informal” remainder, sometimes designated by terms such as shantytown, *bidonville*, or *favela*. As some of the articles in this edition will show, this trend seems to be spreading, heightening social segregation and ecological problems. Worldwide, more than 50% of new housing is built outside of any legal framework, most often haphazardly and in the absence of any land title. In the least developed countries, the problem of urbanization has reached a critical level: while population growth and the rural exodus are accelerating urbanization, especially in sub-Saharan Africa, the cities do not have the means to absorb this additional population and provide basic services. For all these reasons, the construction of “sustainable cities” stands as one of the main challenges for the years to come, and it is chosen theme for this issue of the series, *A planet for life*.

This introduction proposes a reading of the events that have shaped the global landscape in 2009, whose effects not only highlight the sustainability (or not) of current development models, but also set crucial challenges for urbanization and other policies. We will identify what

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1. A 1% growth in urbanization will lead to a 2.2% increase in energy consumption. A 150% growth of urbanization is projected between 1990 and 2025, which should thus quadruple energy consumption: the resulting carbon dioxide emissions will cause half of the changes affecting the planet’s climate (see Salat 2009).
2. A survey can be found in Prager and Thisse (2009)).
we see as the four key lessons governance may draw from these events as a general framework for the specifics outlined elsewhere in this volume.

THE CRISIS AND A “GREEN AND INCLUSIVE” RECOVERY

The economic crisis of 2007-2009 began when the housing bubble burst in the United States, in the wholesale segment of the (high-risk) “subprime” mortgage market. It soon engulfed the entire global financial system, spawning the world's worst economic crisis since the U.S. stock market crash in 1929 and causing international trade to decline even more than during the Great Depression of the 1930s (Eichen green and O'Rourke 2009). American households lost nearly a fifth of their wealth in the space of a year (Federal Reserve 2009), and the U.S. unemployment rate reached 10.0% by December 2009, according to the U.S. Bureau of Labor and Statistics (BLS 2010).

Initial hopes of “decoupling” soon proved illusory. The crisis spread across the planet, extending far beyond the borders of the United States and other Western economies and financial centres. It wormed its way through multiple international transmissions to infect the world economy, causing credit contraction, loss of wealth and confidence, a slump in demand and a fall in foreign trade. Emerging countries, notably in Asia (India and China, in particular) were initially considered immune from contagion due to their earlier banking system reforms and to their accumulation of reserves following the Asian economic crisis of 1997-1998. But fact

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3. Initially, the development of the subprime market was aimed at helping low-income households with bad credit records become homeowners. Banks were willing to lend to them using their homes as collateral even though they were much riskier borrowers. Over time, it was thought these customers could repay or refinance their loans by collateralizing ever-increasing home values.

4. According to the IMF, a 1% decrease in a host country’s rate of growth leads to a 4% decrease in the value of remittances sent by migrant workers to their country of origin.
economies given the linkage of their agriculture into global financial markets since 2006. Staple food prices were thus caught up in the storm, increasing sharply in 2006-2008 when agricultural commodities served as a “refuge” value, only to suffer from a subsequent collapse. In reality, Africa’s unprecedented growth since 2000 came to an abrupt halt.

What can explain the onslaught of such a crisis? Consensus on the causal chain of events will doubtless require time (see Benassy-Quéré et al. 2010). The crisis certainly revealed not only rapacity by some financiers (such as the American businessman Bernard Madoff and his Ponzi scheme), but also certain dysfunctions in the world economy and regulatory practices. It has also shown the dangers of excessive complacency. But fundamentally, the crisis reflects the interaction of a wide range of factors. The macroeconomic environment played some part in this; the global savings glut had fed on global current account imbalances encouraged by the lax monetary policies of central banks, particularly in the United States in the wake of the 1987 financial crisis. Moreover, the exchange rate policies of oil and gas exporters and of many emerging countries – designed to prevent any appreciation of their currencies and also sustaining a loose monetary policy in the United States – translated into an abundant liquidity that inflated bubbles in asset prices. In turn, securitization contributed to global imbalances by boosting the supply of “safe” investments available in the United States, in order to meet the incipient excess supply of savings and satisfy the demands of foreign investors, notably foreign central banks (Adrian and Shin 2009). By investing its official reserves in risk-free U.S. Treasury Bonds, China left it to others to take unwise risks (Brender and Pisani 2009), and enabled Americans to live far beyond their means.5 This “equilibrium” has been dubbed a “Revised Bretton Woods System” (Dooley et al. 2004).

In sum, during the 1990s and 2000s, it was believed that lifting restrictions on international capital flows and the balance of payments would accelerate the transfer of savings from developed countries towards developing countries and emerging markets. In fact, quite the opposite happened: Asian savings financed Western consumption to excess.

These macroeconomic factors interacted with a number of microeconomic failures. Investors were led to underestimate and misprice financial risk. The economist Gary Gorton (2009) provides a detailed analysis of how a “shadow banking system” emerged in the corporate world, through which companies could receive cash against securitized assets. This fed a rising demand for collateral assets and nurtured the growth of mortgage securitization to supply such assets through the higher rated tranches of mortgage-backed securities. As long as no shock disturbed the system, the quality of these assets was not questioned. However, subprime mortgage securitization was inherently sensitive to fluctuations in house prices. When the property bubble actually burst, the value of collateral based on subprime mortgage-backed securities collapsed. But no one really knew how

5. For the last 20 years, U.S. household income has stagnated in inflation-adjusted terms, leading Americans to take on debt in order to maintain consumption levels. The debt levels have particularly harmful effects because of the low inflation rate, which itself is a function of the American government’s desire to maintain a strong dollar and the fear of Asian governments to unpeg their currencies from the US dollar and allow their currencies to appreciate.
to assess the quality of the underlying assets, so the subprime mortgage crisis snowballed into a fully-fledged collateral crisis in which no one was prepared to hold securities. The collapse of the Lehman Brothers investment bank compounded the panic, and started a run on cash.

The more or less implicit pact between the Americans and Chinese did not guarantee stability (Aglietta 2007). Over time, and despite their well-known export orientation, the economic growth of China and of Asia has become less dependent on Western consumption. China developed other outlets, notably in Africa (Chaponnière and Jozan 2009); its exports to the United States and Europe represented only 5% to 10% of its GDP and its home market became a major engine for growth (Anderson 2007). The adjustment of international payments imbalances, and the broader exit from the present crisis, hinge on China and Asia: they will need to strengthen this nascent shift towards growth driven primarily by domestic demand, which in turn will become a key driver of the global economy.6

NATIONAL AND GLOBAL RESPONSES TO THE CRISIS AND CHALLENGES

The policy-makers’ response to the crisis was both active and atypical. They put forth measures designed to sustain demand in the economy through expansionary monetary and fiscal policies, and to support the ailing banking system (e.g. by raising deposit insurance ceilings, injecting capital into fragile banks, guaranteeing debt, insuring banking assets or purchasing toxic ones, and even nationalization). The United Kingdom and the Netherlands, for example, injected 3.4% and 5.1% of their GDP respectively to recapitalize their banks. The French government injected 1.4% of GDP into the sector, as well as providing nearly €80 billion of debt guarantees. In spring 2009, budget stimulus packages across the planet were estimated to be worth 3,000 billion dollars. After years of fascination with the notion of macroeconomic discipline, both monetary and fiscal policies turned dramatically expansionary. Central banks began buying assets that would not have even aroused their interest before the crisis; this move, known as “quantitative easing,” both expanded the money supply and gave a strong boost to their balance sheets. Fiscal policies set about substituting private demand and debt with public demand and debt. As a result, according to the IMF, budget deficits in the G-20 countries as a whole jumped from 1.1% of GDP in 2007 to 8.1% of GDP in 2009 (Economist 2009). Such measures were clearly needed to address a slump of historical magnitude. But they will not create sustainable recovery without well crafted “exit strategies,” since the time will come when this excess liquidity and debt will have to be eliminated. Further complications will arise from the crisis’ lasting impact on rising unemployment.

Two questions have immediately come to the fore: will these responses create a post-recession economy that is sustainable in the medium and long term? And would it not be wiser and more efficient to invest now in that future sustainability, at the same time stimulating the economy in the direction of growth, jobs and poverty eradication?

As pointed out in The Economist (2009), Keynes’ ideas have made a clear comeback, although his own reactions to this crisis remain hypothetical. Rather than returning wholesale to Keynesian views, we should incorporate his insights into our understanding of current problems. To borrow Neustadt and May’s terms (1986), “uses of history” fully inform our learning process and decision-making capacity, but do not imply a return to outdated formulae. The combination of

6. China has become the main trading partner of several Asian countries, thus supplanting the United States and Japan.
environmental and economic stimulus agendas has bolstered the slogan “green and inclusive growth” – initially conceived as “inclusive, green and sustainable recovery,” stressing the centrality of environmental concerns in public policies designed to address the crisis, and advocating future growth based on “green” innovations. These concepts serve as catchphrases, but they call attention to how “green and inclusive growth” explicitly conveys the three requisite dimensions of sustainable development. In an exceptional period of public investment, policymakers must avoid inertia that will subsequently entail high environmental costs. “Shovel-ready” investments that create jobs quickly can in fact give rise to excessive production capacity (as witnessed in the Chinese cement sector), consuming resources that could be mobilized for more innovative infrastructures. At the Pittsburgh summit in September 2009, G-20 leaders pledged to “move towards greener, more sustainable growth.”

**KEYNES’ IDEAS HAVE MADE A CLEAR COMEBACK, ALTHOUGH HIS OWN REACTIONS TO THIS CRISIS REMAIN HYPOTHETICAL**

In their joint publication “Scorecards on Best and Worst Policies for a Green New Deal”, E3G and WWF present recovery policies that truly benefit both the environment and the economy, while critiquing those with noxious effects. The report also cites the German programme for energy-efficient buildings, American incentive schemes for renewable electricity production, and the mandatory reduction targets, accompanied by incentive schemes, set for China’s 1,000 most energy-intensive enterprises. The report concludes that one can do better: “economic recovery packages so far have not generated a green new deal. While some countries have devoted a proportion of their expenditure to climate-friendly stimulus, the impact is too small” (Höhne et al. 2009).

How does one gauge whether “green and inclusive growth” can take root? An initial problem of measurement arises here. Policy-makers need new indicators that capture social, economic and environmental performances more effectively than the current indicators (such as GDP). This need was usefully mapped in the report by the Commission on the Measurement of Economic Performance and Social Progress, set up in 2008 by Nicolas Sarkozy and chaired by Joseph Stiglitz (with Amartya Sen as advisor and Jean-Paul Fitoussi as coordinator). Their report of 14 September 2009 presents several proposals for developing more relevant indicators (see Stiglitz et al. 2009).

Without adequate indicators, growth may prove neither green nor inclusive, or only partly so – which may not be sufficient. More specifically, in the absence of synthetic indicators for sustainable development, growth policies tend to focus on climate change and energy demand. However crucial, these two aspects do not exhaust the need for targeted action. Provoking tensions and contradictions between climate change and other social and environmental needs will also slow progress. For example, many analysts have criticized President Obama for giving priority to American healthcare reform, allowing the energy and climate bill to stall in the Senate. Certainly these two major reforms do not enjoy unanimous support in American society and command limited political capital. The timeframes, now needing extension (since the Kerry-Boxer climate bill was recast into a new Kerry-Lieberman-Graham bill to increase its chances for passage), mired down the American negotiators right up to Copenhagen.
However, Obama’s efforts to redress inequalities in American society are also part and parcel of any sustainable development process.

**THE EVOLUTION OF GLOBAL GOVERNANCE**

Similar approaches apply to aspects of global governance – including financial regulation, which can no longer rely on a purely national perspective. To patch up existing institutions and practices, and then nostalgically call for a return to the past, is to misread how and why the systems have evolved. Gorton (2009) argues, for example, that securitization and the shadow banking system emerged in response to corporate needs, and not simply to satisfy pure greed. Banking has changed and it would be futile to try and reinstate outmoded practices. Far better to understand the market failures involved, and devise proper regulatory responses to address and prevent excessive risk-taking. The task is Herculean. It should stress above all modernized banking and finance regulation, to lessen the likelihood of future crises and mitigate their severity, as well as to deliver adapted services.

The crisis has also revived the debate on global governance. As noted earlier, the G-20 has now become the permanent council for international economic co-operation, opening up the G-8 to emerging countries. The finance ministers and central bank governors of G-20-countries first convened in 1999, in the aftermath of the Asian crisis, and have subsequently met every autumn (and, more recently, at other times, in preparation for the summits of the heads of state and government). In response to the global crisis, President George Bush convened a meeting of the G-20 heads of State and government in Washington D.C. on 14-15 November 2008. Similar summits were hosted in London on 1-2 April 2009, then in Pittsburgh on 24-25 September 2009. These meetings are merely a first step. Global collective action still faces serious obstacles: the prevalence of national interests (or what are perceived as such), little recognition of the domestic advantages of mainstreaming global public goods (which implies a willingness to adapt domestic policy), and the weight of history (which both influences political viewpoints and creates sensitive problems of legitimacy and responsibility).

Both the International Monetary Fund (IMF) and the World Bank made a clear comeback during the 2007-2009 crises. At the G-20 summit in April 2009, world leaders agreed to substantially boost the resources available to the IMF to fulfil its mission, extending its New Arrangements to Borrow by over 500 million dollars. The summit also made the largest allocation to date of Special Drawing Rights (SDR), providing the world economy with 250 billion dollars of additional reserves. The IMF has played a conspicuous role in advocating global reflation in order to limit the costs of the crisis, and has also introduced a great deal of flexibility in its policy recommendations to developing countries. The World Bank, meanwhile, has clearly embarked on a contra-cyclical course, dramatically stepping up its global operations. The crisis has thus confirmed the importance and complementary nature of these two institutions, despite the regular and virulent criticism they received during the 2000s. Their own governance also changed to a degree, although
it will require further balancing of voting powers to reflect current economic realities and increase the voice of the poorest. At the G-20 summit held in Pittsburgh on 25 September 2009, world leaders agreed on at least a five percentage point shift in IMF voting power from “over-represented” to “under-represented countries” to recognize the growing weight and influence of emerging economies.

Finally, the relationship between current global imbalances and exchange rate fluctuations and policies also highlighted defects in the international exchange system. At the G-20 Washington Summit in 2008, the British Prime Minister, Gordon Brown and the French President, Nicolas Sarkozy, called for a new Bretton Woods conference to address these issues. Interestingly, in March 2009 the Governor of the People’s Bank of China proposed strengthening the role of the SDRs in global reserves, in effect a gradual move toward a world reserve disconnected from economic conditions and sovereign interests of any single country. His plan echoed Keynes’ post-war suggestion to establish the bancor, a world currency unit with the same intent. Such proposals show the dilemma of reserve currency issuers: they must choose between attaining domestic policy goals or ensuring an adequate supply of their currency so as to meet the other countries’ reserve demand. Both objectives will inevitably come into conflict at some point. However, such a sweeping reform appears unlikely, primarily because it would impose some discipline and constraints on countries that fiercely guard their monetary autonomy.

The challenge of structuring global collective action appeared most forcibly in the preparatory negotiations for the 15th Climate Conference in Copenhagen (December 2009). The Conference’s mandate was to replace the Kyoto Protocol, due to expire at the end of 2012, with a more global and ambitious agreement. These climate talks renewed tensions between the industrialized world and developing and emerging countries, reflecting real differences in their situations. Industrial countries bear responsibility for past emissions and current levels of greenhouse gases, but high-growth countries will be the main source of future emissions. Equity requires that rich countries cut their emissions to accommodate those of developing and emerging countries, implying high short-term transaction and transition costs to change behaviour patterns, production and consumption in rich countries. The problem is that “accommodation” is not sufficient. Emerging countries must also take substantial measures to curb economic carbon-intensity, which means having absolute reduction targets for their emissions. Political consensus on this issue remains difficult. Negotiations have been underway since 1992, and this sluggish pace means that action has not only become more urgent but also more difficult to achieve within the necessary deadlines. From the outset, then, the Copenhagen summit raised the question of its participants’ political mandate, a necessary foundation of any international accord.

**COPENHAGEN: A DISAPPOINTING BUT NECESSARY STEPPING STONE**

What happened in Copenhagen? Hopes had been high for an agreement between more than a hundred heads of state on six key points, all of them problematic: 1) a shared vision of a climate future – in other words, medium- and long-term objectives to limit global warming; 2) quantifiable targets from developed countries on medium- and long-term emissions reductions; 3) initiatives from developing countries
which translate into expected emissions reductions, especially through the fight against deforestation; 4) rules for measuring and verifying commitments for all countries; 5) medium- and long-term financing of climate policies in developing countries; 6) the mandate to negotiate a legally binding treaty.

Given the high expectations (notably European ones), the outcome seems disappointing. The principle of moving towards a legally binding treaty was not written into the final accord at the end of the summit. In the final declaration, all trace of specific reduction targets for 2020 and 2050 had vanished from the text. China in particular insisted on removing quantifiable commitments, fearing that an over-restrictive “carbon budget” would jeopardize its economic growth, although any real potential for low-carbon development remains far from certain. In concrete figures, the final declaration retained only the shared goal of limiting the rise in global warming to an average temperature of two degrees Centigrade compared to pre-industrial levels. Yet without a *modus operandi*, this reaffirmation amounts to no more than a simple declaration of intent.

The industrial countries’ commitments on emissions go no further than registering their voluntary pledges as quantifiable targets for 2020. The developing countries also register their actions on a voluntary basis, whether or not they receive international funding. These actions will be communicated and reviewed at international level. Different mechanisms, awaiting later development, will measure and verify the actions undertaken by different groups of countries. This international oversight of national actions, together with the target limiting average temperature rise to two degrees, stands as the main achievement of the accord.

On the finance side, the industrialized countries have committed to an annual ten billion dollars over the next three years, which amounts to a total thirty billion dollars between 2010 and 2012. The actual prospects for mobilizing additional finance seem highly uncertain. This commitment will be stepped up to 100 billion dollar a year by 2020. The idea of a universal contribution by all participants through an agreed formula has been abandoned, however. The Conference also failed to reach accord on the principle of new funding sources (for example, through innovative schemes that would chiefly rely on international taxes), but it created a high-level working group to identify such sources.

Yet for all its disappointments, Copenhagen mobilized the fight against global warming on an unprecedented political and international scale, in terms of the number and status of attendees. This mobilization does not guarantee that the negotiations will deliver results in the foreseeable future, but it is certainly a necessary precondition. Climate has now achieved the status of a global political issue, much like the financial crisis or nuclear proliferation. But the core challenge remains: transforming this renewed political focus into credible means of action commensurate with what is at stake.

The major players have returned from Copenhagen in different frames of mind. The United States wished to demonstrate that the emerging countries (and China in particular) could not sidestep shared rules, and that announced actions would entail international verification.
In this sense, the accord is a valuable asset for President Obama in the Senate’s upcoming vote on the climate bill. The American president, who negotiated first with the emerging countries before continuing with European heads of state, thus agreed to abandon quantifiable reduction targets for 2050 and the principle of a legally binding treaty in exchange for a verification mechanism.

For China, the accord is a satisfactory one, and the Chinese press has hailed it as such. National initiatives in the fight against climate change will now gain recognition, without a legally binding agreement that industrial countries could invoke to settle possible trade conflicts. Certainly, while threats to China’s “carbon budget” have not dissipated, it has made no specific reduction commitments. India is firmly aligned with the Chinese position on all these points.

For Brazil and South Africa (and other emerging countries, to a degree) the Copenhagen talks allowed some muscle-flexing and demonstrations of power. Yet both these countries differ from China and India in favouring a strengthened multilateral framework. Finally, the agreement cannot satisfy the ambitions of Europe, which has headed the climate initiative since Kyoto. It has borne much of the financial cost without managing to gain acceptance for its vision. But it has obtained an agreement likely to give momentum to the whole international community.

A growing number of developing countries nonetheless seem ready to take up the climate fight through individual actions. The emerging nations, especially China, resisted emissions reductions across the whole economic spectrum until the very last days before the summit opened. However, one after the other, with South Africa and Brazil taking the lead, they announced reduction targets in relative terms (reduction of GDP carbon intensity). China thus announced that it would reduce its GDP energy intensiveness by 40-45% between 2005 and 2020. India pledged a 24% reduction of GDP energy intensity over the same period. Some countries, with the exception of China and India, even agreed to the idea of a peak emissions date and a long-term absolute reduction.

Yet collective action cannot rest on individual efforts alone: an international agreement is essential for establishing a credible, effective and equitable framework, one that would spread efforts more equally and ensure adequate monitoring. Paradoxically, Copenhagen shows that unilateral commitments may come more readily than an agreed framework for international co-operation. Two difficulties obstruct such international collective efforts: first, the preference for sovereignty that has so far governed the attitudes and choices of the emerging countries; and second, the uncertainty of gains from collective action, even greater when these gains and losses may occur within different timeframes.

In all global negotiations, whether around trade, the fight against corruption or climate change, the emerging countries play a key role, and may successfully co-operate to make their preferences heard (e.g. the “BASIC” group, which includes Brazil, South Africa, India and China). These countries often shape the trade-off between the protection of sovereignty and the exigencies of collective action. But these preferences are changing. From this perspective, the year 2009 will perhaps stand as a turning point in global governance: China, currently one of the countries most reluctant to abandon its sovereignty, has in fact actively helped to conclude two global agreements, even though it has also ensured their limited scope was limited – first at the G-20 on expansionary policies and then at Copenhagen on climate change. Collective
action and dynamics are further hampered by the uncertainty that weighs on the gains and losses arising from the rules determining global public goods’ production and distribution. Pursuing negotiations, developing research and testing initiatives through experiments and pilot projects could decrease this uncertainty.

Whatever the difficulties, collective action on climate change, disciplined by an international agreement, appears all the more crucial, since the whole architecture of our governance system depends on it. WTO talks in the Doha Development Round had to be tabled in the final months of 2009, so as not to overload the international negotiations agenda. Further, the WTO cannot resolve contentious issues such as carbon border tariffs or importer compensation (as envisaged by the European Union and the United States, in case the climate agreement proves too loose) until climate change has become a legally-binding pillar of global governance, firmly established beyond the 2012 deadline. The world needs a New Deal to combat climate change, but it also needs to improve global governance through the institutions already in place.

GLOBAL COLLECTIVE ACTION: THE VIEW FROM 2009

Four key lessons emerge from this analysis. The first concerns the “green and inclusive growth” slogan that appeared in response to the 2007-2008 crisis. This implies much deeper changes than simply “greening” production modes and consumption patterns, or increasing social transfers, although both remain necessary. Rather, such a goal questions the fundamental paradigms of our economic development model calls for a full reformulation of economic and social policy objectives. How to achieve this is one – if not the – essential question. The economic, social and technological learning processes will not happen spontaneously, certainly not within the timeframes recommended by the scientific community. Regulations and policy in general, with all their constraints and incentives, are keys to supporting and accelerating this process of learning and discovery.

Our second lesson, closely tied to the first, is that current statistical frameworks do not help assess or promote green and inclusive growth, despite their sophistication – an unequal one, however, depending on the country of origin. The existing measurement systems tend to confirm choices that go against sustainable development. Gross domestic product figures are a good illustration. While universally available, they provide poor representations of net income (not to mention “well-being”). And more importantly, when divided by population numbers, they provide averages that may hide unsustainable inequalities between individuals. The Commission chaired by Joseph Stiglitz and Amartya Sen has proposed avenues for new and more relevant indicators, but these will require conscious determination to make headway.

Our third lesson concerns precisely the need for collective action and its implications for the global governance system. Past negotiations, e.g. those involving trade, corruption, climate, the financial crisis or nuclear threat, have not yet guaranteed the participation of emerging and less developed countries in a positive, legitimate and equitable way. While the Bretton Wood reforms have made substantial progress, the system still has far to go towards a new
equilibrium, one that translates these changes into more equitable power-sharing. Nonetheless, the Copenhagen Conference demonstrates that emerging nations can mobilize around global issues.

Our fourth and final lesson, inspired by the theme of this 2010 volume, is that worldwide collective action requires a multi-level approach to governance: indeed, these actions (such as the fight against climate change) increasingly take place at the infra-national level. Cities, like local communities, interact at local, national and international level simultaneously, reflecting their global commitment. However, the actors of city governance now demand regulation of national public policies as the underpinning of their own effectiveness. Clearly, public action is now on the agenda as never before.

Works Cited


No sustainable development strategy can ignore cities: they are pivotal to all our current questions on political, economic, social, environmental, health-related and cultural fronts. Today, one in two people in the world lives in a city. Three billion others will likely have joined them by 2050, continuing a trend accelerating since the late 1980s. The major part of this growth takes place in the cities of Africa, Asia and Latin America, which welcome some five million new inhabitants every month, as compared to 500,000 in the cities of Europe and Northern America. Although urbanization is a phenomenon common to all five continents, the courses it follows bear a strong imprint of local cultures and social, economic and technical conditions. In Latin America, Northern America and Asia, large cities draw new residents. In Europe and Africa, however, urban growth mostly concentrates in the medium-sized cities and towns that have grown from the urbanization of rural areas. Other cities, especially in Eastern Europe, have seen their populations decline as a result of the economic crises affecting their regions.

The mainspring of urbanization is certainly economic. When cities position themselves as bridgeheads between territories and the globalized economy, they become the key drivers of growth. Global trade in goods, services and capital takes place primarily between cities interconnected by multiple networks, both material (communication, transport) and non-material (political, economic, cultural and scientific). And it is these opportunities for enrichment that attract a steady flow of new arrivals to urban centres.

The environmental impact of this ongoing urban transition is proportional to the scale of population shift. If cities now account for 75% of greenhouse gas emissions and consume 75% of the world’s energy, it is mainly because they shelter half the planet’s population and most of its economic activities. It is also because current urbanization replicates the growth model of cities in industrialized countries – greedy for resources, shaped by the development of the automobile and the low price of energy over the last half-century. Yet there are no longer sufficient natural and financial resources to support this pathway, and this calls for a profound and radical change in transport, investment, industrial and service-sector choices, habitat, and so on. This opens up an extraordinary window of opportunity for new avenues in urban
development, as much for cities in the industrialized world as for those still largely under construction in emerging countries.

This global urban transition is also often marked by a growing social and spatial fragmentation. Most new city dwellers settle in informal districts that are badly serviced, underequipped and disproportionately poor. The share of urban populations living in precarious conditions already stands at 43% in South Asia and 62% in sub-Saharan Africa, yet policies to support these districts fail to measure up to their needs. Building an inclusive city consistent with socially sustainable development means guaranteeing access to basic services, providing decent and affordable housing, and ensuring free and easy circulation in a unified urban space.

The leaders and citizens of today thus have a major responsibility as trustees of the future. It is their task to influence the shape and structure of cities so that the generations to come can live healthy and contented lives. This collection of articles proposes ideas that may help formulate appropriate policies and plans to shape cities. Drawing on examples from some 80 cities across the five continents (see Figure 1), the authors identify, within their own fields, the contemporary trends, the mechanisms at play in city formation, and the tools that can influence current strategies and future action. There are
no foregone conclusions in these approaches to present-day urbanization and its threefold relationship - environmental, economic and social – to sustainable development; they simply illustrate the diversity of manoeuvres open to all urban actors (local government, states, aid donors, companies, citizens) in the margins of urban complexity.

**STEERING THE ECONOMIC COURSE**

In today’s world, cities are enmeshed in globalized economic flows. Connected to extensive commercial, financial, scientific, cultural and political networks, the largest urban centres play fully active roles in these flows, sometimes wielding even more influence than nation-states. The GDP of Tokyo, for example, is twice that of Brazil, and the number of inhabitants concentrated in the Japanese capital surpasses the populations of Sweden, Finland, Denmark and Norway combined. This situation is not essential to urbanization *per se*, but rather arises from successful economic strategies – grounded in investments targeting infrastructure and high-growth economic sectors, as well as the human capital (higher education, culture) that makes cities attractive, innovative and dynamic.

Pierre Veltz (Chapter 1) explores the prime movers of this globalized urban economy. Large well-integrated cities function as “powerful hubs that allow chains between producers, consumers and other social participants (such as universities) to be created and reconfigured constantly.” As spaces of opportunity, they are proving powerful engines for growth. However, the lower communications costs underpinning this evolution over the past few decades have not produced a geographic homogenization. On the contrary, in a world where goods and information circulate ever more rapidly and freely, the polarization of wealth and power between and within cities has become more pronounced.

Opportunities for social and economic advancement are not equally distributed, and tend to concentrate in certain city districts or networks. The challenge for local and central governments, and all the urban actors involved, therefore lies in organizing this growth and revenue-sharing to redistribute opportunities between and within territories.

The cities’ integration into international trade is a decisive factor for foreign private investment. This linkage provides the basis for the rating agency rankings that guide the decisions of most real estate investment funds. As a result, investments by multinationals, drawn by the promise of high short-term returns, further enhance the attractiveness of these cities and foster a seemingly virtuous circle of economic growth. Taking Bangalore (India) and Greater Mexico City (Mexico) as examples, Louise David and Ludovic Halbert (Chapter 2) show how investors steer these financial flows towards specific sites within the city – not only because of investment logic, but via collaboration with the local facilitators who make these operations possible. Working at the crossroads between the worlds of finance, the city’s concrete production, industry and political decision-making, these facilitators act as craftsmen of the globalized city, not simply in its economic flows but also its urban fabrication. No sustainable urban policy design should overlook these conditions, or fail to influence them in seeking to redeploy investment across the whole territory.

The logic of global economic relations funnels the effects of this economic growth into certain districts and specific urban areas, widening inequalities even within territories. Tracing the urban history of São Paulo (Brazil), Sergio Moraes (Chapter 3) shows not only how industrial activities and residential zones developed contingent on transport networks and roads, but also how the urban fabric itself concretizes the social inequalities underpinning the city’s
economic growth. In Bangalore and Greater Mexico City alike, economic development marks out the boundaries of a “useful city,” to the detriment of other, declining city districts. This calls for greater attention to municipalities now seeking to rebuild socio-economic cohesion by involving the most marginalized populations in urban planning.

**STEERING THE ENVIRONMENTAL COURSE**

Urbanism is often presented as synonymous with pollution and predatory environmental behaviour. Certainly, the high concentration of people, industries and vehicles in urban areas explains the massive consumption of natural resources and the high levels of water, air and soil pollution. Yet territorial dynamics go beyond pollution: city dwellers may be the main producers but they are also the main victims of environmental degradation. At the interface between a territory and its population, the city offers a privileged intervention framework for influencing the causes and effects of these issues.

Today’s broad public focus on climate change and energy consumption raises questions about the city, its housing and transport. Urban formations are not powerless in the face of these challenges, because the higher their population density, the greater their hope of achieving economies of scale and intensifying their energy use. A very substantial share of the current increase in CO₂ emissions reflects the growth of emerging countries, caught between their energy needs and the scarcity and cost of supplies. Faced with rising sea levels, heat waves, flooding, storms, and the arrival of “climate migrants” driven from the countryside by drought, cities will have to adapt to the expected impact of climate change.

**Partha Mukhopadhyay** (Chapter 4) looks at how Indian cities can adequately address these challenges. In a still largely rural India, building carbon-light cities resistant to climate change remains a viable choice. While technological progress helps further this objective, it will not suffice in itself to change the present course of development. Only by integrating climate and energy objectives across the whole urban policy spectrum is there a hope of reshaping representations of the optimal city and influencing its development.

The fight against urban sprawl is one of the keystones of integrated environmental and urban policies. In the cities of the industrialized world, it is imperative to break with a development path linked to easy motorized transport and fuelled by land and property prices that decrease relative to the distance from the urban core. Developing and emerging countries must avoid such mistakes, and counter trends towards urban sprawl fed by proliferating informal districts. This means that cities everywhere must restructure themselves to foster new lifestyles.

**Serge Salat and Caroline Nowacki** (Chapter 5) propose a return to ambitious policies shaping urban morphology, to encourage city dwellers to change their transport habits and consumer behaviour. Again, technology can ease this changeover, provided that it forms part of an integrated approach to urban development. A city-scale logic will address social, environmental and economic needs and also facilitate the design of integrated projects that promote all three in parallel, rather than favouring one at the expense of the others.

**How can a city in a developing country initiate an environmental protection policy? How can it fully engage an agenda that may seem less urgent than (for instance) the fight against poverty?** Taking the example of two African capitals, Yaoundé in Cameroon and Ouagadougou in Burkina Faso, **Florence Fournet, Aude Nikiema, Blaise Nguendo-Yongsi** and **Gérard Salem** (Chapter 6) show that the way forward often proves roundabout. The impact of pollutants on health generally forces municipal...
action on this issue. However, the technical means of intervention remain very limited in urban spaces with a high rate of informal settlements that maintain close ties with rural areas. Such settlements often bypass centralized solid waste disposal, for example, as alternative rural outlets are found for part of the waste, a practice that may run counter to the interests of health and environment. To surmount these obstacles, the most promising courses of action will elaborate solutions in collaboration with the urban populations concerned, so that they become aware of the stakes and adopt the technologies required.

To grow and function, cities draw on resources from increasingly remote hinterlands, and their polluted emissions do not stop at the city limits. Reducing or controlling a city’s environmental footprint in line with a course towards sustainable development requires action in all of these interrelationships. The underlying rationale is as much environmental as economic, as Bernard Barraqué (Chapter 7) shows with respect to municipal water suppliers in European cities. Although technical improvements such as water treatment have temporarily given municipalities greater autonomy, present-day demand for better quality water and the resulting higher costs now favour territorial partnerships to prevent the pollution of catchment areas. Protecting water catchments located upstream from cities increasingly entails co-operation with farmers, and the non-pollution of ecosystems appears to be the less costly solution.

**STEERING THE SOCIAL COURSE**

Today’s urbanization involves a proliferation of informal districts with poor public provisions of water, sanitation and energy. With no security of land tenure, no decent housing, and no basic services, these city dwellers are not really citizens in the full sense. However, Sylvy Jaglin (Chapter 8) shows us that connections to the main public water utility networks – a marker epitomizing urbanity – are being outstripped by “uncontrolled – and most often illegal – commercial modes of water supply” more suited to the income status of different populations. This resourcefulness is not simply technological but also institutional. Everywhere in Asia, Africa or Latin America, we see the emergence of composite systems that integrate private informal suppliers into overall service provision, alongside connection to the urban utilities’ distribution systems. Although these developments improve the quality of life for the poorer city dwellers, questions of rates, intra-city solidarity and cost-sharing mechanisms remain unresolved. The situation calls for a strengthening of governance mechanisms capable of establishing common norms and redistribution schemes.

If local authorities require tools in order to integrate informal districts, they also need the will to do so. Marie Huchzermeyer (Chapter 9) takes the example of South Africa, where cities have opposed the influx of poor migrants to heighten their national and international appeal. Providing housing for these migrants is considered not only a burden but also an obstacle to economic prosperity. The rare extant social housing programmes relegate them to the city outskirts, necessarily raising their transport costs and depriving them of opportunities offered by central city districts. The author examines the case of Nairobi (Kenya) to show how a regulated private market can deliver affordable rental accommodation at lower cost and in better locations, by favouring a compact and densely populated city over a sprawling and socially segregated one.

Yet all the efforts to promote social cohesion,
In developed and developing countries alike, are jeopardized by “security discourses” – policies and practices that advocate distrust and control of the city’s younger and poorer residents, rather than addressing their needs. Luca Pataroni and Yves Pedrazzini (Chapter 10) analyze the effects of this discourse on the urban fabric, coining the term “urbanism of fear” to describe the fragmentation it generates. The number of control points, barriers, and gated communities continues to rise in cities around the world – all signs of daily humiliations, and conducive to explosions of violence. Political will alone can counter this oppressive trend, by asserting an “urbanism of recognition” that assures each resident a place and a means of urban livelihood.

**STEERING GOVERNANCE FOR A NEW COURSE OF URBAN PLANNING**

Whether they explore the economic, environmental or social dimensions of a sustainable city, all these chapters emphasize the importance of political decision-making and the need for tools to manage urban services and planning. In the same vein, Thierry Paulais (Chapter 11) notes that addressing the global financial crisis requires that governance systems incorporate room to manoeuvre between their echelons – territorial administration, private and public actors, and even international aid entities. The global financial crisis that began in the United States in 2007 has not spared local governments and continues to weaken their urban investment finance systems. With economic activity on the decline, municipal budgets dwindle and access to loans becomes difficult. Paulais outlines this situation to propose some key reforms in the urban finance sector, as well as in urban planning and housing, now needed to guarantee the continuity of urban development. Above all, restoring municipal finance capabilities means overhauling relations between the state and local governments.

Likewise, according to Saskia Sassen (Chapter 12), only by rethinking decision-making from the local up to the global level can we reduce the environmental degradation associated with a resource-hungry, governance-deficient urban development model. Cities should be seen “as structural platforms for acting on and contesting irresponsible and powerful corporate actors.” Their geographical base can indeed unite actors within various legislative measures and behaviours and make them accountable. To achieve this, we need to espouse a vision of cities as complex systems, active at multiple levels of scale and time, and thus able to create links among a diversity of actors. Analysing these interactions may identify the mechanisms needed to design environment-friendly urban policies.

The geographical encounter between diverse actors and rationales prompts a wealth of alternative strategies. Jérémie Cavé and Joël Ruet (Chapter 13) examine institutional innovations tested in emerging countries as a blueprint for new norms of urban planning and governance. Using examples drawn from the water and energy sectors in India and Brazil, the authors show how new alliances of actors, such as national enterprises, globalized firms, NGOs, international development agencies, and so on, have emerged in these cities, proposing new technical systems for providing essential services. In the long run, this inventiveness reveals the “power of norms,” whose first signs have already become visible. This potential spurs new thinking on the role of public authorities’ power, and promotes adaptation of analytical tools for urban development policies. This analysis shows, in fact, that the decentralized approach underpinning these policies, reinterpreted in the light of sustainable development, can also inspire developed
countries facing renewal of all of their urban utilities networks.

Finally, all cities currently in search of sustainable development share a dual need: they must adopt the constraints and opportunities of a globalized world while grounding policy in local specifics, in the strategies of local actors and the potential of local government. And many cities need support in this complex process. Elisabeth Gateau (Chapter 14) observes how decentralization has generally moved forward, transferring more authority to the cities without always giving them adequate means to cope. The strengthening of city networks since the second half of the twentieth century shows their will to exchange information and experiences, aiding them to play their role more effectively and to make their voices heard at national and international level – without competing with state prerogatives of international representation and territorial solidarity.

INTEGRATE FOR SUSTAINABILITY
The very diverse pathways that cities follow require evaluation over the long term. Although cities now assemble half of the world’s population, other slower-changing factors also determine their structures: their built environments, transport infrastructures, diverse networks, and massive investments locked up for several decades. Changing their economic, environmental and social policies – and the course of cities’ development – necessarily means identifying long-term objectives and planning how to achieve them. Today’s decisions shape the urban environment that the next few generations of citizens will inherit.

This means that investment choices are vital. Rather than simply relying on outside support and seeking to attract international investment, cities also need to promote the development of local businesses. In an economy where innovation proves the wellspring of added value and where – as Pierre Veltz (Chapter 1) points out – it has become “more strategic for cities to attract talent than to attract capital,” the needs of their inhabitants must not be neglected. Education, health, environment and culture are all long-term investments.

This need to anticipate justifies a critique of the currently over-compartmentalized management of economic, environmental and social problems. Changing the course of urbanism requires more than marginally correcting the more troublesome effects of uncontrolled development. Everything argues for ambitious policies that integrate as many different dimensions of sustainable development as possible: weighing up the environmental and social consequences of investments, safeguarding the environment for reasons of economic good sense and social wellbeing, and – given the tight interconnection of all three dimensions – treating the economy and the environment as agents of social integration.

Adopting these challenges requires technical innovation, investments and institutional know-how. It also depends on seeing decentralization processes through to completion, and firmly establishing local governments as the lead actors in sustainable development. Yet this strengthening will have little reason or effect until states safeguard the balance between local governments and financial solidarity, and ensure that their populations are truly represented in globalized economic and political processes. Finally, to guarantee that local specifics receive their due, urban development must find ways of effectively involving citizens in defining the directions of public policy. It is only through efforts such as these that cities will become cities in the true sense of the word.
The contemporary globalized economy is based on permanent innovation and ever-growing flows of goods, investments and talented people. Some large cities offer an urban fabric perfect for globalization’s imperatives, and their built environment and resources allow them to attract international investment and grow richer. In this globalized game, new large metropolises are being born - and older ones are revitalized - while smaller cities with less to offer find themselves marginalized.

GLOBALIZATION: AN URBAN OPPORTUNITY? *

In his description of the nineteenth-century origins of modernity, the French historian Fernand Braudel described a great rivalry between the city and the state. Three centuries later, the state’s victory is undeniable: except for some city-states such as Singapore and Dubai, nation-states are still the primary global actors, despite the effects of globalization. However, nation-states’ social, political and geographic primacy could change, due to the undoubted trend towards an ever-stronger urban concentration of wealth and power (as well as poverty and despair), especially in the largest cities. One of the lessons of the nineteenth century, affirmed for the most part by the last decades of the twentieth, is that decreasing the costs of communication does not lead to a wider distribution of wealth and power. On the contrary, it leads to their polarisation. In a world where goods, information and, to a certain extent, people circulate ever faster and more freely, the concentration of spatial inequalities increases. This is a worldwide trend. In Europe and in America, cities’ economies have long been integrated into State-managed structures, particularly in Europe’s omnipresent welfare states. In Africa and Asia, rapid urban growth is creating massive territorial inequalities that will deeply affect political circumstances. By 2015, twelve of the twenty largest cities in the world will be in Asia, and the majority of the two billion additions to the world’s population will live in Asian cities. It is fascinating to compare the economic weight of cities and nations: the GDP of Tokyo is twice that of Brazil, and the GDP of the Kansai region in Japan is higher than that of Spain. Very different rationales produce waves of urbanization in Lagos or London, Shanghai or Tokyo, Mumbai or Paris, so our observations will be about cities in the developed world that are asserting themselves as suitable ecosystems for the economy and advanced technology.

* This paper is an updated version of a keynote address given by the author at the Leverhulme International Symposium at the London School of Economics in 2004.
The polarisation of wealth and power can be explained simply. When communication costs are high or very high, as was the case before the arrival of railroads, the world was composed of separate, closed compartments that reduced competition between firms. Spatial separation created monopoly-privilege rent-seeking and prevented economies of both scale and agglomeration for consumers and producers. Conversely, when the flow of goods and information improves, the positive effects of economies of scale and agglomeration appear in higher returns and agglomeration externalities. Cities’ growth processes show the considerable and most certainly underestimated power of technological and pecuniary (i.e. tied to price mechanisms) agglomeration externalities.

These basic agglomeration effects are relevant throughout many periods in history. This system is strongly reinforced by the specific characteristics of global competition and by the transition from price-based competition to a more complex trade pattern of non-price-based competition – one where quality, diversity and innovation in goods and services become the key factors of economic survival. Traditional distinctions between price-based competition and non-priced-based competition prove less and less evident in all but niche markets. Organizations that compete globally generally do not have a choice about competing for on price or on product/service differentiation, because they must compete for on both simultaneously. These changes in competitive profile result from the breaking down of traditional barriers that protected national oligopolies. The chief discovery, explicit or more frequently implicit, that organizations make concerns the strong feedback loop between quality and innovation-based competition on one hand, and agglomeration externalities on the other hand. Three driving forces reinforce the relationship: the increased mobility of differentiation; innovation and quality-based competition; and urban network effects.

Traditional competition, where natural and national barriers played a central role, is space-based by nature. The new world, where cities become leading economic actors, is a world of time-based competition. If an organization is less protected by space, it has to be faster and more responsive; it has to learn the rules of a new, more open game, and do so better and more quickly than in the past. The rules governing the distribution of innovations in production processes or goods illustrate this trend. There is no longer any place for the international product life cycle that the American economist, Raymond Vernon, described in the 1960s, where new goods and processes slowly migrated from the developed country where the product or process was invented (the United States) to Europe and then to developing countries as their level of standardisation increased. Today, new goods and production processes appear nearly simultaneously, although unequally, throughout the world.

These observations call forth two comments. The first addresses the famous controversy between economists about the effects of globalization and of technology on the changes that are underway in our societies, particularly labour markets. On
one side, the American economist Paul Krugman and the majority of his colleagues criticize the habitual over-estimation of the effects of internationalization. On the other side are those who focus on international trade and worldwide restructuring. Observing the phenomenon at work in organizations shows that there is a very tightly linked interaction between globalized competition and technological innovation – and not only for so-called “defensive” innovation in trade between developed and developing countries (Thoenig and Verdier 2003, 19-32; Wood 2004). Large cities’ economies play essential roles in this interaction, as places where experiments in both production and consumption can take place at the same time.

The second comment is that the classic distinction between new, emerging industries and mature industries should be reduced. The current interdependence between globalization and innovation affects nearly all activities. Old industries such as steel and automobile manufacturing have to innovate constantly, just as do new industries such as multimedia and biotechnology. Economic history shows the crucial impact of the territorial matrix during a new industry’s initial development phases, due to tacit knowledge and other analogous externalities. That remains true, but very large cities or “megacities” are not simply enormous clusters of technology parks, even if they often include them. The relationship between the metropolitan environment, quality and/or innovation-based competition and globalization defines a larger framework that includes manufacturing activities and mature service industries, inasmuch as they are involved in international competition.

CITIES’ ECONOMIES AS “SCHUMPETERIAN HUBS”

It is not possible to review the details of the economic mechanisms that underpin the growth of very large or even second-tier cities now expanding rapidly in Europe. Nor is it possible to list the many externalities related to these mechanisms: excellent work has been done in that field elsewhere (Fujita and Thisse 2002). There are many familiar “mantras” that do not really explain what is happening today and can therefore get in the way of a deeper analysis. Such is the case, for example, with the well-known concept of the “knowledge-based city.” What does the term mean? Wasn’t seventeenth- and eighteenth-century Paris, with its dense network of highly qualified luxury goods manufacturers and trades, already an urban economy based on knowledge and apprenticeship?

In today’s framework, modern developed cities reflect the Schumpeterian dimension of advanced economies and the systematic and relational nature of efficiency. To understand the current context, look at the dynamic aspects of agglomeration economies. Cities offer not only complementary assets, such as the inputs and outputs of a local production system’s structure and constant coordination between economic actors, but also the possibility of quickly and effectively reorganizing networks and value chains. Cities are powerful hubs that allow chains between producers,
consumers and other social participants (such as universities) to be created and reconfigured constantly.

Cities accelerate the process of exploring possibilities and putting previously unconnected actors in touch with each other: this is the basis of growth in a Schumpeterian environment. In fact, megacities are laboratories for new products, services and lifestyles for consumer markets. In this sense, today’s physical agglomeration is probably less pertinent for the supply of diversified goods and services than during earlier phases of development: the Internet and modern commercial logistics provide access nearly everywhere to a highly diverse level of goods and services. However, megacities still provide an essential framework for the process of creating the most advanced forms of consumption, before goods and services enter into production and mass distribution.

Next, the size of labour markets is a competitive advantage for cities. Recent data indicate that relatively weak variations in employment levels hide very high degrees of job creation and destruction within a constant and relatively broad process of employment turnover. From annual increases or decreases in total job supply that vary between 1% or 2%, it is estimated that about 15% of the jobs are created or destroyed during the same period: this figure remains fairly constant in all developed countries, surprisingly so in fact (Cahuc and Zylberberg 2004; Davis and Haltiwanger 1999). The key variables in labour market efficiency are the quality of the adjustments made and the search process between job seekers and employers. Thus, it is easy to understand why large, accessible labour markets, where one does not have to move house for a new job, facilitate the search process. A readily accessible job pool for urban residents depends crucially on the quality of the city’s transportation system, a key factor in urban dynamism.

Finally, we note that competitiveness is no longer simply a matter of intensifying traditional work and productivity effects (Veltz 1996, 2000). Efficiency depends less and less on the simple division of labour, which is and has been the main engine of productivity for ages, and more on the quality of cooperation processes. These processes involve several actors who share common goals and who depend on information exchanges and the ability to synchronize their tasks. Only a small portion of these cooperation processes can be standardized or mechanized. Criteria such as innovation or the quality of goods and services, or the reliability of sophisticated means of production – an essential factor for the productivity of capital – fundamentally depend on the quality of formal and informal communication between various actors in the value chain. The various components of an organization require high-quality cooperation: between the organization and its suppliers and clients; between product or service engineering, production, marketing and other functions; and between the organization and its overall environment. From this perspective, cities are the principal source of networked relationships feeding these open processes of coordination. The essential point is central command or even market forces do not
suffice to put these open cooperation processes into place. Cities provide numerous kinds of network effects. In this context, producers progressively moving from an organizational pyramid based on a hierarchy to flatter structures shaped by networks find a direct echo in the urban context: megacities provide a suitable ecosystem for the continuous restructuring of such networks.

These three dynamics – city-laboratory, city-labour market and city-network – are the products of short-term adjustments, even as they rely on lasting mechanisms – in particular, social capital, confidence, shared culture and tacit knowledge. Cities, especially the largest ones, also provide another kind of flexibility, a source of insurance. From a chief executive’s point of view, choosing an urban location for his or her company requires the least risk with the most potential for opportunities. Compared to a small town, a big city provides easier and faster access to needed skills – including ones that are yet unknown – and probably makes it easier to leave the area without paying high exit costs, whether financial, social or political. The same is equally true for individuals and households.

Let us look at the issue of face-to-face contacts. There is no automatic link between such contacts and the resurgence of cities. People do not congregate in cities simply to facilitate face-to-face contacts. In-person discussions are easier in an urban setting, but many other factors combine to create the interlinked, “hub economy” described earlier. The ability to reconfigure value chains constantly and flexibly, to improve efficiencies in all kinds of research processes, and to reduce the number of irreversible choices in the setting up of new offices or plants, are all powerful vectors of urban growth that do not depend on face-to-face contact. In fact, mobile phones and email are certainly an urban economy’s most powerful technological tools.

**THE “ARCHIPELAGO ECONOMY”**

Concentrations that benefit large cities are not only a local phenomenon, nor a combination of local phenomena. The trend is part of a global reworking of the spatial framework of developed societies. A succinct metaphor for this new framework is the archipelago (Veltz 1996). This view resembles the description proposed by Allen J. Scott (1997) and Michael Storper (1997). It differs, however, from Manuel Castells’ view (1996), which describes the “rise of the networked society” and puts a greater emphasis on technology as a vector for change.

The emerging structure breaks even further from the traditional organizational tree hierarchy (where successively higher levels oversee successively lower levels), still at the heart of most institutional and political organizations. Relationships between actors, whether commercial, social or political, are strongest when the distances are shortest. Braudel’s world-view posits an enormous base at one extreme, made up of the proximate community’s economy with its large share of subsistence activity. In the middle, one finds the local market economy, regionally-based but becoming increasingly national. At the other end, there is long-distance trade, which has structural importance but very thin flows. These different levels are organized entirely according to a hierarchy based on distance.
However, Braudel’s world no longer exists! The local level and the global level are mostly interconnected everywhere. Distance is no longer relevant to the strength or frequency of contacts. It is difficult to determine “natural” levels of subordinates in organizational structures and in policy formulations – even if the European Union has attempted to make “subordination” a key concept in its own structure.

The global economy’s worldwide network is increasingly a horizontal network, one linking its principal hubs and nodes. Vertical and hierarchical links become less important. According to the numbers we have on varied flow types, flows between the largest core centres are increasing more rapidly than other types. Broadly speaking, two major models of spatial organization can be distinguished. The first is the network of cities that played a major role in Florence and Flanders during the Middle Ages, as well as in many other regions and periods of economic history. For example, colonial trading posts or the boating and shipping centres of ancient Greek cities follow this model, in which total territorial control was not essential.

The second model is one of “territorial economies,” which seek extensive and complete control over vast continental areas. This model is central to the difficult birth of unified states, but not necessarily of nation-states, such as those created in Europe by the French and Spanish monarchies. In France, the Ancien Régime appears to be a pure example of a “territorial economy” because it deployed centralized power over a vast area where transportation was difficult, but in fact, the situation was more complex (Fox 1971).

Is the contemporary trend a revenge of the first model, of the network of cities? It is, in a sense, but it is worth emphasising that today’s networks of cities differ fundamentally from ancient ones. It is not possible to understand them without taking into account the major role played by states. Despite increasing cross-border flows and despite stronger and denser transnational relationships, such networks are still very much embedded in state-based structures and regulations. Networks of cities are not going to replace the mosaic of nation-states forming our basic architecture in the near future. They will mingle increasingly with former structures, disturbing the states-based organization at the same time they reinforce it.

**NETWORKS OF CITIES ARE NOT GOING TO REPLACE THE MOSAIC OF NATION-STATES**

**PERIPHERIES BECOME AN INCREASING BURDEN, EVEN IN EUROPE**

A crucial phenomenon is the weakening of links between the urban hubs and the hinterlands, between the cores and the peripheries. This hypothesis seems paradoxical. Modern “new economic geography” pushes core-periphery models. Yet the needs of the formal theory and those of the real world can differ. It is easy to understand that in many cases, the traditional functions of the peripheries and the traditional links between core and non-core spaces have become obsolete. The provisioning of large cities, once so important, is no longer a relevant territorial issue, and more a problem solved by global logistics networks. The unskilled labour that used to be the basic commodity of peripheries is not needed in advanced economies. On the
contrary, the poor areas surrounding large cities appear as a burden for the rich regions that constitute urban cores. In short, the rich no longer need poor people.

Some authors, such as the Japanese corporate strategist Kenishi Ohmae, have made this theoretical argument. He emphasizes the success of region-states or city-states such as Singapore, a case that fascinates him: Singapore’s competitive advantage comes from its freedom from the weight of subsidized agriculture and a corrupt state bureaucracy (Ohmae 1996). Likewise, the economic performance of small countries is remarkable – for example, of Ireland and Denmark in Europe. They have powerful advantages: strong social and institutional cohesion, low transaction costs and a small-scale, transparent redistribution system. Their macro-economic tools are also efficient. For example, if these countries opt for a fiscal policy designed to attract foreign investment, the policy will have a far greater impact than in larger countries, where foreign investment effects must coexist within a much larger domestic market.

On the other hand, several economists draw attention to what is called “the curse of mid-sized countries” that have neither the advantages of a small landmass nor the advantages of a large, structured domestic market, such as that of the United States. Regarding large but structurally weak empires, one can wonder about the value (other than natural resources) added by the vast hinterlands that threaten the booming cities of Moscow or Shanghai. Peripheries are an increasing burden even in Europe, and not only in Italy. Ethical questions aside, it is difficult to predict whether the increasing selfishness of core regions will be politically tenable or not.

Today’s networks of cities differ greatly from those of ancient times in that they do not connect clearly identified collectives or interest groups, but consist instead of interconnected and complex webs, with cross-functional supply chains and social and intellectual communities spread across the world. They form nodes in distributed networks rather than high points on a graph. Socrates compared Greek cities to a gathering of frogs around a pond. However, each frog was an individual and could fully compete or cooperate with the other frogs. In the networks of the Middle Ages, the dominant players were merchant groups who mixed competitiveness with cooperation in a sort of “co-opetition.” They glorified local citizenship and created wealth via “superprofits” or extra surplus-value, extracted from maintaining power over space, through high communication costs and risks linked to their long-distance operations.

Today, the main players in consolidation are multinationals, business groups and transnational scientific groups who operate in stable and homogenous environments, or who endeavour to create such environments across the globe. They do not extract wealth and power by capitalizing on large differentials in capacity between various parts of the world, but rather from their ability to create controlled networks composed of homogenous places. Such places often seem to be islands within their local environment, hosting standardized operations as well as open,
creative processes. The academic archipelago of university campuses provides an apt illustration. In the world of manufacturing, differences in productivity occur not so much between countries as between the components of leading supply chains and other supply chains, wherever they might be located. Naturally, this is only a trend: transnational organizations and communities continue to have local touch points and preferred local partners, although transversal systems detached from purely local ones are growing rapidly.

Regardless, the cross-functional logic, whether formal or informal, has rapidly gained ground. Consequently, it is more difficult to identify local collectives comparable to the “urban bourgeoisie” of the past, especially in the biggest cities. Even in “world cities,” or those deemed to be important nodes in the global economic system, such as New York, Tokyo, London and others, there is a growing gap between ordinary people attached to a local identity and the main engines of a cosmopolitan society.

CITIES AND ENERGY, AND CLIMATE CHALLENGES

For the last several years, questions about energy, climate and global public goods have invaded debates about the future of cities and urban public policy. The spectacular growth of Asian cities, especially Chinese and Indian ones where most of the next few decades’ population growth will live, appears as a central issue in the fight against climate change. As a matter of fact, the consequences for the planet will be very different depending on whether these cities choose a development model that resembles Europe’s, with compact cities that use relatively little energy, or the North American model of energy-intensive sprawling. That said, two other truths bear remembering. First, the urban built environment is more energy-efficient than non-urban environments that are spatially dispersed. If cities have a high concentration of greenhouse gas emissions, it is very simply because they have a high concentration of human activities. They allow for economies of scale and energy concentration that non-urban environments cannot duplicate. Even in the United States’ most sprawling cities, per-person emissions levels remain lower than those of the entire country on average. Second, city politicians in developing countries will remain under pressure to propose new solutions for basic service access, e.g. water, transportation, housing and sanitation, for reasons that will primarily be social and political rather than environmental. Fortunately, in most cases, solutions that lean toward social sustainability also carry positive environmental effects, although this does not

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1. Global public goods are non-excludable and non-rivalrous goods, which means, respectively, that consumption of the good by one individual does not reduce availability of the good for consumption by others; and that no one can be effectively excluded from using the good, whose benefits reach across borders, generations and population groups. Examples include clean air, health, and the absence of armed conflict and pandemics.
hold in every case. Thus in developed cities, many beneficial improvements in energy use or climate concerns may bring high extra costs, which makes them acceptable or even fashionable for the middle and upper classes. However, such improvements may penalize the working class who are relegated to poorly equipped and poorly served suburbs. Managing these incongruities will probably often prove difficult. Finally, in the urban field we note the lack of motivational mechanisms such as carbon offset markets. An industrialist in a developing country who improves his processes could benefit from such encouragements, but that will not be the case for a mayor who invests in reducing automobile use in favour of mass transit (Giraud and Lefèvre 2006).

**CITY VERSUS STATE AND PUBLIC POLICY ISSUES**

Let us conclude this brief analysis with a few remarks directed at European cities and public policy. As the French sociologist and political scientist Patrick Le Galès (2003) has clearly stated, the dynamics of European cities remain closely linked to state mechanisms, especially the welfare state. It is stupid to pit nation states and cities (or city regions) against one another, because they share a history and destiny. However legitimate city governments’ demands for greater autonomy, their boastful declarations of independence are absurd, inasmuch as they ignore the high number of industries and jobs directly or indirectly depending on the national public sector and/or national transfer payments. The number of state-dependent industries and jobs is substantial in all cities, especially second-tier cities. The French economist Laurent Davezies (2008) has compiled figures showing that an enormous share of the activity in French provincial county seats does not come from private market mechanisms.

On the other hand, Paris is the most “private” city in France, despite the renowned centralization of its public administration. Paris’ economy thus depends more heavily on the international situation. However, even in the Paris metropolitan area, a large share of non-commercial revenues and activities are linked to the French state. These state-related activities and revenues serve as a kind of shock absorber that hardly exists in America or Asia. Like Janus, European cities have two faces. On one side, they have been driven historically by an economy based on flexibility; on the other side, they remain deeply anchored in a shock-absorbing state welfare system. The latter probably gives them a real competitive advantage compared to cities that rely only on flexibility, as long as there is a balanced mix of the two forces. European cities are – or could be, or should be – the preferred laboratories for experimenting with needed public-sector reforms, as well as for new alliances between public and private actors. They already offer a diversified and unique range of public-private partnership experiments, rich with lessons for urban and mass services. This component of their makeup should be recognized for the huge competitive advantage it is, rather than something to dismantle for ideological reasons.
CONCLUSION

Let us look for a moment at the policies that will ensure the economic and social success of our cities, even if that is not the main subject here. As we said earlier, prosperous cities are those where market-oriented dynamism best captures social externalities and effects linked to non-commercial interdependencies, such as “milieu effects” or those of the immediate environment. In these cases, the fluidity of market relationships integrates with enduring social structures, providing non-physical goods such as mutual confidence, tacit knowledge and an acceleration in the collective apprenticeship process. Relevant polices will aim fundamentally to consolidate this non-physical infrastructure. Physical infrastructure remains important as the *sine qua non* of development, but these non-physical assets are more crucial still. The determining factors for success include the ability to foster cooperation between organizations; improving the quality of coordination between institutions; production values, expectations and shared projects; and, at the end of the day, increasing the quality of public and private governance. Resources essential for development are socially constructed, rather than conferred by nature or geography. Decreasing communication costs will relativize traditional parameters for geographic location. As social and political actors, cities are responsible for their own success or their failure.

Another important consideration is that territorial marketing should not become the be-all and end-all of development policy. Many cities, especially those facing financial difficulties, are obsessed with finding outside investors and are ready to do whatever it takes to attract them, usually using tax incentives. However, such cities tend to forget three basic rules. First, success or failure in creating jobs depends most on the health of local businesses (Chesire and Gordon 1998). Consequently, it is often more profitable to monitor trends closely and to seize risks and opportunities within the local economy than to try to attract new investors. Second, cities strangely persist in making costs their central strategic tenet, while competition in our countries’ economies now depends not only on price, but rather on quality and innovation. Cities’ decisive competitive advantages are far more sophisticated and complex. What is more, they must differentiate their objectives and strategies, resolutely refusing to opt for narrow specialization. Third, as the British scholars Ian Gordon and Paul Cheshire (1998) also stress, it is imperative to find the right scale for development policies: unfortunately, local policies too often limit themselves to a zero sum game between different areas, different actors and different interests within the same city.

Finally, it is worth strongly stressing a profound change that may prove decisive for new trends in the worldwide geographic-economy. Increasingly, personal mobility prevails over the mobility of capital. In the short term, the choice of location appears to be a structural issue. However, in the medium term, individuals’ choice of residence at the national and international scales – especially those workers with the most resources, skills and entrepreneurial capacity – ultimately determines the...
geography of work. Developments in communication technologies permit an even greater choice of location and accentuate this phenomenon. International communities of scientists or engineers become conduits for the distribution of technologies and development – as important in this respect, if not more important, than multinational firms (Saxenian 2006). Thus, it becomes more strategic for cities to attract talent than to attract capital. Policies to develop urban amenities, quality of life and cultural interests therefore directly affect urban economic policies. Cities always need companies to grow. Yet increasingly, companies need cities to attract and retain the best-performing employees.

WORKS CITED


International investment funds have a growing interest in emerging metropolitan areas such as Mexico City and Bangalore, where the pace of development seems to augur well for significant quick profits. International property investments follow real estate sector strategies and rankings created by property consultants, but still need local intermediaries for information and assistance. The kind of urban development that results from these investments reflects both international and local influences.

**“WORLD CLASS” CITIES: HUBS OF GLOBALIZATION AND HIGH FINANCE**

In terms of magnitude, shape and implications for sustainability, the articulation or interaction between economic and financial systems and the actual built environment of cities remains largely unknown. This chapter will examine the process of materially producing and re-producing urban spaces. The cities of Bangalore in India and Greater Mexico City in Mexico will serve as two points from which to observe contemporary economic and political transformations (Box 1). Both cities are bound up with the economic globalization of the 1990s, through their particular positions in the new, global division of labour – information technology services in Bangalore and the populous business and logistics centre of Greater Mexico City – and because of their status as beachheads for access to fast-growing “emerging markets.” According to international real estate consultants, both cities are “opportunity spaces” for local and especially international investors seeking to profit from the strong demand for the development of urban areas and their infrastructure, equipment and real estate. We will discuss how a more globalized and more “financialized” form of capitalism increasingly shapes the built environment, landscapes and spatial organization of cities in emerging market countries.

By “financialization,” we mean the process of evaluating and managing real estate investments through the same types of financial tools that investors use to evaluate stocks and bonds (Orléan 1999). Using Bangalore and Greater Mexico City

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1. Greater Mexico City refers to the Metropolitan Area of the Valley of Mexico (Zona Metropolitana del Valle de México) an agglomeration that incorporates 59 municipalities in three states: the Federal District, the State of Mexico and the State of Hidalgo.
as examples, we set out to examine the mechanisms by which international capital flows are “fixed” (Harvey 1985) or “land” (Torrance 2008) in urban regions and, by doing so, modify the regions’ spatial organization and landscapes. We will analyse the role of investors who, whether in tandem or in competition with other public and private investors (such as developers, business tenants, individuals or local and national governments) contribute to the material development of metropolises. The chapter thus first discusses how financialization may have effects on all levels of the urban environment, from its physical shape to the evolution of a city’s governance, and is thus central to an analysis of sustainable development.

That said, by taking a closer look at Bangalore and Greater Mexico City, we intend to dispute the conventional wisdom that international real estate investors act independently and with the same facility that they apply to stock marketing investing. Rather, urban societies affect investors’ strategies by making possible the

BOX 1  BANGALORE AND GREATER MEXICO CITY: BECOMING GLOBALIZED CITIES

Greater Mexico City in Mexico, and Bangalore, India, are fast-growing economic beachheads to their countries. Bangalore’s population grew from 4 to 6.5 million inhabitants in the last fifteen years and to a projected 8 million in 2010. The growth is based on high employment rates for skilled labour, moderate salaries and the internationalization of the software industry since the 1990s (Parthasarathy 2004), as well as for outsourced information services, such as call centres, teletranscription, business processes, etc., and since the 2000s, certain high-tech activities such as research and development and biotechnology. This mode of development has created wealth that, through a trickle-down process, can be seen optimistically as benefiting a large part of the local population. The growth model is probably not as inclusive as all that, and feeds strong tensions in the metropolitan area (A. Halbert and L. Halbert 2007). In particular, there is competition for land between salaried technology workers in “globalized” economic sectors and citizens of poor or modest means who work as bureaucrats, shopkeepers and artisans, or in services and light industry (Benjamin 2000). The urban region’s attractiveness for both qualified workers and poor migrants energizes the whole, despite numerous criticisms from all sides against rampant urbanization – conflicts that the local public authorities and the Karnataka State have a difficult time managing.

The result is a transformation of the metropolitan region’s spatial organization (Figure 1). Bangalore’s historical layout, where densely populated working class neighbourhoods adjoined the government’s administrative district and the bungalow city left over from the British encampment (now renovated into the Central Business District), has been totally reconfigured by dynamics that combine multiple business clusters and sprawl. Where military and State enterprise claims over the land kept the early population sparse, the city has now become a sprawling metropolis that stretches out 30 to 50 kilometres at its rural edges. There are also new “modern” business clusters emerging: because of competition for land, the cluster around the M.G. Road has grown denser, and the secondary cluster of Koramangala is expanding, whilst new business centres emerge on the periphery of the city around business parks and shopping malls. The 2000s have witnessed the building of several dozen kilometres of high-tech-oriented-zones, ranging from additional development for Electronic City in the southeast to Whitefield in the east, with its emblematic International Technology Park, Ltd., developed by Karnataka State and the Singaporean investor, Ascendas (A. Halbert and L. Halbert 2008). Other recent dynamics, such as the opening of a new international airport 50 miles to the north of the metropolitan area, or development projects for five new private cities around Bangalore, reinforce their “multipolar” spatial character, i.e. their organization around several centres of activity. Land competition forces the “local productive economies” (including light manufacturing such as textiles, the factories inherited from the Socialist era, as well as the informal economy) and their workers to move to peripheral areas. This produces a break-up of agglomeration economies that cannot be reproduced over a scattered area (Benjamin 2004).

The metropolitan area of the Valley...
integration of international capital in real estate projects. In this process, which we call “commutation,” local urban societies have a direct influence on the practices investors use to access the metropolitan territory they covet. In other words, governments and local societies have an unrealized power over international investors because the investors need to negotiate their place at the table with other international, national and regional actors – those who have local relationships and expertise, and who are part of social networks essential to doing business.

**THE INCREASING POWER OF INTERNATIONAL INVESTORS**

From the 1980s to the current and probably temporary slowdown due to the financial crisis, international investors have had ever-increasing amounts of capital to invest. A share of these funds was placed in so-called “alternative” investments, such as real estate, to diversify portfolios. Fund managers increased the number of

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1 The term “megalopolization” was coined in 1957 by the French geographer Jean Gottmann to describe the emerging city-region that today stretches from Boston to Washington D.C. The term now refers to a vast urban region made up of several metropolitan areas that are interconnected by dense road networks and functional relationships.

2 According to the OECD (2004), in 2001-2003, 75% of jobs in Mexico were service-related, of which a third were considered “informal,” i.e. without secure employment contracts, worker’s benefits, social protection or workers’ representation.
FIGURE 1  BANGALORE: A “MULTIPOLAR” METROPOLIS

Bangalore Metropolitan Area (India)

Urban Morphology
- Dense indigenous city
- High-end residential neighbourhoods
- Mixed areas (dense housing and light industry)
- Low-density areas under transformation and low-density urban fringes
- Satellite towns
- Government area (including Military area)

Major activity hubs
- Central commercial and business districts
- Administrative district
- Hi-tech zone
- Industrial zones
- Large roads
- Intra-urban green belt, Forests and farmland

Sources: based on a map compiled by L. Halbert and H. Rouanet; Bangalore Revised Master Plan 2015 (2007); C. Didelon (2003); A. Varrel (2008); Bangalore City Map Book Eicher (2005); Aranya (2008).
locales acceptable for investment to spread geographic risk and profit from growth in emerging markets.

Since the 1990s, observers have noted an increase and acceleration in investment flows into the construction of infrastructure and urban services in general, and in commercial real estate in particular (Figures 3 and 4).

Financial services companies, such as banks, insurance companies, mutual companies, pension funds, hedge funds and private equity companies, collect huge amounts of capital of their own and from third parties, which they invest in infrastructure and real estate projects. The funds are smaller than those invested in the largest stock markets, but are potentially very large in terms of the cities where they are invested. The financial institutions have become major actors, in the style of the
Swiss pension funds that increased investments in the Swiss real estate market and are the primary holders of national real estate assets (Theurillat et al 2006). International capital flows are made possible through the liberalization of investments. They have stepped up, in particular, with governments’ frequent recourse to public-private partnerships, where private investment is used to finance urban development and the management of equipment, infrastructure and networked services.

Emerging market countries are not to be outdone, given their great need for financing urban development. The participation of certain metropolitan regions in the re-deployment of international value chains, e.g. the export assembly factories in Mexico, the IT industrial parks in India, the factory workshops of China, and the Russian and Eastern European engineering firms – comes about because of and in support of international investors. The partial abandonment of protectionist policies after 1990s in favour of policies of “opening” has thus transformed some terms of producing urban spaces in these countries.
BEYOND GLOBAL VALUE CHAINS TO GLOBAL INVESTMENT RISK MANAGEMENT

The dynamics that led to “the city being seized by financial interests” (Renard 2008) are linked in part to the global fragmentation of production activities. Outsourcing and global supply chain management by multinationals, and the participation of regional businesses in long distance trade, have fed a demand for infrastructure and specially-adapted buildings and office parks. The existence and quality of infrastructure is a determining factor in a territory’s ability to participate in the globalization of production.

In the case of commercial real estate in newly opened countries such as South Africa, Brazil, India and Mexico, the entire value chain and local and national investment were turned upside down. This is partially because of multinational companies setting up offices in the largest cities of the world: cities drew international investors that fabricated the office buildings they needed, which the investors very often rented to their peers. When the retail chain Walmart opened 180 stores in Mexico in 2008 and projected opening more than 250 stores for 2009, a whole set of specialist real estate developers found a rich vein to mine. Such is the case for Mexico Retail Properties (MRP), which was created in 2003 by two North-American based real estate investment companies, Equity International Properties (EIP) and Black Creek Group, and which develops shopping centres almost exclusively around Walmart group stores, including Aurrera, Suburbia, Sam’s Club and Superama.

The increase in international real estate investments also results from the portfolio management strategies of fund owners. True to Markowitz’ (1959) portfolio diversification theory, for example, fund managers spread their investments between locations with complementary characteristics, which brings together infrastructure and equipment that are geographically very far apart but are evaluated and managed in a very similar way (Torrance 2008).

EIP does nothing else once finance capital has been gathered from financial institutions (banks, insurance companies and pension funds) and invested for third parties in funds where the principle features are defined by contract. Generally speaking, an investor relying on this type of real estate investment company commits his capital for a specific amount of time, whether five, ten or fifteen years; for a risk level, i.e. core, value-added, or other targeted return; and very often for a type of building or infrastructure, as well as a targeted geographic location or locations. For EIP, the first fund that opened in 1999 focused mainly on Latin America and acquired minority shares in real estate companies according to three classifications: by country, such as Mexico or Brazil; by type of property, such as industrial, residential, commercial, or hospitality; and by type of activity, i.e. development, construction or financing. The two follow-on funds were extended to include Asia, the Middle East and Europe.

International investors are implicated to a greater degree in the reproduction of cities that they help finance and in which they hold a “piece of the action” or a share in a building or part of a city. These investors “financialize” the city to the extent that they apply tools that guide their investment decisions in terms of the production and
holding of buildings, infrastructure and urban equipment. For example, N. Aveline-Dubach (2008) writes: “With global finance, real estate has been financialized and has become an investment vehicle like any other financial asset. The real estate industry has adapted to this changing situation, inventing new forms of investment such as real estate securitization (transformation a real estate portfolio into financial stocks) and by borrowing analytical tools from finance.” (Aveline-Dubach 2008: 7)

Meanwhile, the territory does not function as a simple receptacle of external financial systems. Certainly, real estate fund managers have adopted so-called “dynamic” management methods, which, according to them, depend on three things: (1) the constant search for investment opportunities; (2) re-investment in assets held to increase rental returns; and (3) a policy of “dynamic arbitrage” at the time of sale. To some extent, investment managers scrutinize the city on a quarterly basis (Clark 2000). However, if international investors are increasingly important for financing of real estate projects, it is only because urban societies enable them to be, and in doing so, participate in the shaping of the international investors' strategies.

THE FINANCIALIZATION OF CITIES IS A PROCESS OF “COMMUTATION”

Even if it can be said that the arrival of international investors “financializes” property development, the current dynamic can be analysed more accurately as a “commutation” process (Halbert, Rutherford 2008), in which various actors participate in long distance networks that circulate international capital until it reaches the built environment. Looking at the actual form of investments helps explain the relationship between the deployment of a more financialized capitalism and the process of creating a metropolitan area. In Greater Mexico City as in Bangalore, whether directly (through one or more properties), or indirectly (through holding shares in a real estate investment trust or in land), fund managers need to negotiate with the resource holders who can interconnect the financial systems with the urban territory: that interconnection is a function of commutation.

LOCAL INTERMEDIARIES PREPARE THE TERRAIN

Commutation implies friction between different spheres of activity, such as finance, property, buildings, regulations, etc., and different scales, from a single building site to the distant office of a given investor. The deployment of new structured investment products and other practices by institutional investors only becomes possible when agents in the targeted territories make themselves capable of collaborating with international investors. This is because of the limited liquidity² of property markets and

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² A market is said to be liquid when its products can be traded rapidly, which depends on the volume of transactions. Property markets are considered to be relatively illiquid because of transaction costs and construction delays. Their financialization tends to increase property markets' liquidity through the creation of publicly traded property companies, the development of transparent information, comparative indicators and the construction of standardized buildings.
their relative opacity\(^3\) (Clark and O’Connor 1998), particularly in emerging-market cities where lack of tracking tools and studies limits information access.

For example, Cuautitlán Izcalli’s logistics corridor north of Greater Mexico City has become very desirable to investors since 2000. In the 1990s, national developers built several logistics parks along its main highway. In turn, Walmart and other well-known multinational companies set up their logistics centres along the road. Following on the interest of the multinationals, international investors came to the Greater Mexico City region at the beginning of the 2000s and saw the municipality of Cuautitlán Izcalli as an investment opportunity. However, much of the land was part of the ejidos\(^4\) system of cooperative agricultural land, held in common tenancy by rural families and passed down through generations. While the privatization and sale of such land has been authorized since 1994, the procedure for getting unanimous agreement from a community of owners is long and complex. After working on it for more than a year, a small developer was able to set up an agreement with one such community to put its land up for sale and offer it to international investors. This developer facilitated the articulation between financial and other constraints related to the real estate market in specific locales. This example shows how diverse resources from more or less formal organizations can be mobilized by individuals who use their social networks, their personal knowledge and survey the metropolitan region to identify saleable land and clients.

Putting sufficiently large land parcels together requires knowledge that only local specialists possess, particularly in countries where land titles are often contested. Local specialists can obtain cooperation from the owners – sometimes by force – and the clearing of titles and usages rights from local authorities. In political and administrative systems where economic agents openly acknowledge corruption, local intermediation is crucial to attract institutional investors who are less inclined to get involved in such arrangements. In all, no matter the extent of the investors’ globalization, the capital that has been collected on international markets can only effectively “land” on a given real estate project after testing the territory and negotiating with the organizations/individuals that control the targeted territory. This requires facilitators who provide valuable site-specific information and reduce entry costs.

**LOCAL FACILITATOR IS KEY**

How the facilitator works can be illustrated by looking at a manager working in a large developer’s land management office in Bangalore. His life story shows the importance of having a Rolodex of contacts and being part of a local metropolitan

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3. The opacity reflects the private and specific nature of information related to a given property transaction, which makes it difficult to compare with similar goods. Opacity is often a comparative advantage for the party that possesses this private property-specific knowledge.

4. The ejidos or cooperative land system was created after the 1910 Mexican Revolution as part of a movement to restore land to Mexican peasants.
company. The manager comes from a Bangalorian family whose business was pharmaceuticals distribution. In the early 1990s, he started two businesses, using his family’s network with varied success. Benefiting from his Rolodex, he went into real estate just as it was going through its first boom years in the second half of the decade. Known for his entrepreneurial qualities, the manager made the most of his connections to property owners, politicians and local businessmen, which allowed him to identify real estate opportunities: “I know a lot of landowners from Bangalore. I have a very large network of friends, who go back to grade school, my career as a businessman, and now my new job here (at the property company). I’ve met people in very different social circles and kept up good relationships with businessmen and landowners...

Everyone has political connections today, there’s no doubt about that, everyone is very well-connected. It’s a small world, really. It’s necessary if you want the powers that be to move our business ahead. It’s about that simple, in fact: I know you and I can use your resources so you can get something for me. If you are well connected politically, so much the better – I can take advantage of your resources. All of that is important because some of the landowners are politicians. It’s not the case for the majority of our transactions, but it happens sometimes. And then, often we buy land from the public authorities... in such a way that our contacts are very valuable. For example, when we go to a minister and we have to ask for an authorisation for, let’s say, so much land, and we ask someone to please have a look at the file nicely, please, and to try to do what he can to move it ahead...

Money is everywhere in this world...there is money made by everyone in real estate. But that’s not all, it’s also a question of contacts. It’s your ability to use the tried and true services of people you know that matters for doing business.” (Source: Authors’ interview in Bangalore on 5 March 2008).

WHOSE WORLD-CITIES ARE THEY?

International institutional investors concentrate the majority of real estate investment in the major cities of industrialized countries and emerging markets. International real estate consultancies, such as CB Richard Ellis (CBRE), reveal an especially selective geography: according to the depth of the analysis, the “useful” world for real estate investors is reduced to a few hundred, or even just a “Global 50” cities (Figure 5). This “geography of opportunities” is very selective, and when investors become interested in second- or third-tier cities like Mysore and Mangalore in India, or Lyon and Marseilles in France, it is for the purpose of diversification. The “useful” world thus appears as a hierarchy between places that are evaluated according to risk diversification strategies.

The investors’ rationale is to select spaces that have sufficiently large market volume to be relatively liquid. These sites also need to have an international-standard real estate consultancy industry and national legislation that favours property investments. Taken together, the criteria create a sort of “herd mentality” or tendency to copy extant strategies that some observers attribute to investors using the same
comparison tools and data (Henneberry and Roberts 2008). Spatial concentration of investments therefore results from the process of commutation, whereby international investors can decide to invest only if and where actors and tools permit it (such as CBRE’s reports, legal authorisations, etc.), as much as it is a product of contemporary agglomeration economies.

Take the case of Bangalore’s metropolitan area. There has been an exponential growth in the demand for modern commercial real estate, despite two downward cycles during the crises of the late 1990s and 2008-09. Bangalore is regularly cited as one of the top five cities in the world in terms of having the most square metres of commercial space, alongside London and New York. Traditionally, development was supported by partnerships between the local land-owning notables and regional developers, using bank credit. International investors who have taken advantage of the opening of India’s borders since 2005 have also financed the most recent real estate projects. They prefer certain neighbourhoods, such as the central business district near M.G. Road or Koramangala, and smaller business centres, particularly in the southeast quadrant that links the two big high-tech parks, Electronic City and Whitefield (Figure 1).

The herd mentality of international investors also shows in their choice of projects. Buildings developed with international funds follow so-called “international” standards and tend to be very large projects because of the large amount of capital funding available. In Bangalore, the preferred projects are those that offer very high internal rates of return of around 25%, and are all five-star hotels, class A office buildings or office parks for prestigious tenant companies. In the wording of the marketing brochures, we find ourselves in “world-class” cities.

**FINANCIALIZATION AND THE FABRICATION OF TWO-TIERED CITIES**

The developers who partner with property investment funds are often asked to change the way they work to collaborate with both the local real estate industry and the fund manager. They must produce comprehensive information about their company, their past activities, their financial situation, etc. They must also be capable of following the steps of property investing, of calculating and evaluating the criteria that the fund managers take into account when determining the interest of a project. In the case of Greater Mexico City, real estate development companies rush to find professionals who speak fluent English and who understand finance. Through the typology of buildings in which international investors invest, new “international” property standards spread to local real estate markets.

This dynamic affects the whole industry. The criteria for quality and security promulgated by so-called “institutional” developers working with international finance capital quickly become the reference points for all other market participants.
The buildings produced meet the needs of only the most creditworthy regional purchasers or renters. Businesses with lesser purchasing power, slow-growing local industries or the informal sector have no option other than looking to other investors to finance the space needed, or, in many cases, suffer the consequences of a competition for land that is lost before it starts. Thus the process favours a highly selective roster of “useful” places, and leaves aside a great number of urban areas that do not benefit from “global” capital accumulation (Harvey 1982): the precarious workers’ encampments that spread out beneath highrises, or working-class neighbourhoods far from the beaten tracks of the financialized city. In Bangalore, real estate developers and investment companies have produced a city of swimming pools in condominiums within a city where 800 low-income families must share one water source (A. Halbert and L. Halbert 2008); a city where air conditioners run off their own generators within a city with chaotic cuts in electrical service.

In the last five years, developers and investors seeking a “green” brand for themselves led a trend toward a certain kind of “sustainable development,” based on buildings that were supposed to be more respectful of the environment during their construction phase and active lifetime (I. Nappi-Choulet 2009). The “green” image is still largely conceived as being about (predominantly) technological choices aimed at environmental preservation, rather than being aimed at any of the economic or social objectives of sustainable urban development.

The regional political and economic dynamics have also changed. The arrival of international finance capital allows certain market participants to gain influence over the real estate industry and in the political arena. The well-established real estate industry developers and advisors in Bangalore had a strong influence on redrawing the lines of governance for the metropolitan region, notably by publishing their positions in the press (A. Halbert and L. Halbert 2007). In Mexico, the battle for transparency reinforces power struggles. On one side, international institutions that a priori lack local social contacts fight for a better information flow to facilitate the rapid development of the international market. On the other side, the (usually) local actors, especially certain entrepreneurs and politicians, try to maintain their position by limiting the circulation of information – their fundamental comparative advantage within traditional social and economic systems. Thus while “growth coalitions” can have an effect on the built environment of these metropolitan regions, the points of convergence follow relatively variable lines that do not systematically invite participation by international investors. The hackneyed local power struggles behind the fabrication of a city repeat themselves yet again with the arrival of international investors, even if the nature of the resulting game is not predetermined, especially because of the location-specific factors affecting the commutation process of international real estate investment.
CONCLUSION

It may be appropriate for cities to leverage international investors to finance urban development in the name of economic development – particularly because of the way urban regions must adapt to the needs of potentially very mobile companies. It may be appropriate even in a capitalist system, because of the urgent investment needs of fund managers who contribute to collective functions, such as insurance and retirement pensions, etc. And finally, this leverage may assist urban regions facing reduced funding from national and local governments. However, the question of spatial organization, of regulation and the negotiation of the type of “city” international investors help fabricate, remains open to debate. In formerly industrialized countries as in emerging markets, the capacity to encourage sustainable development assumes that certain factors can be used as investment criteria, although with different terms. The criteria should include three elements:

1. Address economic issues by strengthening the ability of tenant companies to compete, via construction adapted to their activities, whilst still accommodating industries or economies considered necessary for economic diversity or job creation
(regardless of economic viability), 2. Take social considerations into account to avoid creating two- or several-tiered cities, 3. Address environmental issues by accepting the challenge of a type of development that is less predatory in terms of all resources, including natural ones.

A better understanding of the international real estate investment process is therefore necessary to identify at which times and by what means a government and a metropolitan society can negotiate with international investors who often, and incorrectly, appear all-powerful.


The 2007 financial crisis revealed the gap between securities and the real-estate assets backing them. Short-term financial gain practices are difficult to reconcile with the planning needed for urban development in the medium- and long-term.

In recent years, new funding mechanisms have begun to play a bigger role in the management and development of cities. The mechanisms vary in form according to the development level of a given country. The use of these funding mechanisms is called “financialization.” Financialization may be defined as the development of a market of debt, equity and derivative securities that represent real estate and buildings, without any given security being precisely identified with a given piece of real estate.

Treating land, houses or office buildings as financial assets is certainly not a new idea. While one need not go back to antiquity for examples, as early as the Second Empire in France, the emergence of bank-supplied real estate and property financing through the Crédit Lyonnais and Crédit Foncier banks fuelled cries of alarm against “financializing buildings.” In France, Great Britain and Germany at that time, the funding mechanisms were hardly more than simple housing loans, financing for building construction and the development of a mortgage market. These mechanisms differed greatly from “financialization” as we know it today.

In this essay, we wish to focus on a recent evolution, where more sophisticated funding mechanisms disconnect the financial product from the property that backs it. Securitization, real estate investment trusts and funds, the growth of real estate asset-backed securities, collateralized debt obligations or CDOs, and a number of other financial products often traded on the stock market, all represent income streams from commercial and residential buildings. However, there is no direct link between the building and the financial product: the holder of the security knows that all of securities of the same type correspond to the ownership and income streams of a number of buildings, but unlike with a individual mortgage contract or loan, a specific building is not linked to a specific security.

These “mixed” securities are known as “structured products,” where the security is made up of a number of receivables or other debt instruments. The debt instruments may be housing loans combined to create mortgage-baked securities or MBS, or they may be consumer credit or other types of loans that make up asset-backed securities or ABS. The investor holding the security is not aware of the actual asset that guarantees the receivables' value or income stream. The entire banking system may be contaminated by “toxic” products (toxic because the debt is unpaid) that lack all “traceability” i.e. the original assets linked to the securities cannot be identified.

Whilst it is not our intention here to provide a precise analysis of these funding mechanisms, we wish to indicate the impact they can have on the management of cities, especially with regard to housing and the outlook opened up by the current financial crisis.
The recent subprime loan crisis in the United States provides a good illustration. For a certain time, banks, mortgage companies and other real estate finance institutions, including government-sponsored enterprises such as Fannie Mae and Freddie Mac, provided financing for home purchases to “subprime” borrowers – those whose financial situation made loan repayment more risky than for “prime” borrowers who could guarantee repayment. The unguaranteed loans made to these risky borrowers were securitized or packaged, and thus turned into a marketable security. Investors did not know precisely what was in the debt security purchased, and were not necessarily aware of the risk, particularly because credit-rating agencies (such as Standard & Poor’s) obfuscated risk levels. Many of these securities, along with derivatives known as credit default swaps or CDS, make up “toxic products” that continue to circulate through the financial system.

As increasingly cyclical markets rise (and as long as they continue to do so), such financing is not a problem in the short term. This is especially true in the first years of the cycle and with special types of loans where the borrower reimburses interest only at favourable rates. This apparently virtuous financing worked until the beginning of 2007, as the subprime loan market grew and its debt securities were distributed far and wide, often blindly.

The market reversal that started in the United States at the end of 2007 created a crisis. At first, the crisis was limited to the subprime credit market and its debt securities, but it spread rapidly following the distribution of other structured products. Although it was not the only source of problems, the subprime credit crisis touched off a massive financial crisis that remains unresolved two years later.

Beyond the purely financial aspect of the crisis, it is worth noting two other effects of financialization and its funding mechanisms on urbanism and housing. The first relates to housing and the serious situation of indebtedness in which many families find themselves. In subprime loan cases in the United States alone, more than two million families were evicted from their homes in 2008 for non-payment of their mortgage. In many instances, the bank’s sale of the home did not cover the amount of the mortgage loan outstanding, a situation known as “negative equity.” The family loses its home and its mortgage debt in the foreclosure process. Foreclosures continued at a similar rate through the first quarter of 2009.

This perverse effect of globalization does not affect only the (very) developed countries. In Thailand, the combination of real estate financing and cyclical real estate market movements has also led to negative urban consequences. For example, an excess of mortgage financing in Bangkok led to a real estate bubble at the end of the 1990s. The bursting of this bubble helped precipitate the Asian financial crisis at the time. A number of real estate construction projects were abandoned. In particular, many office buildings – some practically finished – created a new kind of vast urban wasteland.

Ten years later, the real estate cycle has returned to a high point and construction projects flourish. However, the old, abandoned projects have not found new takers, for reasons of cost, obsolescence, pollution, etc. Instead, the urban fabric spreads out further to the periphery, leap-frogging the abandoned areas. Toll highways then link these new neighbourhoods. Thus, the end result exacerbates the incoherence of transportation, housing and employment systems. The combination of real estate and property financialization and the cyclical nature of real estate markets plays an increasing role in the structuring of cities. However, its short-term focus is not very compatible with structured urban planning.

Furthermore, it remains unclear whether sustainable development will find its place in the financialization of cities. Market cycles and speculative bubbles aside, how to develop sustainably remains an open question. Public action to address these issues is necessarily complex. It should prioritize regulation of derivatives into financial markets based on interest rate policy, require higher capital reserves, and take other actions as necessary.
The economic development of São Paulo has always tended to concentrate wealth in political, social and economic elites. Today, globalization shapes much of the inequality in its residents’ space and living conditions. The challenge now is to undertake urban policy reforms capable of overcoming inequalities, sharing the wealth, and producing an effective “democratization of the urban fabric.”

SAO PAOLO: IS FRAGMENTATION INELUCTABLE?

The city of São Paulo, Brazil, is a dynamic business centre and figures in the roster of twenty-first century globalized cities, despite the enormous inequalities between the few highly developed business centres and the huge peripheral urban areas that lack even basic infrastructure. The roots of these inequalities reflect a long historic process: the means by which Sao Paolo’s economic development always tended to guarantee income concentration for the economic, political and social elites who ran the country. The rise of “globalization” reinforces historic patterns of inequality, but new policies have sought urban reforms and an effective democratization of urban lands.

The biggest city on the South American continent, São Paulo (Brazil) translates in its territorial patterns the complexity of the economic, physical and social transformations wrought by globalization. From a mere warehouse between the port of Santos and the agricultural area of the interior in the seventeenth and eighteenth centuries, to today’s “globalized business hub” of Latin America, the city of São Paulo has followed a successful path of economic development, dynamic and ongoing. Inequality generated from long-standing processes has been and continues to be a driving force of the city’s transformation. Extreme income inequality has already led to the city’s fragmentation and shrinkage, and will compromise São Paolo’s “global” status if broad democratic participation cannot construct a sustainable territory. The city must now address the heavy social costs that both result from and have propelled its dynamic economic success.
SÃO PAULO AND ITS UNEQUAL URBAN FRAGMENTS: GLOBALIZATION AND EXCLUSION

The “global city” theorist Sassen (1998) framed the Latin American metropolises of São Paulo, Buenos Aires and Mexico City within the context of the globalized market because of their primal role in their respective countries and because of their national concentration of foreign investments. Other authors such as Ferreira (2007) argue against including São Paulo in that list, because its huge social and economical inequality has brought with it a globalization lag: “São Paulo does not correspond, in spite of its “global” image, to this expectation. Trying to analyze and verify this possibility from several points of view, the largest metropolis of the continent seems more marked by the archaism of its poverty and by its incapacity to overcome conflicts inherited from its historic unequal and exclusionary formation, than by new urban dynamics dictated by the ‘globalized economy.’ It is important to remember that we are speaking about a metropolis where 40% of the population lives in situation of urban informality and about 1.2 million people live in slums.” (Ferreira 2007: 49-50)

The historic pathway we will describe, leading to the construction of the fragmented and globalized city of Sao Paulo, highlights three elements: (1) its continuous connection to an ever-changing global economy; (2) the permanence of an elite oligarchy; and (3) its increasing inequality, materialized and crystallized in the city’s built environment and geographical organization. To understand Sao Paulo’s development path and possible prospects, one must retrace both Brazil’s and São Paolo’s history, analyze disparities among the city’s different neighbourhoods, and examine how the forces of exclusion – restricted voting and land rights, spatial segregation and globalization – contributed to São Paolo’s economic dynamism and global city status, and how they threaten it today. In the final section, we evaluate attempts that have been made to redress historical social and economic imbalances.

THE CONSTRUCTION OF A FRAGMENTED AND GLOBALIZED CITY

The city of São Paulo experienced huge transformations in the second half of the nineteenth century, due to the strength of coffee production within the national economy, and later to intense industrialization. The international coffee trade and the subsequent diversification of the local economy created wealth, which found its echo in the urban form and in the occupation of open areas in the city. At the time, many coffee growers moved to the city because of a practical need to assist in the commercialization of their products. Moving to the city also made it easier for them to interfere with financial and economic policies.

The wealthy farmers sought the best areas in which to live, on the hilltops on the west side of the city. At the same time, the city experienced a proliferation of
unhealthy, small, collective, beehive-type housing (cortiços in Portuguese) due to the critical lack of affordable housing for workers and newly-arrived immigrants. The collective settlements usually occupied the cheap swamplands near the rivers on the north and east sides of the city, clearly determining a pattern of segregated urban space (Osello 1986).

The implantation of the railroad along the Tamanduatei River in the middle of the nineteenth century expanded the city limits and drew the nascent industrial park to the south-east side of São Paulo. The railroad also had a significant impact on urban form, definitively establishing a segregated occupation of the territory, and contributing to the development of autonomous working-class suburbs such as the Brás and Mooca neighbourhoods, as well the cities of Santo André and São Caetano do Sul (Villaça 1998).

The increase in coffee exports in the last decade of the nineteenth century and an enormous increase in the number of European immigrants\(^1\) contributed to the establishment of factories in São Paulo between 1890 and 1930. The settlement of a stable and skilled workforce in urban areas (mainly European immigrants who did not adapt themselves to rural work) and the increase in monetary flows and consumption pushed the coffee growers towards industry rather than farming.

São Paolo’s skyline also began to change. The first highrises that were built by successful immigrants, such as the Portuguese merchant, Sampaio Moreira, and the Italian shipping magnate, Giuseppe Martinelli, helped shape the “progressive” profile of the city in the early 1920’s. The Sampaio Moreira Building of 1924 and the Martinelli Building of 1922 -1929 changed urban regulations, minds and the city’s landscape, hastening São Paulo’s development. At the turn of the century, the São Paulo aristocracy actively sought to identify itself with “progress” as part of its emulation of the European upper classes. Reis Filho (1995:13-15) states that a “modern, positivist and republican ideology” motivated a crossing of the natural barrier of the Anhangabaú Valley, leading the social, political and economic elites of Sao Paulo to occupy lands on the west side of “old” São Paulo. The establishment of different socio-economic development vectors in São Paulo signals the importance of both the international trade in coffee and the railroad. Those factors thus contributed to the strengthening of São Paulo as an important job market in the twentieth century, and determined the fragmented socio-spatial patterns observed still today (Figure 1).

When the Brazilian coffee market underwent a worldwide price collapse in 1928-29, due first to oversupply and then to the Great Depression, the transfer of resources to new and diverse economic activities helped break coffee’s hegemony and led to the development of Brazil’s early industrial park (Dean 1971). The transition was also made possible by new immigrants with European industrial skills, but without the European guilds or trade unions to bind them to any one industry or trade.

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1. In 1888, the Brazilian government abolished slavery and encouraged emigration from Europe as a source of labor to replace slaves on coffee plantations: Spanish, Portuguese and Italian nationals were given incentives to become farm workers in São Paulo state.
BRAZILIAN “FORDISM”2 AND NATIONAL POLICIES FOR URBAN DEVELOPMENT

By 1920, a significant number of industries, including textiles, food and beverages, and ceramics, as well as retailing and services such as hotels, banks, change offices, and so forth, had concentrated in São Paulo: it had become the dynamic, international centre of the Brazilian economy (Dean 1971). The reduction of international trade during World War I, and the over-production of Brazilian coffee in the late 1920s combined with the 1929 banking catastrophe, all led to a crisis in coffee exports that drained São Paulo’s economic power and generated mass unemployment. At the end of the decade, this crisis – along with the emergence of an urban middle class eager for its share of political power – drove Getúlio Vargas to oust President Washington Luis from São Paulo in 1930, establishing a populist government that lasted until 1945.

Vargas opted to adopt an “Import Substitution Industrialization” (ISI) policy that had a meaningful impact on industrial development, and consequently on work policies, lifestyles and urban development. Among the many consequences of the ISI policy was a surge in the number of urban workers and an increase in the demand for housing (Rolnik 2001). By the 1930s, apartment rentals were the most convenient housing for low and middle-income people, since there no credit system existed for them to purchase their own homes. Rental prices were not regulated until the end of the 1930s; state involvement in housing was reduced solely to sanitation measures, which usually benefited the rental market (Bonduki 1998). At the end of the 1930s, São Paulo’s urban fabric around the old city centre displayed a mix of factories and dense workers’ housing as well as exclusive neighbourhoods where the socio-politico-economic elites built their mansions. In the 1940s, new urban centres sprang up with new factories along the railroad, which helped the city expand to the north, east and southeast.

Under Vargas, the housing debate was reinvigorated: the private housing market was unable to provide affordable housing for low-income workers, so state intervention in the housing market appeared imperative. However, while the Federal Government discouraged speculative housing construction for rentals and created housing subsidies for low-income unionized workers, it ignored a vast contingent of so-called “informal” undocumented workers, a group suffering from high unemployment. This neglect set in motion a number of informal expedients, ultimately resulting in workers building their own houses on the cities’ peripheries (Box 1).

After the Vargas period, President Juscelino Kubitschek (1956-1961) saw energy and transportation as a fast track to development. To achieve his aims, he regulated the Import Substitution Industrialization policy, and gambled on the international

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2. Fordism is a term used in Western Marxist thought for a “regime of accumulation” or macroeconomic pattern of growth, developed in the US and diffused in various forms after 1945. It consisted of domestic mass production with a range of institutions and policies supporting mass consumption, including stabilizing economic policies and Keynesian demand management that generated national demand and social stability. It also included a class compromise or social contract entailing family-supporting wages, job stability and internal labour markets, leading to broadly shared prosperity; rising incomes were linked to national productivity from the late 1940s to the early 1970s.
Sao Paulo: Is Fragmentation Ineluctable?

The automobile industry as a means to develop the national industrial park and to expand the road system, replacing train travel. Several important industrial companies, such as General Motors, that had originally chosen locations near railroad centres now moved closer to newly developed highways. The automobile industry's growth and subsequent substitution of tramways for bus services allowed a nearly unlimited expansion of the city's periphery, propelled – despite a lack of basic infrastructure and services – by self-built housing.

SAO PAULO'S UNFAIR URBAN DYNAMICS

In the 1940s, São Paulo affirmed its primal role in Brazil's development, undergoing huge transformations in its urban fabric, due mainly to a real estate boom and land speculation marked by the construction of highrises. The city government contributed

FIGURE 1  SÃO PAULO: NO LIMIT TO URBAN SPRAWL?

The Spreading Greater São Paulo Metropolitan Area (Brazil), 1872-2002

to the game of rising land values through road building and transportation development, favouring capital accumulation in the real estate market (Somekh 2008). It tolerated the development of an unregulated market of land subdivisions, since the government was not able to provide housing to the masses of poor people flowing into the city.

President Kubitschek's economic policies had also triggered a huge national migratory movement, one that accelerated in the 1970s. From the 1970s through the 2000s, a huge mass of poor people migrated to the hills, valleys and swamplands of cities such as São Paulo, bringing a new complex of urban problems. The cities were not prepared to receive such a large contingent of settlers. They lacked jobs and urban infrastructure and their administrations did not know how to deal with the problem. As result, the population of the cities’ peripheries swelled and a large number of poor people, previously spread out in rural areas, became concentrated in squatter settlements in very poor living conditions (Maricato 2001). By the end of 1970s, the housing deficit had escalated to an estimated 7.9 million units and a further 15 million families were living in inadequate conditions (Fernandes 2007).

The Brazilian industrial park was consolidated in the Kubitschek years. Traditional industries declined, such as textiles, food products and clothing, while the transportation equipment, machinery, electrical, appliance and chemical industries expanded. The production of durable consumer goods changed the Brazilian way of life and helped create a new urban middle class. However, many poor people remained without access to civil and social rights such as voting, housing, sanitation or labour laws (Maricato 2001). The excluded comprised 49.3% of the total Brazilian population of 70,000,000 in 1960, and 47.3% of 170,000,000 Brazilians in 2000 (Pochmann and Amorim 2004).

In the 1960s, in lockstep with increased industrialization and economic growth, the urbanization of Brazilian cities intensified. The dictatorial military regime of 1964-1984 ordered municipal governments to develop “integrated urban plans” that were linked to the release of federal funds. São Paulo produced its Zoning Plan of 1972, which consolidated inequality in terms of land occupancy: while it allowed an increase in the floor area ratio in the city’s central areas, it reaffirmed the “legal illegality” of favelas and subdivisions on the periphery, simply by ignoring them in the Plan (Rolnik 1997).

Between 1960 and 1980, the abandonment of the city centre by the elites and a housing policy marked by social and territorial exclusion exacerbated socio-spatial polarisation and further shaped the inequitable pattern of contemporary São Paulo. After 1960, several downtown businesses moved away to the highlands of the Paulista Avenue neighbourhood in the south-west of the city. This formerly aristocratic district then became the most valuable area of the city, where offices, banks and corporate headquarters are now located. At the same time, the implantation of the Metro

3. To calculate an index of Social Exclusion, Amorim and Pochmann added data associated with quality of life, such as violence, inequality, number of young people, education level and formal employment.
subway’s central station right in the city centre and pedestrian zoning of the streets contributed to the abandonment of the central district: the elites who owned cars could use them to flee from the urban centre to the south-west and elsewhere. Thereafter, low-income people who depended on public transportation started to develop business activities in the central area (Roldnik 2001). Also at this time, housing policies developed during the 1970s and 1980s led to the further peripheral expansion of the city’s fabric (Box 1).

**THE SÃO PAULO METROPOLITAN AREA IN THE LATE TWENTIETH CENTURY**

The end of the military dictatorship and re-democratization of Brazil in 1984, the relative economic stability reached in the late 1980s, the progressive liberalization of the economy, and macro-economic policies aimed at encouraging foreign direct investment (FDI) all favoured a relative dispersion of economic activities in the

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**BOX 1 SOCIAL HOUSING DEMAND, APARTMENT BUILDINGS AND GENTRIFICATION**

In the 1940s, the state ideology aimed to convince workers that home occupancy depended on their own initiative, and that living on the outskirts without infrastructure would be better than unhealthy collective housing in the centre. The state tacitly allowed an anything-goes approach, even in disregard of building codes and regulations. The government allowed retirement pension funds to finance housing, but the system aimed more to sustain the real estate market than to incentivize social housing, and ended up financing an apartment building boom at the end of World War II (Bondoia 1998).

Despite earlier attempts to create a financial system for housing low-income people, it took until 1964 for the state to link the Financial Housing System (SFH) with the National Housing Bank (BNH). It served as a relatively efficient system to facilitate housing construction for low-income people. When it ended in 1985, about 4.4 million houses had been financed, but only a third was “popular housing.” While São Paulo’s population grew from 4.8 million in 1960 to 15.1 million in 1985, the program assisted 400,000 people, while 3 million were still living in unhealthy collective houses, 2 million in precarious neighborhoods on the outskirts of the city, and 1.5 million in squatter settlements (Sachs 1999). The programs developed by the BNH between 1970 and 1990 were marked by huge housing complexes on the extreme periphery, segregating the poor families in “ghettos” lacking any social or economic opportunity. This became a frontier for new slums and a trigger for a wave of violence in the 1990s (Roldnik 2001).

In São Paulo, the demand for low-income housing was always greater than availability: the private real estate market exclusively targeted the middle and higher classes. The solution for poor families was to self-build homes in peripheral areas through a collective effort outside of the market, often assisted by municipal housing policies. The “self-built” periphery is huge, estimated at 63% of all homes built on the outskirts (Mautner 1999).

At the same time, wealthy neighborhoods in the central areas of the most important municipalities continue to lose population while growing vertically. The unevenly distributed demographic growth of São Paulo’s metropolitan area has been highlighted by Torres (2007: 211), who studied the relationship between urban growth/stagnation, real estate investments and spatial patterns. His data show that population growth occurs mostly in areas where land cost is low, and population decreases where real estate investments grow most significantly. The data also indicate that in 1995-2003, the private market built nearly 400,000 residential units, three million square meters of floor area, and invested almost US$10 billion. The bulk of such investment took place in areas that lost a significant share of population in 1991-2000. Torres also found that private companies never intended to sell or rent residential projects to poor people, who would be unprofitable. This dynamic demonstrates that a gentrification process is underway.
south-eastern states. The dominant role of São Paulo in Brazil’s economic scene decreased. Other regions with less-skilled workers benefited more from FDI capital inflows. Consequently, the polarisation of economic activity in São Paulo reversed itself in favour of less developed regions elsewhere in the country (Rodrigues-Pose and Tomaney 1999), but also in favour of a new territorial fabric moulded by globalization. This new fabric is complex, and involves the gentrification of city centres, construction of edge cities, industrial districts, shopping centres and business centres within or outside of the metropolitan area (Figure 2).

In spite of the growth of services and the migration of industries to other regions, the city of São Paulo still accounts for a third of the aggregate value of São Paulo state: the city is big, diverse, modern and dynamic (Rolnik 2001). Instead of being a threat to industrial capital, the enlarged retail and services sector has made São Paulo an economic and business hub where the national economy connects to the rest of the world. However, due to historic socio-economic inequalities, the new economic activities create further fractures, walls, enclaves and ghettos.

**TERRITORIAL PATTERNS OF DEVELOPMENT**

The rise of the new “globalized” world economic order, propelled by financial services, information technology and global value chains, also affected the biggest Latin American cities significantly, reinforcing old centralities, creating new ones, defining vectors of population occupancy and increasing the strong contrast between wealth and poverty (Sassen 1998; Fainstein 2001). In the metropolitan area of São Paulo, the effects of globalization exacerbate its fragmented urban fabric. The proliferation of squatter settlements on the edge of the city contrasts with the surge of new, dynamic sub-centres, built to attract national and international capital with a mix of skyscraper office buildings and commercial businesses, such as shopping centres, banks and transnational company headquarters. The opening of a new territorial frontier is not a new strategy for the city’s speculative real estate market. It recalls the movement of São Paulo’s long-time elites within the city, first across the Anhagabaú Valley to the west at the end of nineteenth century, and their later ascent of the south-western hills to the Paulista Avenue neighbourhood in the middle of the twentieth century.

Now, at the beginning of the twenty-first century, the real estate market dynamic can count on transnational capital from corporations and investors, and upon construction by large real estate enterprises that find allies in the city’s public administration. This partnership is dear to strategic planners, and São Paulo’s marketers’ efforts have pushed the wealthier and newer “global city” sub-centres further west down Paulista Avenue’s hills, while wealthy enclaves have been established on the edge of the Pinheiros River. At the same time, the long-standing low-wage policies of Brazilian industry have kept factory workers from participating in the legal real estate market, leaving only the alternative of squatter settlements in fragile environmental areas, mainly on the city’s periphery (Maricato 2001).
Historical locations and movements of business centres and elites in central São Paulo

First movement of the business centre and the elites (1870-1900), across the Anhangabau Valley

Second movement of the elites (1890-1930) and business centre (1950-1980) towards the heights of Av. Paulista

Third movement of the elites (1890-1940), down towards the Pinheiros River banks

Fourth movement of the elites (1950-1980), towards the heights of Av. Paulista

Source: based on a map compiled by S. Moraes derived from Prefeitura de São Paulo/SEMPLA/Dipro.
Globalization tends to disconnect São Paolo’s citizens from their own territory even as they become connected to the global network. Rich businesspeople and the elites inhabit gated communities and high-rise apartment buildings to more easily separate themselves from the poor. They work in spaces, as Sassen (1998) notes, that produce and reproduce the organization and management of the global production system and the marketplace for finance. They are the local interface between the local and the global. Similarly, low-income and informal workers are enmeshed in the global economy because it impacts them directly. Even as they are excluded spatially, economically and politically from the centres of power, they sustain globalization through their work, producing inexpensive goods for export and for low-income service workers (Buechler 2006).

PERSISTENCE IN OVERCOMING INEQUALITY: HOPE AND PERSPECTIVES

The deliberate absence of social policies in Brazil aimed to perpetuate the political and economical power of the elite, whose origins are linked to the nineteenth-century rural coffee oligarchy. For instance, from the proclamation of the Republic in 1889 until 1988, the right to vote was linked to education, but the aristocracy made no major attempt to expand basic education (Ribeiro and Cardoso 2003). Therefore, by restricting illiterate people’s right to vote, the Brazilian aristocracy guaranteed the exclusion of the majority of the population from political participation, and the great mass of poor workers had very limited citizenship rights during the twentieth century.

Historical inequality is also strongly associated with land ownership in a patrimonial society such as Brazil. Until 1850, land occupation was the legitimate form of occupation with trade unions, civic organizations, social movements, residents’ associations and other collective channels. They demanded social welfare polices and shaped the “National Movement for Urban Reform” (MNRU). In 1986, for the first time, all Brazilians were allowed to participate in a new Federal Constitution. The MNRU helped produce a document demanding urban reforms, including the autonomy of municipal government; democratic management of cities; social right to housing; right to the regularization of informal settlements; social function of urban property; and the need to combat real estate speculation in urban areas (Fernandes 2007).

Even though there was no political consensus on most of the demands, the principle of democratic management of cities was fully endorsed in the new 1988 Constitution. It provided legal and political instruments to widen direct participation in the decision-making process. This led to the approval in 2001 of a progressive federal law known as “Statute of the City” that regulates urban reforms: it brought about good initiatives to cope with urban development, inequality and democracy, explicitly recognizing the “right to the city.” The Statute was created on the principle of the “social function of property and of the city” and aims to promote land reform in urban areas, changing the elitist nature of previous policies and programs. Its key point is the democratization of the local decision-making structure: it provides a number of legal, urban and fiscal instruments that municipal administrations can use to induce and/or to inhibit urban development according to criteria of social inclusion and environmental sustainability (Fernandes 2007).
achieving ownership. After 1850, urban regulations were created that aimed to structure a capitalistic real estate market and to ensure elite control of the city’s “better slice,” expelling the massive low-income contingent of citizens from the well-built city centres (Maricato 2001). None of the governments from the 1940s through the 1990s showed much interest or ability in lessening socio-economic and territorial inequality and fragmentation.

The sense of fragmentation in São Paulo not only expresses the lack of connection between neighbourhoods and the increased process of social segregation: it embodies the fracture in social justice, in the democratic process and in citizenship. The fracture appears in the power of gangs on “their” territory within the favelas, where there is a complete absence of constitutional government. The fracture is also evinced by elites escaping to gated enclaves in a process of auto-segregation (Souza 2006).

In Brazil, after decades of urban development marked by imbalances of every order, the approval of the “Statute of the City” (Box 2) in 2001 opened new hopes and perspectives for urban planning and development. However, many scholars have raised questions about the implementation of the law, and how this new set of territorial policies can achieve effective social justice. The legal urban development tools provided by the law include the “Urban Operation Trust” (UOT)4 (Box 3).

In São Paulo, the UOTs had already arrived on the scene before the promulgation of the “Statute of the City,” and since 1983 have helped significantly to shape the (unequal) urban fabric of the twenty-first century. The use of UOTs in São Paulo always aimed to expand the real estate market; the social proposals it expressed never succeeded. For instance, in the UOT Água Espraiada Boulevard, the three original objectives of the intervention – to improve the drainage system, enlarge the road system and relocate poor families that lived in squatter settlements – were manipulated by various municipal administrations and lost all social content. It resulted in the migration of people from sixty-eight squatter settlements to environmentally sensitive areas on the periphery of the city.

4. “Urban Operation Trust” is a translation for “Operações Urbanas Consorciadas”.

BOX 3 “URBAN OPERATIONS TRUST” (UOT)

An Urban Operations Trust (UOT) consists of a group of actions and measures for the urban environment, coordinated by the municipal government in association with owners, renters and private investors who want to start or complete physical, social and/or environmental improvements.

A UOT should establish specific urban parameters for subdivision, land use and occupancy, and other regulations for building in specific areas of the city. These parameters should make Master Plan regulations more flexible, allowing the public administration to capitalize on building potential and get financial resources to operate. The resources should be applied within the UOT perimeter and a significant percentage should be invested in social housing programs to have an income redistributive effect. UOT rules should plan for ways for the public to oversee and manage the process and implementations (Somehk 2008). Furthermore, the UOT has to pay for itself. Investors should pay for urban social and local improvements without draining public resources: the improvements will increase the value of their properties and compensate the investment.
Notwithstanding the claims of the “Statute of the City,” many consider the “participatory municipal budget” the real “star” of the new planning order. Its goal is to bring political and social issues to a field that is basically technical, allow effective social oversight and increase political responsibility and awareness (Souza 2006).

We could also question whether the Brazilian federal government takes seriously the need to plan Brazilian cities. In 2008, a federal program was announced to invest 106.3 billion Reais (about US$ 50 billion) in social housing construction and 40 billion Reais (US$ 20 billion) in sanitation by 2010. Urban planners have criticized the program because it is not integrated with any comprehensive urban policy linking housing with urban development; nor is it clear how the resources will be applied within the context of Municipal Master Plan – according to the Statute of the City, the proper venue for reserving developed urban land for this specific use.

CONCLUSION
This paper aimed to clarify how long-standing international trade, massive migrations and socio-economic inequality may have affected urban and metropolitan morphology and economic dynamism in Brazil. The metropolis has fragmented itself into islands of wealth where the upper layer of the urban economy concentrates its power, and islands of poverty where all sorts of excluded citizens concentrate their misery, stamping an unequal profile on the territorial fabric (Santos 1990; Maricato 2001). The historical dynamics of the city’s international trade and industrialization, alongside the government’s urban policies, pushed investments to the speculative real estate market and helped keep developed areas in the elite’s hands. Inadequate housing policies for low-income workers have pushed them to the city’s periphery in fragile environmental areas, developing a parallel real estate market leading in turn to a huge expansion of the urbanized area. At the same time, the city centre and sub-centres have been losing population, growing in height and becoming increasingly gentrified. Globalization has exacerbated this process.

At this point, the effort to recover the city’s social balance in the urban environment relies on new, socially focused planning policies and a progressive new federal law, the Statute of the City. These efforts may yet produce good initiatives to decrease inequality, democratize urban land use and repair fractures in the urban fabric; but it is difficult to evaluate whether the new law can reverse centuries of inequality and overcome the built environment to confer real citizenship upon Brazil’s poor.


The urbanization of densely populated emerging countries such as India will have a significant impact on world climate in the coming decades. Limiting energy consumption and preparing urban areas for adaptation to climate change requires taking social and urban policy issues into account more than developing a new energy policy. Effectiveness will ultimately depend on how changes in individual and collective preferences.

India: When Urban Lifestyles Determine the Climate

Climate change risks only manifest themselves over a multi-decade period, providing an opportunity for pre-emptive action. The danger is that the longue durée may also stymie action, since the effects and benefits of efforts to mitigate climate change lie beyond current political and perceptual horizons. Populous, growing countries like India are particularly crucial, as their urbanization will affect the global climate significantly. Understanding India’s current situation, constraints and possibilities is thus critical.

Despite resisting binding climate change-related commitments, India is ahead of the sustainability curve on various fronts, as Rao et al. (2009) have documented. It has lower energy intensity than China or the United States and relatively high industrial electricity prices, at 10 cents per kWh versus 6.5 cents in the U.S. Energy-intensive industries, such as cement manufacturing, are energy efficient. Non-hydro renewable energy comprises 10% of capacity, partly in response to policy: seventeen large provinces accounting for 90% of national power consumption have “Renewable Purchase Obligations.” Coal, currently the primary fuel source, constituted only 37% of capacity addition in the last decade, while renewables, including hydroelectricity, constituted 50%. Natural gas is almost 10% of current capacity, and Rao et al. (2009) calculate that if new gas discoveries push this to 16%, as projected in India’s Integrated Energy Policy (Expert Committee on Integrated Energy Policy 2006), 20% of India’s current CO₂ emissions would be cut. In large, dense Indian cities, less than 20% of trips use individualized (non-mass transit) forms of transportation, and non-motorized modes of transportation such
as bicycles and walking remain relevant. Finally, many Indians continue to have low-carbon preferences such as vegetarianism.\textsuperscript{1}

However, some of this low-carbon character comes from India’s economic structure, which is weighted towards services, and from relatively low levels of income and urbanization, a situation about to change. India is expanding its manufacturing sector, and its income growth is just a little slower than that of China. Although less than a third of India is urbanized, its urban population is already larger than that of the U.S.: its increase in the last decade of about 70 million is larger than the urban population of all but five countries. Concomitantly, this Indian urban population is acutely vulnerable to climate change, not only in coastal urban areas: as Revi (2008) notes, the enhanced risk of drought induced by overall warming and the loss of glaciers can adversely affect cities in the northern and eastern Gangetic plains. The relationship between climate change and Indian urbanization is thus important both for the world and for India.

**THE EVOLUTION OF INDIA’S URBANIZATION**

Indian urbanization has had a long relationship with climate change. As Agrawal (2002) notes, it forced the Harappans of the Indus Valley civilization to move east, first to Rajasthan by the end of the third millennium; then, as increasing aridity succeeded the mid-Holocene warmth and turned the region’s lakes saline, further east to the dense, swampy, monsoonal forests and gravelly soil of the Gangetic doab, where the Harappans died out. Re-urbanization of the region had to wait for the advent of Iron Age technology in the first millennium BC.

This Gangetic urbanization continues to this day, though southern India is now more urbanized, reflecting in part the strength of market forces. Despite policies that tried to disperse industrial activity through licensing and to discourage urban concentration with long-range master plans (Mohan 2006), populations have concentrated in larger cities. The share of population in cities with more than half a million people has grown from 18% to 38%, while the share of towns with fewer than 20,000 people fell from 27% to 11%. These large cities grow in a fairly dense manner, but also expand at the edges (Mookherjee and Hoerauf 2004). The peripheral growth is not that of slums. Of the 59 census towns\textsuperscript{2} that surround Delhi and comprise 19% of its overall population, the 2001 Census recorded slums in only 13, accounting for only 5.9% of Delhi’s total slum population.

With deregulation of business, the opening of foreign trade, and investment in

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\textsuperscript{1} An average American consumes twenty-five times more meat than an Indian. The United Nations Food and Agricultural Organization (FAO) estimates that the livestock sector contributes 18% of global greenhouse gas emissions (Steinfeld et al. 2006).

\textsuperscript{2} A classification category used by the Census of India for an agglomeration of urban population greater than 5,000 outside the boundary of a formal urban area.
and reforms to capital markets, market forces and provincial policies currently determine industrial locations. It appears that the provinces’ rising economic relevance has favoured an Asian-style focus on the development of political capitals (Mohan 2006). While nationally, the top five cities comprise less than 20% of the urban population, urban primacy prevails at the provincial level. Mumbai is nearly five times larger than the next largest provincial city, and political capitals are prime cities and population leaders in nine out of 16 major provinces. Given this urban concentration, provinces have been reluctant to decentralize power to cities. Local governments typically have limited and inflexible taxes, and depend on provincial governments to bridge their revenue gaps. Politically, cities do not have a strong elected leadership: provincial bureaucrats administer most cities. Elected politicians do have some control over local budgets, but these are meagre, with much of the expenditure and service provision routed through provincial agencies and “parastatal” or quasi-governmental agencies.

Market forces are even more significant in the informal sector, which comprises 70% of the urban workforce, and an even higher share in major urban occupations such as construction and trade. While the share of urban casual employment has remained stable or has even fallen in some larger cities, informal self-employment has grown substantially. Informal arrangements pervade housing as well, with about 15% of urban Indians living in slums; the percentage is much higher in cities like Mumbai. However, most slums are embedded in residential neighbourhoods (NSSO 2004).

These urban characteristics have critical implications. While bigger cities are more complex, they can also develop the capacity to tackle looming urban challenges; however, provincial control will determine if and where that development takes place. Similarly, informality will affect the vulnerability and adaptability of residents to climate change.

ADAPTATION CHALLENGES AND ASSESSING THE EFFECTS OF CLIMATE CHANGE

Even with mitigation efforts, the global climate system will respond only with a multi-decade lag; all countries will, inescapably, need to adapt eventually. Populations and enterprises can be vulnerable for many reasons, including location, inability to survive extreme events (due to poor entitlements and multiple prior episodes of

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3. Urban primacy is a phenomenon where the largest city in a region has a population that is at least twice as large as that of the next largest city.
4. Over 1987-88 to 2004-05, casual employment remained at 14.5% overall and fell from 10.4% to 9.3% for cities with more than 100,000 people. In Ahmadabad and Chennai, it fell from 20% and 19.6% respectively to 10.7% and 10.4%, while in Mumbai, which lost regular employment in the textile mills, it rose from 4.8% to 8%. It also remains unclear how much of self-employment is truly entrepreneurial and to what extent it is merely an interim survival strategy until acceptable employment is found.
5. As Satterthwaite (2009) notes, mitigation in high-income nations is the most effective form of adaptation, but they appear to believe that it is cheaper and easier to fund adaptation in low-income countries as compared to reducing their own greenhouse gas emissions.
displacement), lack of preparedness capacity, and limited community and social safety nets. Taken together, the effects of climate change affect the capacity of communities – especially those that are already vulnerable – to adapt to long-term risks (de la Fuente, Lopes Calva and Revi 2008; Revi 2008).

The risks manifested by climate change – increased mean and peak temperatures, changes in the distribution of precipitation, extreme weather events and a rise in sea levels – represent extensions or intensifications of existing urban risks and hazards. In India, drought and associated changes in surface and groundwater availability are critically important in the Ganges plains, where the rivers are at risk of evaporating as glaciers are lost.

One cannot neatly separate adaptation to “climate change” from adaptation to existing risks. However, as Satterthwaite (2009) notes, discussions around the international funding system for adaptation assume just such a distinction. Further, most adaptation cost calculations are based on the cost of modifying climate-sensitive infrastructure, much of which has yet to be built in countries like India.

Climate change can potentially induce two types of migration-driven urbanization. In India, migration has thus far been constrained, *inter alia*, by unattractive conditions for the urban poor, neglect of rural education in the past and a slow process of social transformation. However, a future agrarian crisis, catalysed by climate change, could lead to a migratory deluge. Alternatively, climate change could further limit migration by increasing the severity of induced stress in cities. Such scenarios have yet to be systematically investigated.

To respond to such issues, an adaptation plan would ideally link city-, provincial- and national-level policies, interventions, and political and institutional arrangements. The Indian democratic tradition makes this feasible, but current governance and institutional culture, which limit city’s capacities, are inadequate to the task. Building local government capacity is a slow, difficult, and often contested process that needs to be accelerated. The challenge becomes more acute when city growth depends on real estate surpluses, and the inter-relationship of vulnerable and better-endowed residents remains largely unrecognized. The challenge cannot be met by large international funding flows alone. Adaptation cannot succeed if governments, usually provincial ones, refuse to work with the poor and consider their localities and activities as “the problem” (Satterthwaite 2009).

**LINKS BETWEEN INDIAN URBANIZATION AND CARBON AND ENERGY USE**

While adaptation is the key concern for Indian cities, it is the effects of Indian urbanization on climate that concern many other countries. According to the International Energy Agency, urban areas consumed about two-thirds of the world’s energy in 2006, and this is expected to increase to three-quarters by 2030. About 80% of the projected increase is expected to come from non-OECD countries. Given the complexity of links between urbanization and climate change, we focus here on three elements: (1) individual preferences; (2) social norms; and (3) public policy interventions.
Personal preferences can affect energy consumption in various ways, e.g., through appliance use, modes of transportation, etc. Urban areas account for about 60% of the overall electricity consumption in India; 25% is consumed by agriculture and 9% by rural domestic consumption. However, Mukhopadhyay and Kapur (2009) find that while spending on fuel and electricity increases as income rises, the share of non-food expenditure devoted to energy falls from 40% to 8%. This low share may limit the price response for richer consumers.

Similarly, the choice of public or private modes of transport often depends on how preferences are constructed. “Paratransit,” mass transit and non-motorized modes of transport account for over 80% of the trips in major Indian cities. However, if current trends continue, private transportation modes, especially motorized two-wheelers, may increase appreciably. Mukhopadhyay and Kapur (2009) also find that, unlike fuel and lighting, the share of spending on conveyance rises with income, reaching 12% to 14% of non-food expenditure for the higher-income classes, almost as high as in the United States. This may indicate more potential for using pricing policies to influence behaviour.

Social norms about building aesthetics interact with culturally-based thermal comfort expectations in actual energy consumption. The ubiquitous nature of glass and steel construction in aspiring, modernist India does indeed owe something to the speed of constructing glass curtain walls, and to the consequent increase in productivity for the real estate industry. However, the commercial attraction of such buildings also flows from the spread of the aesthetic that underpins them. Such buildings often are designed for full-time, full-space air conditioning, rather than part-time, part-space use (Jiang 2009) – the latter being the more familiar pattern in Indian homes with air conditioning. In addition, the embodied energy embedded into these building systems increases the carbon footprint of these aspirational spaces, while ignoring the large body of indigenous, energy-efficient designs.

Here, energy certifications such as LEED may have limited use. Newsham et al. (2009) find that while as a group, LEED buildings in U.S. consumed less energy per unit area, up to a third of them used more energy: higher levels of certification did not imply better energy efficiency. Benchmarks that appear aggressive in the U.S. could well prove irrelevant in India, given the nearly forty-fold difference in average electricity-consumption levels. Scrutiny of such standards is especially important, given the lock-in effects that flow from the long-lived nature of building stock in urban areas. Domestically developed ratings like GRIHA also exist, but according to one estimate, 200 times the number of green building parks have registered under LEED than under GRIHA (Anonymous 2009a). This preference for imported over

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6. These are low cost flexible transportation modes that often do not follow fixed routes or schedules.
7. Leadership in Energy and Environmental Design is a Green Building Rating System, of the U.S. Green Building Council (USGBC).
indigenous standards may reflect the international character of the clientele for modern buildings, but it may also indicate aspirational motives, where international standards are seen as inherently preferable.

Thermal comfort preferences also affect actual energy consumption. Hwang et al. (2009) present evidence from a survey in Taiwan,\(^8\) documenting sharp differences at home and work in how people responded when they felt hot. While the extensive use of air conditioning at work was partly because workers did not have to pay for it individually, the researchers also noted that “only a quarter of workplaces…visited [were] equipped with an electrical fan or [had] sufficient operable windows to facilitate natural ventilation” (Hwang et al. 2009: 1131-2) – indicating how building forms and facilities interact with behaviour.

Apart from indirectly influencing individual behaviour and social norms, public policy often directly drives energy consumption. It does this in many ways: through the provision of public transport, urban planning, pricing, taxes, resource transfers, and through various institutional decisions – the last being our focus here. In India, for example, public transport is much more likely to be available in provincial capitals than other cities, thus limiting its benefits. Water is increasingly transported over long distances to cities such as Bangalore, Indore and Delhi, embedding a significant energy component in water supply. In many smaller towns, electricity for water pumping becomes a main expenditure even before wastewater treatment begins, which can add substantially to the energy bill.

In terms of human resources, the Indian construction workforce may currently lack the competence for building the kind of high-precision structures that may be needed to reduce the carbon footprint. While federal and provincial governments share responsibility for vocational education, the training of construction workers remains very limited (SEWA Bharat 2006), though they account for more than 9% of the urban male workforce. It is important to note that in all these cases, the relevant level of government is often not the city but the province.

**IS THERE A LOW CARBON PATH FOR INDIA?**

Many OECD countries, especially Europe, are now trying to decarbonize their cities. This has led to improvements in energy and resource efficiency and some successful changes in behaviour, but given the cities’ locked-in urban infrastructure, most such initiatives result in only incremental changes. In India, by contrast, urban form remains fluid; it is still possible to question principles more difficult to challenge in already-urbanized societies. In the context of these adaptation and mitigation challenges, is there a way for India to meet its development goals without travelling on the well-trodden high-carbon path? Some researchers, e.g. Shukla (2008), estimate that lower-carbon cities could contribute over a third of the carbon mitigation needed in countries like India by 2050. Can India’s National Action Plan on Climate Change

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8. Leadership in Energy and Environmental Design is a Green Building Rating System, of the U.S. Green Building Council (USGBC).
(NAPCC) (Government of India 2008) successfully contribute to these trends?

The NAPCC proposes a Sustainable Habitat Mission (SHM) to promote energy efficiency as an integral component of urban planning and renewal, through the following three initiatives: 1) application of the Energy Conservation Building Code (ECBC); 2) urban waste management and recycling, including power production from waste and wastewater recycling; 3) better urban planning and a modal shift to public transport.

First, while ECBC may help to shift perceptions about building forms, India has had little success integrating building codes into its urban planning process, and may need to consider incentive-based regulation – e.g., additional fees on buildings with high energy use and increasing block tariffs for electricity. This is within the scope of the provincial governments, subject to the oversight of their electricity regulators. Nationally, the Bureau of Energy Efficiency (BEE) requires usage reporting from all buildings with a connected load of over 500 kVA or a conditioned floor area of over 1000 sq. metres. It has also initiated a “BEE Star Rating of Office Buildings” based on a building’s specific energy use.

Second, water use is one area where Indian urban per capita consumption may exceed the levels in rich countries. Once consumption is reduced, wastewater treatment could further mitigate the effects of industrial pollution on surface and ground water; these effects, more than actual use, diminish usable water resources that are likely to become even scarcer due to climate change. As noted above, water is often provided by provincial governments or their agencies. Further, the lure of carbon credits for transforming urban waste into energy diverts attention from more feasible solutions, often leaving the city with a dysfunctional facility and no treatment. Here too, the provincial government invariably steps in once the projects reach a certain size and complexity.

Finally, initiatives to improve urban planning and shift to public transportation are perhaps the most difficult challenges for policy-makers anywhere. It is debatable whether local policies alone can actually make cities more compact, increase use of public transportation and affect building forms. Comparing more compact European cities to sprawling American ones, Nivola (1999) argues that macro policies such as agricultural support, tax codes that favour home ownership, fuel taxes, federal tax sharing practices, and so forth can also affect urban built form in a complex manner.

India’s Sustainable Habitat Mission thus appears to address mitigation issues only partially and, in particular, seems to neglect the institutional context, though the release of their first report will give better grounds for evaluation. In the government’s defence, however, they face challenges characterized by Rittel and Webber (1973) as “wicked problems.”

9. There were 968 observations gathered at workplaces and 707 at home.

10. The tariff cannot increase with total consumption because it would discourage density. Furthermore, this assumes that the effect of per capita intensity in the use of space on energy demand is negligible.
WICKED PROBLEMS AND OUT-OF-THE-BOX THINKING FOR SOLUTIONS

As defined by Rittel and Webber (1973), wicked problems have no definitive formulation and admit multiple representations. They are affected by a multiplicity of poorly-understood factors that resist manipulation, and to which one must now add climate change as an additional element. They are often the symptom of deeper problems and their particular characteristics may override commonalities with similar problems elsewhere. Every attempt to address the problem is consequential and creates new wicked problems, for which the would-be resolvers bear responsibility. In democracies, these wicked problems are “confounded by a still further set of dilemmas posed by the growing pluralism of the contemporary publics, whose valuations of… proposals are judged against an array of different and contradicting scales” (Rittel and Webber: 167). This “confounding” is exacerbated in intensely pluralistic and transitional societies such as in India. Since existing urban forms appear unsustainable, India must think outside the box to address these wicked problems. This section provides a point of departure for such an inquiry.

In 1993, the 74th Amendment to the Indian Constitution decentralized responsibility for town planning, allowing it to devolve upon local governments. A decade later, in 2004, the federal government launched the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) to foster self-governing cities. Unfortunately, the JNNURM has been reduced to a federal financing mechanism for building traditional infrastructure, with an overwhelming focus on water supply and drainage – undeniably a key adaptation measure – often executed by provincial parastatal agencies. This was a predictable outcome in the absence of a radical restructuring of responsibilities: many interventions, such as those under the SHM of NAPCC, remain in the remit of the provincial government. Indeed, one can argue that no local government could achieve a global public good such as carbon mitigation. But the replacement of local responsibilities by higher levels of government can also negatively affect the urban metabolism, potentially derail adaptation and push back mitigation efforts. What, then, is the appropriate degree of decentralization?

Responsibilities at different levels of government are tied to intergovernmental financing. Much of India’s urban financial reform agenda under the JNNURM is structured around improving property tax collection. However, not only will climate change require much more investment than property taxes can generate, the structure of such taxes may discourage densification that leads to increases in taxable values, and will thereby foster urban sprawl (Slack 2006).

Arguably, sprawl is possible even without local taxes. Recently, both government policy and market conditions in urban India have promoted the growth of apartment condominium complexes and private planned developments. Like “Common Interest Housing” in the United States and “Master Planned Estates” in Australia, their success indicates that some people are quite willing to pay for what are traditionally municipal
services, and consume them at unsustainable levels – ignoring the spatial realities of their surroundings, and building “an explicit connection between intentions and imagery, which encourages socio-spatial polarisation” (Kenna 2007: 300).

A fiscal system that relies more on statutory intergovernmental transfers and user fees may thus encourage more large compact cities and fewer small towns. It can be argued that if the quality of local public goods is high and their distribution equitable (which arguably requires a well-functioning and empowered local government), there will be less interest in establishing separate communities and cities will remain compact. It may be odd to consider education delivery and intergovernmental transfers as climate change instruments, but if they reduce sprawl, they may prove more relevant than traditional measures like fuel efficiency.

The promotion of home ownership through tax benefits has led to a housing boom in India over the past decade. It is difficult to supply more homes in India’s city cores, since this involves replacing existing structures; therefore, new-home builders move outside the core city, where land is cheaper. Concomitantly, the new labour market may entail multiple job changes. Once a home is purchased, the cost of relocating closer to a new workplace is high. Over time, this increases demand for transportation. In this context, increasing the supply of rental housing may be climate-friendly, by reducing induced transport demand. While there are many non-pecuniary reasons for location preference not affected by ownership status, such as the quality of school and neighbours, renting does reduce the cost of relocation. As O’Sullivan and De Decker (2007) document, differences in regulation of private housing rentals in Europe do seem to affect the proportion of renters. With this in mind, should homeownership incentives in India be revisited?

India’s transportation sector has a low per capita count for passenger vehicles; two-wheelers of increasing fuel efficiency dominate. Fuel prices are relatively high, as is use of public transportation: average commuting distances are relatively low and urban living spaces are dense.11 Barring the odd large, linear city like Kolkata or Mumbai that can benefit from transit corridors, most of the larger cities in India are circular – a configuration that challenges public transportation systems, especially in multi-focal cases. In Delhi, a large circular city, 52% and 45% of the top-consuming quintile owns cars and two-wheelers, respectively. In Chandigarh, considered to be a better-planned smaller city, the corresponding shares are 52% and 82% respectively (NSSO 2007), indicating that conventional planning helps little. To limit the use of private transport, many cities in India now strive for mass urban rail transit, often through public-private partnerships.

Most of these cities, like Bangalore and Delhi, have a set of ring roads and a sequence of radial spokes. To take a person from any point to any other point within the circle, a transportation system would need to have multiple nodes and convenient interchanges. The low capital cost and capacity of intermediate public transport

11. Five categories of buildings - office buildings, hotels, hospitals, retail malls, and IT Parks in five climate zones in the country – have been identified for this programme. The scheme details are available at BEE (2009).
and paratransit can be leveraged to increase service frequency and to connect from the interior to the ring roads and spokes. Predictable and frequent schedules on the rings and spokes and free or low-cost interchanges could then permit passengers to customize their own routes. Such systems could be mapped over existing transport using low-cost modern ticketing systems, coupled with better predictability of service using GPS and SMS technology. However, few such examples exist in practice; and despite its place among the oldest modes of transport and its high investment costs, locked-in nature and excessive embedded energy, urban rail has become the desired, aspirational mode of transportation in India. This adds a social dimension to an already wicked problem.

In India, the dissonance between planning and implementation further complicates efforts to solve these wicked problems. Regulations are routinely disregarded, though from a climate perspective, this can occasionally produce favourable consequences. For example, in many areas of Delhi, zoning laws have been ignored and mixed-use neighbourhoods have evolved that combine residential with industrial and commercial use. In some instances, this allowed hazardous industrial activity to grow without safeguards, but other areas benefited from such mixed use. Acceding to the popular pressure created by such organic growth, the federal urban ministry (note where the locus of planning authority lies) modified zoning laws (MoUD 2007).

CONCLUSION
Currently, international climate negotiations link support to reductions in greenhouse gas emissions. Clean development mechanisms (CDM) with additionality criteria typify this approach. However, such mechanisms deny the uncertain and complex linkages between actions and outcomes – the wickedness of the problem – particularly as manifested in countries like India. CDMs are not suited to the kind of programmatic changes needed to create climate-friendly cities. A better approach, particularly for countries such as India that do not yet have a completely locked-in built environment, would be a specialized fund that could support a set of climate-friendly and measurable, reportable and verifiable (MRV) actions in cities through long-term low-interest loans or “interest-free, non-repayable financial transfers (Anonymous 2009b).

The argument would then focus on the scope of supportable MRV actions. Should public transportation be rail- or road-based? Do natural gas pipelines qualify because they encourage fuel switching in transportation and facilitate load-centre power

12. About 86% of India’s urban population lives in homes of less than 100 m²; half in homes of less than 50 m². Also, 67% of urban residents have a commute of less than 5 km. However, in large circular cities like Delhi this percentage falls; only 56% of non-slum residents in Delhi live within 5 km of their workplace.

13. Allowing per seat fares would help make these modes more accessible to the poor, but authorities often frown on these. NOIDA, near Delhi, recently prohibited sharing of autorickshaws (tuk-tuks). See Ghosh (2009).

14. See the discussion in the section entitled “Response to immediate concerns” in MouD (2007).
plants that reduce losses? What about recycling water to reduce the energy used to transport it? Should public rental housing and the additional cost of low-carbon cement qualify? Must private real estate developments be limited? What about the costs incurred trying to modify behaviour and change social norms, e.g. radio and television programming? Indeed, should international actors try to influence societal behaviour in individual countries?

In India as elsewhere, none of these solutions can unconditionally guarantee benefits and all will have irreversible consequences. As we search for responses, it is instructive to recall that “there are no value-free, true-false answers to any of the wicked problems governments must deal with. To substitute expert professional judgment for those of contending political groups may make the rationales and the repercussions more explicit, but it would not necessarily make the outcomes better” (Rittel and Webber 1973: 169) – as the example above from Delhi illustrates. The choice before us is either to play God in an ambiguous environment or wait interminably like Godot for uncertainty to abate. It is a wicked choice indeed.


As “climate-friendly” city initiatives become more commonplace around the world, renewable energy is enjoying a surge in interest. In the United States, local authorities are targeting increasing amounts of renewable power in their supply mix, purchasing green power for government facilities, educating the public on the benefits of renewables, and using various tax and zoning rules changes to encourage private investment.

In San Francisco, the local government established a target of 150 megawatts (MW) of wind capacity and 50 MW of in-city solar power by 2012 (CCSF 2002). In 2007, the City of Chicago set a goal of purchasing enough renewable energy to reduce the city’s electricity-related greenhouse gas emissions by 20% (CCAP 2007). More recently, Los Angeles’s Solar LA plan proposes to increase the city’s solar portfolio by a factor of 100, setting a target of 1300 MW of residential, commercial and municipally-owned solar photovoltaic (PV) systems by 2020 (CLA 2008).

On paper, these changes look promising, but if we examine how well most cities are doing in 2009, there is considerable room for improvement. In general, the urban energy supply of five years ago remains the same today, with “new” renewable technologies like wind, solar, tidal and biomass-based power virtually invisible in the local supply picture. For example, in New York City, peak electricity demand on the hottest summer days is approximately 11,400 MW. Renewable power systems deployed within the city currently account for just 5 MW – a mere 0.04% of peak demand – approximately the same level as five years ago.

CURRENT DEPLOYMENT AND USE TRENDS

Data on the energy supply picture in most cities are notoriously difficult to obtain. Many utilities either do not report their fuel sources or they lump different forms of renewable power in a single category, making it difficult to parse trends. There are also few reliable databases focused solely on tracking the use of renewables in different cities. San Francisco and Boston both have websites detailing the location of every solar power system deployed around the city, but...
concerns prevent most utilities from making this information widely available.

The U.S. Environmental Protection Agency tracks large-scale “green power” users around the country. Figures from July 2009 (Figure 1) show how widely usage levels vary from city to city: even large purchase volumes tend to represent only a fraction of the total electricity demand, except in relatively low-demand cities. Ironically, Houston and Dallas – best known as the twin capitals of the U.S. oil industry – reportedly use more green power than any other cities in the U.S., with more than one-third of their electricity obtained from wind farms hundreds of miles away on the barren Texas plains.

An independent database originating in Slovenia tracks the largest solar installations around the world (Lenardic 2009). Although the self-reported data may be somewhat unreliable, they nonetheless tell a similar story – that even solar power, the most “urban-friendly” renewable energy technology, has seen its biggest gains in remote areas outside of cities, in large (multiple hectare-sized) installations. For example, there are now seventeen large solar PV systems in rural Spain capable of delivering more than 20 MW of peak generation capacity, with one topping out at 60 MW. According to the same database, the largest PV systems being deployed inside cities are far smaller, generally with no more than 2-3 MW of peak capacity.

Why are cities turning to large out-of-city installations for their power rather than focusing on in-city deployment? In Paris, historic preservation concerns make it impossible to install renewable energy systems on rooftops in the center of the city, because

<table>
<thead>
<tr>
<th>City and Rank</th>
<th>Annual Green Power Usage (kWh)</th>
<th>Percent of Total Electricity Use</th>
<th>Resource Type(s)</th>
<th>Power Product Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Houston, TX</td>
<td>438,000,000</td>
<td>34%</td>
<td>Wind</td>
<td>RECs</td>
</tr>
<tr>
<td>2 Dallas, TX</td>
<td>333,659,840</td>
<td>40%</td>
<td>Wind</td>
<td>RECs</td>
</tr>
<tr>
<td>3 Chicago, IL</td>
<td>214,635,000</td>
<td>20%</td>
<td>Biomass, Wind</td>
<td>RECs</td>
</tr>
<tr>
<td>4 San Diego, CA</td>
<td>69,043,000</td>
<td>27%</td>
<td>Biogas, Small hydro, Solar</td>
<td>On-Site Generation</td>
</tr>
<tr>
<td>5 Austin, TX</td>
<td>62,466,303</td>
<td>14%</td>
<td>Biogas, Wind</td>
<td>RECs</td>
</tr>
<tr>
<td>6 Philadelphia, PA</td>
<td>25,500,000</td>
<td>4%</td>
<td>Wind</td>
<td>RECs</td>
</tr>
<tr>
<td>7 San Francisco, CA</td>
<td>25,033,977</td>
<td>3%</td>
<td>Biogas, Solar</td>
<td>On-Site Generation</td>
</tr>
<tr>
<td>8 Bellingham, WA</td>
<td>25,000,000</td>
<td>100%</td>
<td>Biomass, Solar, Wind</td>
<td>RECs</td>
</tr>
<tr>
<td>9 Santa Monica, CA</td>
<td>25,000,000</td>
<td>100%</td>
<td>Biogas</td>
<td>RECs</td>
</tr>
<tr>
<td>10 Albuquerque, NM</td>
<td>22,261,568</td>
<td>20%</td>
<td>Wind</td>
<td>RECs</td>
</tr>
</tbody>
</table>

Source: US EPA, Green Power Partnership, Top 20 Local Governments (as of 7 July 2009).
of worries they will destroy the aesthetics of the city’s renowned architecture. In other cities, the high transaction costs associated with installing thousands of small-scale systems make it far easier to opt for a large installation on a single-owner parcel of land.

From a utility’s perspective, it is easiest to work with systems that fit seamlessly into existing grid design models, which prefer large power generators interconnecting to the grid at a single location. In-city generation is fundamentally more challenging, requiring an engineering review of each installation to ensure its deployment will not jeopardize public safety or the quality of service enjoyed by other grid customers.

Finally, there is the inescapable issue of these technologies’ cost. Wind, biomass, and solar facilities all benefit from significant economies of scale, with larger installations generating power at a much more competitive price than smaller systems. Contributing to the low price point is the fact that large-scale systems tend to be sited in areas with optimal resource conditions. Cities are much trickier locations to deploy solar and wind technology, because the dense urban environment can create shading issues or cause wind conditions to vary dramatically from neighbourhood to neighbourhood (Mardaljevic 2005; Mertens 2006).

IN-CITY VERSUS OUT-OF-CITY DEPLOYMENTS

If our primary goal is to reduce greenhouse gas (GHG) emissions, then the trend towards large out-of-city installations may not pose a problem, since GHG-free renewable power offers climate change mitigation benefits regardless of site. Some efficiency losses occur in transmitting electricity over long distances to a city, but these must be balanced against the economies-of-scale advantages of the larger systems.

There are many other reasons, however, why we might prefer to deploy our renewable energy directly within the city. Job creation is an important one, as it obviously takes a large number of installers to deploy systems on buildings across a city. Second, we must remember that renewable energy can do more than just create electricity. By tapping the earth’s natural cooling powers, geothermal systems can reduce the amount of energy required to satisfy buildings’ space heating or cooling needs. This technology is most cost effective when installed on-site. Third, in-city renewables deployment can be particularly valuable on hot summer days, “shaving” peak loads to more manageable levels, preventing breakdowns on older portions of the grid, and delaying or ultimately eliminating the need for costly system upgrades.

Finally, we must extend our view beyond a developed-country perspective. In Africa, Latin America, and Asia, cities are undergoing record and rapid growth. As cities grow beyond their current borders, there are tremendous opportunities to leapfrog conventional energy technology, deploying renewable systems as an integral part of new infrastructure plans. The “eco-city” movement has pushed the limits of these efforts, maximizing the role renewables play in powering the city. For example, just outside of Abu Dhabi, the planners of the new Masdar City envision a compact city of 45,000 people powered entirely by 130 MW of solar PV, 20 MW of wind turbines, a waste-to-energy facility and district solar cooling (Dilworth, 2007). The initial phase of the project began with the construction of a twenty-two-hectare, 10 MW solar PV power plant completed in June 2009; this facility will provide a portion of the energy required to build the city.

Will the lesson from Masdar be that only new cities can achieve significant deployment of renewables? Or will existing cities finally determine workable strategies and accelerate their deployment and use of local renewables? It is still too soon to tell.

Because cities are intent on reducing their environmental impact and promoting economic development, renewables must and will become central components of urban energy systems. The proper balance between large out-of-city installations and distributed in-city resources is debatable, but it will likely depend on local resource and economic conditions; policies at the national, state, and local levels; and technological and entrepreneurial innovation. Regardless of the balance struck, much room for improvement remains today.


Ever-increasing environmental constraints demand a profound reconsideration of urban lifestyles and natural resource consumption, particularly energy. Technical solutions now make it possible to increase buildings’ energy efficiency, curbing or reducing their negative ecological effects. However, these solutions must be integrated into a more comprehensive urban planning process, steering urban forms and human behaviour towards more efficient models.

Sustainable development respects the environmental, social and ecological dimensions of our world. The environmental dimension is the one most often addressed, as it appears most amenable to simple and universally applicable solutions that limit carbon footprints, greenhouse gas (GHG) emissions and resource consumption. We can continue growth and development partly by optimizing our resource consumption, producing more growth and wealth while consuming minimal quantities of natural resources. Much current systems and technologies research aims to achieve this outcome. However, while the work under way is constructive, it is meaningless if done in isolation. In an increasingly more urbanized world where 50% of the population already lives in cities, technology alone is no panacea for all of our problems: it is crucial that we rethink our lifestyles in terms of urban organization. Cities today expand and develop according to the twentieth-century model prevalent in industrialized countries, designed for cars and a limited increase in population. This model does not suit the exponential growth of cities in developing and emerging countries; it will not even remain viable for cities in the more-developed world. By rethinking urban form alongside lifestyles and new technologies, and by integrating forms and flows (movements of people, goods, water, electricity, waste, and so forth), we can build sustainable cities and greatly increase the savings facilitated by a single, coherent system. Analysis at the city scale means eliminating separations between social, environmental and ecological dimensions, and thereby linking aspects to multiply their beneficial effects without risking that they cancel each other out.
BUILDING LIVEABLE CITIES

Research at the CSTB1 Urban Morphology Laboratory measures the city – street lengths, building heights, green areas and so forth – and uses geometric data to describe its morphology and spatial organization. The data are used to construct urban parameters that affect energy consumption and environmental performance. We can compare the performances of cities across the world by integrating their morphological parameters into energy and environmental equations, helping decision-makers organize cities so they consume the fewest resources possible while remaining attractive places to live.

Acting simultaneously on urban form, building technology and systems, and people’s behaviour would help reduce GHG emissions in successive, cumulative steps. By itself, well-thought-out bioclimatic design of urban morphology would cut GHG emissions in half. Optimizing building technology would further divide emissions by 2.5, while optimizing systems would halve them again. Finally, residents adopting “sober” or low-carbon-consuming behaviours would again divide energy consumption by 2.5. Ultimately, combining all of these factors would have a multiplicative effect, reducing energy consumption by 90% to 95%.

Studies have calculated new indicators for already-built cities and for those to be built, employing several scales – agglomeration, city, district, city block, individual building – to explore density, compactness, fractal form,2 connectivity, design-related properties, organization and size of streets, irregularity, solar admittance, and so forth. The method’s usefulness lies in its mathematical tools, which represent physical realities as numbers that are easier to measure, compare and optimize. Each parameter must be carefully handled: the interpretation of results is critical. Our laboratory has started to test these parameters in a cross-regional comparison of urban fabrics. The results show how urban forms may be transcribed as numbers, and how the built landscape shapes residents’ behaviours.

COMPACTNESS, DENSITY AND MIXED-USE AT THE AGGLOMERATION SCALE

The compactness of an urban area contrasts with the fractal form of urban sprawl, where empty spaces become visible, contours are complex and irregular, and the urban fabric becomes less and less dense. Sprawl consumes more land and generates roads of greater length, while spaces become isolated, far from amenities and shops. This type of urban fabric occurs in the suburbs of Western cities, and appears ever more widely in cities throughout the world. It can take the form of suburbs with

1. Centre scientifique et technique du bâtiment (Scientific and Technical Construction Center)
2. In this paper, the fractal form refers to the form of the city’s spatial limits, characterized by a mixture of irregular and ordered lines that repeat the same pattern at different scales.
detached houses or large-scale housing blocks. It includes little or no public transport and few local shops, making private cars indispensable and diluting the notion of a city-place. Social structures or relationships between residents are specific – neither urban nor rural – and have none of the benefits of either model, such as accessibility, familiarity or recognition in one’s neighbourhood.

What we call urban density is the floor area of buildings within a given urban perimeter. We take into account infrastructure such as roads and transportation systems, whose size diminishes the built area and thus the density. This shows that maximum density is not achieved through gigantic buildings, but rather by a continuous urban fabric of average height (three to five storeys). In fact, high-rise blocks housing large numbers of people vertically have few access points – often only one road that must therefore be very wide. Consequently, roadways take up much space, breaking up the city: they do not favour “softer” forms of travel, such as walking or bicycling. Moreover, high-rise buildings must admit sunlight and therefore may not stand in too-close proximity, and this further increases distances travelled between them inside...

**Restricting urban sprawl is a critical challenge for some countries**
the city. Studies we have conducted in various cities show that Parisian districts in the Haussmann style, with buildings averaging six or seven storeys, have a higher density than a twenty- or thirty-floor tower-block district in Hong Kong (see Figures 1 and 2).

High density has an advantage because it limits how much land the city consumes. This preserves neighbouring farmland, and limits the distances residents must travel to obtain goods, go to work and do other activities. Restricting urban sprawl is a critical challenge for some countries. For example, China's agricultural production already lags behind its population growth, making it imperative to prioritize urban food needs and to preserve cities' agricultural hinterlands. The same phenomenon is true for Paris and its agricultural basin, to a lesser degree.

Mixed uses\(^3\) at the city scale can prevent commuting in and out of the city – behav-

\(^3\) Mixed usage refers to areas where it is possible to live, shop, work in offices and/or factories, recreate and socialize within a small perimeter.

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**FIGURE 2** SPACE GREEDY VERTICAL CITIES

**Le Corbusier’s Cruciform Tower Compared to Central Turin (Italy)**

Le Corbusier’s Cruciform Tower

Plot building density is 3.6. The tower has a density no higher than Turin’s traditional urban fabric. On equivalent scales, there are only four intersections, reducing the number of routes and increasing distances. Spaces for social interaction are fewer.

Turin City Centre

Plot building density is 5. The traditional city block form means there are many intersections and possible paths between two points. On the above sample, there are 7.5 km of street façade, often in the form of arcades, and 4 km of façade around courtyards, all highly conducive to social interaction.

Source: Laboratoire des morphologies urbaines, CSTB.
behaviour that currently produces a large share of GHG emissions and creates urban traffic jams, reducing mobility and making cities less enjoyable and efficient. Mixed usage also enhances neighbourhood security. It ensures an all-day human presence, since activities take place at different times, and prevents the soulless emptied-city and bedroom-community phenomena, so unappealing to residents. While important from the environmental standpoint, mixed usage matters most from a social perspective, injecting life into urban spaces and ensuring residents’ wellbeing.

**FIGURE 3 KYOTO AND PARIS: CITIES THAT FLOW**

Built block density and Street Grids in Kyoto (Japan), Paris (France) and Guangzhou (China)

<table>
<thead>
<tr>
<th></th>
<th>Kyoto</th>
<th>Paris</th>
<th>Guangzhou</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyclomatic number</td>
<td>83</td>
<td>88</td>
<td>6</td>
</tr>
<tr>
<td>Average distance between intersections</td>
<td>52</td>
<td>153</td>
<td>518</td>
</tr>
<tr>
<td>Intersection density</td>
<td>19.2</td>
<td>6.2</td>
<td>1.9</td>
</tr>
</tbody>
</table>

Source: Laboratoire des morphologies urbaines, CSTB.
A MOBILITY-FRIENDLY CITY

Mobility within the city is of paramount importance, not only for its substantial share of direct and indirect pollution, but also for its vital contribution to a city’s economic and social development. For a city to be efficient and enjoyable, it must connect to regional, national and worldwide travel networks; and more importantly, its districts need inter-linkage to make intra-city movements as fluid as possible. A city’s “connectivity” is measured by the average time it takes residents to travel to their various activities. The efficiency of transport systems is calculated by distance travelled divided by average time. Other important indicators of connectivity include the availability of public transport, the number and spacing of stops, and areas served. Studies of urban transport must take into account the variety of transport means and their spatial distribution and speed, as well as their contribution to global warming.

Cyclomatic numbers, which count the number of circuits in a network, prove very useful for measuring a city’s degree of connectivity based simply on its block organization. A cyclomatic number gives us an idea of the number of possible routes between one point to another: the higher the cyclomatic number, the more diversified the possible routes and the less congested the city. Moreover, route diversity allows various forms of transport – such as walking, bicycling, or taking the bus or tram – adapted to different activities. The cyclomatic number, combined with the average distance between two intersections, has permitted study of several cities in different regions of the world, along with comparison of their urban block forms.

The study showed that traditional urban forms, such as those in the historical centre of Kyoto or in Paris, have many more alternative routes and much shorter distances between intersections than modern tower-block cities, such as Guangzhou. The first two cities have layouts that allow movement on foot or by bicycle, subsequently adapted for trams (Figure 3). Both cities were built before motorized vehicles, while modern cities develop solely to suit the needs of cars. This clearly creates problems: cars tend to exclude other people, occupy a great deal of space and concentrate high pollution levels. A sustainable city must allow individuals to choose their transport modes and adapt them to their activities, giving priority to soft, non-polluting means of transport – means that are more beneficial for health, accessible to all types of people, and independent of unproven and costly technological advances intended for less-polluting cars.

URBAN SUSTAINABILITY AT THE DISTRICT AND BUILDING SCALES

The study of urban forms requires thinking at the district scale. Again, mixed-use criteria come into play, allowing an arrangement of shops at street level, offices in specific buildings or on the first and second floors, and housing on upper storeys. Other facilities, such as schools and healthcare facilities, must be integrated as well. District-scale mixed uses must ensure residents can meet their daily needs by walking...
– avoiding social segregation, pollution and traffic jams, as well as saving time and creating local jobs. Public transport’s design must reflect the district scale, e.g. in the location of bus and tram stops, as well as parking places for bicycles and cars. District-level density ensures a clientele for local trades people and shorter distances between shops. Residents do not perceive such arrangements as too dense; studies have shown that they associate negative feelings of density with tall buildings, and we have seen that six-storey buildings suffice for achieving high urban density.

District scale criteria include the fractal form, solar admittance and openness to the sky. Although fractal scaling has numerous disadvantages at the urban area level, it has advantages for analyzing districts. In fact, fractal scaling introduces complexity into building and street forms, allowing green spaces to be included in the city. Overly-simple linear streets and buildings without inner courtyards make the city unattractively uniform. By contrast, treed courtyards and greenways function as air-conditioners, provide shade, collect water, retain soil and absorb some carbon dioxide emissions. A variety of urban forms allows for a diversity of routes that makes moving around the city enjoyable.

Another key variable is solar admittance, linked to a building’s openness to the sky, which makes it possible to benefit from sunshine’s light and heat. It is tricky to adapt buildings, streets and green spaces to protect the city from the summer’s heat and, conversely, to let in light and heat during winter (Figure 4). One solution is to

**FIGURE 4**

**LONDON: THE CHAMPION OF NATURAL LIGHT**

Passive zones in London (UK), Toulouse (France) and Berlin (Germany): Second floor

Passive zones (within 6m of a façade) are shown in dark red.

On average, these zones consume half the energy of non-passive zones.

plant deciduous trees along the streets: their leaves provide shade in summertime, and warmth and light from the sun after they fall in autumn.

Buildings account for a factor of 2.5 in terms of energy consumption. Their form and placement will predispose them to consume less or more energy for space heating and lighting. For example, individual detached houses have more surface areas leading to heat loss, making them consume more energy for space heating. On the other hand, contiguous buildings have fewer heat-losing surfaces and retain warmth better. Conversely, very high, large buildings may be compact and require little heating, but will be subject to ventilation problems and have a low passive volume, e.g. little area within six metres of a window that receives natural lighting and ventilation. In France, heating is one of the main sources of energy consumption in the housing sector, while ventilation and lighting are the largest in the retail and services sector. At the building level, one must therefore find a compromise between compactness and passive volume. Energy efficiency measures tend to show this trade-off prevails more often in medium-sized, contiguous French buildings than in detached houses or isolated tower-blocks.

CONCLUSION

Given the urgent need to reduce resource consumption and house a growing number of people in the world’s cities, adopting urban development and planning strategies becomes crucial. They must take into account the drawbacks of private cars: not everyone can afford them; they consume major shares of urban space, pollute directly and indirectly, and tend to exclude other transport means. The keywords remain density, mixed usage, and sober energy use through passive building design. We have shown the tools available for comparing and measuring these criteria in cities. It now becomes vital to develop the city inside the city or as an extension of the urban fabric—providing spaces for all kinds of activities and all residents, and thinking about connecting these spaces from the outset. All participants and all aspects of urban life must be assessed as a whole, before building starts—to integrate forms and flows, ensuring cities develop along a harmonious and sustainable path.
WORKS CITED


China’s sustained average growth of 10.1% per year over the past 15 years has been accompanied by a quadrupled energy consumption. Notably, energy consumption increased by 30% between the years 2000 and 2005 – an amount representing more than the total energy consumption of a country like India. Today, China’s energy consumption is equal to nearly two billion tonnes of oil equivalent (TOE). The International Energy Agency’s “business as usual” scenario forecasts an additional 55% increase in China’s energy consumption by 2030.

GOVERNMENT POLICIES
The Chinese government has become progressively aware of the importance of energy-efficiency improvements to sustained, long-term economic growth. In fact, energy efficiency is seen as a way to limit environmental degradation caused by coal-based electricity production and to promote more sustainable development. Above all, it is seen as a way to limit China’s dependence on imported energy.

Three slogans related to the government’s energy policies over the last thirty years illustrate this growing awareness: the 1983-1993 slogan, “Developing energy production on a large scale while contributing to savinga energy,” followed by “Producing and conserving energy are equally important,” replaced in 2003 by “Energy conservation and diversification of energy sources are our priorities.” In 2003 the Chinese authorities decided to put energy and the environment at the heart of their economic development plan, and started working towards a more balanced development – reflected in the new slogan, “Building a society that uses natural resources frugally and is environmentally friendly.”

While emphasising the speedy development of renewable energies (China now being the leading producer of solar photovoltaic energy), the Chinese authorities have also made energy conservation a major strategic focus in their national policy. They have launched large energy-efficiency programmes in all sectors of activity. Over the course of their 11th Five-year Plan, energy savings should represent 560 million of tonnes of coal equivalent (TCE).1

It is within this context that the Chinese authorities adopted the 2007 Energy Conservation Law of the People’s Republic of China. This relatively

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1. TCE or tonne of coal equivalent is 0.07 of a toe or tonne of oil equivalent, and equal to 780 square metres of natural gas.
comprehensive law sets out energy efficiency measures and objectives for various sectors of activity, and defines responsibility for implementation and monitoring.

It is worth noting that the 11th Five-year Plan sets out a very ambitious objective of reducing the national economy’s energy intensity by 20% in 2006-2010, entailing an average reduction of 4% per year. In its annual report, China’s National Bureau of Statistics cites a 4.59% decrease in energy intensity in 2008, whereas the reduction achieved during the first year of the Plan was only 1.2%.

**THE URBAN CONTEXT**

Chinese cities have undergone massive growth over the last 30 years. Currently, 43% of China’s total population lives in cities. There are nearly 17.5 billion square metres of urban buildings, of which 65% are residential buildings. Over the last dozen years, approximately one billion square metres per year have been built, of which more than 600 million square metres of residential buildings.

China has had energy consumption standards for new buildings since 2000. While the compliance rate for these standards was very low initially – about 2% in 2001 – it has since improved significantly, as provincial as well as national authorities conduct regular inspections. Thus, the percentage of compliant new buildings rose from 21% in 2005 to nearly 90% in 2009. Taking these measures into account along with the enormous increase in total structures, 20% of all Chinese buildings are now energy-efficient, compared to only 1% or 2% in 2000.

The Chinese authorities also launched several energy-efficiency retrofitting programmes to optimize energy consumption in existing buildings. According to the objectives of the 11th Five-year Plan, the entire building sector must reduce its energy consumption by 110 million TCE, of which one-third or approximately 27 million TCE will come from improving energy efficiency in existing buildings. The Chinese authorities have concentrated their efforts in the Northern provinces where the climate is harsh. The priority targets are 3.2 billion square metres of buildings with central heating systems. The five-year objective aims to renovate 150 million square metres, which will double to 300 million square metres in the next five-year Plan. It is worth noting that 150 million square metres represent only 6% of the residential buildings that could be renovated in the region, and that these energy-efficiency programmes depend upon heavy national subsidies. The latter are enhanced by provincial and municipal subsidies, which cover up to 75% of the costs.

In addition, the Chinese authorities have targeted about twenty “pilot towns” across China for various energy-efficiency experiments. The selected towns include some in China’s temperate region (where four months of heating and six months of cooling are needed), even though retrofitting operations will not take place there until the 12th Five-year Plan. These pilot experiments call for installing energy-consumption monitoring systems in the government’s office buildings and in large public and private buildings.

**NEW APPROACHES TO MOVE FORWARD**

China, like most countries, faces the usual barriers in moving from small-scale pilot projects to a full-scale programme. International experience has shown that successes occur in the experimental phases, and come primarily from initiatives developed at the local or regional level – rarely from national implementations. Experience has also shown that success in changing scale depends on a new approach and three essential factors: (1) identifying which technical and economic aspects of energy-efficiency measures to implement; (2) conceiving suitable financing mechanisms; and (3) mobilizing new participants in the programme.
Solving technical and economic issues is the basic sine qua non. Knowledge of technical requirements is critical (should the building envelope be partially or totally insulated? What interventions are needed in heating, cooling or lighting systems? and so on), as well as what energy savings can be achieved for the money invested. Such analysis permits building owners to identify clearly the work to be done and the time needed for a return on their investment. It also allows decision-makers to identify the economic, technical and energy challenges resulting from various levels of retrofitting. Therefore, it helps guide energy-efficiency policies in a given climate region.

Conceiving new financing mechanisms is equally critical to the success of this change in scale. They should supply the resources necessary to respond to identified needs. Taking account of the amounts at stake, financing mechanisms cannot include long-term project subsidies, and favour recourse to the banking system owing to its ability to leverage funding. Furthermore, financing mechanisms should adapt to the range of elements that require financing, and to the needs of various participants and the multitude of beneficiaries. Financing mechanisms should encourage participation and should favour, as much as possible, the partial recovery of investment costs via energy (and thus money) savings. In addition, the financing mechanisms should favour the creation and growth of an energy-efficiency retrofitting market.

Finally, the successful transition from small-scale projects to large-scale programmes depends on mobilizing a large number of stakeholders. Various governmental ministries and administrative offices at the national, provincial and municipal levels must become involved. In many countries, government bureaucracies have difficulty working cross-functionally, especially when leadership is not clearly defined. Obviously, these efforts call for close association with the banking sector, as well as energy producers, energy service companies, project owners, construction companies, installers, manufacturers and professional associations, as well as universities, laboratories and research scientists. These various participants should enter into a dialogue, learning to work together and to adapt to one another, to meet the set objectives. That dialogue is possible only if the government supports the creation of a framework for discussion and cooperation. In fact, the government should focus on defining energy-efficiency policies and programmes, as well as leading networks of stakeholders. It should also support jointly defined financing means and mechanisms, and promote policy implementation by all public and private economic agents. Its role is critical in addressing long-term energy and environmental concerns in a way that market forces alone cannot do.

These innovative approaches have already been investigated, in a 2006 research programme launched by the provincial authorities of Hubei and the City of Wuhan with the support of AFD4. The programme targeted public and commercial buildings. The first results were presented at a seminar in Wuhan in May 2009. The Franco-Chinese seminar was co-organized by AFD and the Chinese Ministry of Housing and Urban and Rural Development. It brought together many of the stakeholders and participants described above, as well as representatives from all of the provinces in the Chiang Jiang (Yangtze) region. During a working group meeting held in Paris in October 2009, the Chinese authorities confirmed their government’s interest in pursuing this innovative approach and in developing discussion and cooperation groups in Wuhan and one other province. As a concrete demonstration of the approach’s ability to achieve scale, the City of Wuhan simultaneously offered to carry out the retrofitting of one million square metres.

4. AFD is the Agence Française de Development, the French bi-lateral development bank for aid and cooperation.
“CHINESE CITIES HAVE UNDERGONE MASSIVE GROWTH OVER THE LAST 30 YEARS. CURRENTLY, 43% OF CHINA’S TOTAL POPULATION LIVES IN CITIES”
Even though issues such as access to clean water and sanitation affect the health of city dwellers, governments in developing countries do not prioritize environmental concerns. But when governments do address these issues, often with help from the international community, they must find solutions that fit with local needs and customs. Often, both governments and new urban residents require an apprenticeship in healthy urban living.

**AFRICA: IMPROVE BOTH ENVIRONMENTAL AND HUMAN HEALTH**

As the urban population doubles between now and 2030, cities must make room for as many new residents as they currently shelter. This growth poses a real challenge to human health. City dwellers face many poorly-assessed health consequences from air, water and solid waste pollution. Determining environmental pollution’s role in health has become vitally important. Just as health is an engine of sustainable development, sustainable development can improve people’s health in turn. The infrastructure needed for sustainable urban development has not kept pace with the demographic growth of cities. Furthermore, many African countries lack sufficient economic growth and sound development policies. By concentrating a large number of people in one area, cities increase pollution risks from multiple sources – often without knowing how to assess the risks or protect people from the effects.

This paper will evaluate how cities in developing countries grasp the pollution problem. We will look at two African cities to assess the origins and health impact of pollution. The practices of households in Yaoundé, Cameroon, provide an opportunity to study many sanitation challenges in one city. Ouagadougou, the capital of Burkina Faso, shows how despite many obstacles, some cities pursue more sustainable urbanization by implementing household waste disposal. We will show how highly local solutions are needed more than international plans. We will see that raising people’s awareness about pollution and the importance of protecting the environment helps them understand crucial differences between occupying rural and urban spaces. Finally, we will see how this awareness and local participation can support more sustainable development.
POLLUTION IS AN ANCIENT PROBLEM
The banal word “pollution” refers both to activities that degrade the environment and to different types of contaminant: chemical, organic, particulate, etc. While all pollution is noxious, pollution's impact on health remains difficult to assess. Numerous studies, particularly in Western countries, describe air pollution and its health effects (Leikauf 2002; Ly 2007; Theophanides et al. 2007). In developing countries with deficient sanitation, pathogen-contaminated drinking water often causes diarrheal diseases (United Nations 2008; WaterAid 2008). Other pollutants also affect water, nitrates used in fertilizer being a leading contaminant. Accumulation of solid waste – which usually evokes a nasty image of landfills full of slowly rotting, abandoned waste, attracting rodents, insects and birds – has less well-known effects on health. Health problems seen in people living near dumps come less from pollutants' toxicity than from the worry created by foul odours (Lhuilier and Cochin 1999; IAURIF 2007).

Pollution is neither a recent nor an episodic problem. In 400 B.C., Hippocrates linked the intermittent fevers of malaria to certain weather and environmental conditions. However, for much of the pre-modern age, pollution had limited causes and importance. It usually resulted from local surface and ground water contamination by bacterial pathogens and microorganisms in household waste. Only after the Industrial Revolution at the end of the eighteenth century did the human impact on the environment become more noteworthy (Guillerme 2007).

At that time, scientists, industrialists and farmers in what are now developed countries saw the city as a font of natural resources; their new urban projects ensured a certain level of healthfulness, since nothing went to waste. However, once the city ceased supplying those resources, it was no longer able to consume its own waste. The beginning of the twentieth century witnessed a progressive depreciation in the value of urban excrement, which was then called “waste” and “wastewater” (Barles 2005). Europe in the nineteenth century was the theatre of massive cholera and typhoid epidemics that eventually led to great advances in sanitation. John Snow, a British physician who studied the propagation of the 1854 cholera epidemic in London, hypothesized that the city’s water supply transmitted the disease.1 England then launched water treatment facilities to reduce the threat of illness. At the same time, the French chemist and biologist Louis Pasteur discovered the risk of bacterial contamination through human and animal contact, giving rise to an interest in hygiene. These new theories of disease slowly changed the fabric of the city through many different proponents, ranging from the French civic planner Baron Haussmann to the sanitation engineers who devised water treatment and purification techniques (Frioux, 2007; Barraqué 2007). Water supply networks and

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modern sewage systems were put in place. These improvements, along with medical progress, contributed to a clear improvement in the health of urban populations, which immediately translated into an increase in life expectancy.

**MANY RISKY SANITARY PRACTICES IN DEVELOPING COUNTRIES**

Cities in developing countries bear no resemblance to their developed counterparts: sanitation is insufficient and of poor quality. Solid waste is thrown outdoors with residual water, which can have negative health effects. One-fourth of city dwellers in sub-Saharan African do not have access to sufficiently clean water, and half do not have access to proper sewage facilities (FNUAP 2007). From 1975-2000, only about thirty public wastewater treatment stations were constructed in all of Western and Central Africa (Figure 1). In 2002, these stations represented nearly 20% of the collective waste treatment works in the region. Despite their simplicity, they soon faced reductions in material and financial operations support – quickly exceeding their initial capacity and weakening their output. They have also contended with poor quality monitoring of treated wastewater and effluent.

In Yaoundé, public authorities make considerable efforts to clean up the city, but the results fall short of ever-growing needs. Projects for sanitation systems focus primarily on the city centre and modern neighbourhoods, leaving densely-populated traditional and “spontaneous” or unplanned squatter neighbourhoods untouched. Thus, the enclaves on the valley floors and mountainsides where the poorest people live, areas regularly subject to flood and erosion, have absolutely no storm water management or sanitation systems. To address environmental pollution problems, Cameroon’s government passed a law in August 1996\(^2\) specifying the legal framework for managing the environment across the country. The law accompanied a national environmental management programme;

\(^2\) Law number 96/12 of 5 August 1996.
one whose implementation, however, has fallen short because of inadequate financial resources (Ngwé 1999), a multitude of decision centres, and absence of coordination, leading to wasted resources and conflicts over turf.

**SANITARY RISKS LINKED TO TYPES OF SANITATION**

Developing and developed cities generate large amounts of liquid waste. In Bamako, Mali, the National Direction of Sanitation and Pollution and Nuisance Control estimates household wastewater production at 28.3 litres per inhabitant per day. That is far less than the 118 or 225 litres produced per inhabitant per day in Islamabad and Montreal respectively. In Yaoundé, wastewater disposal volumes are very high and represent 90%-95% of the volume of water consumed, while only 7.3% of Cameroonian households have modern sanitation equipment. Nevertheless, an average consumption of 60 litres of water per day per inhabitant would require daily disposal and treatment of nearly 62,400 cubic metres of wastewater. However, the ten wastewater collection and treatment stations that served 1.2 million people in 2002 are now old and function poorly (Wéthé 2001; Kengné et al. 2001). Indeed, 70% of wastewater, equalling five cubic metres per day and per urban hectare, goes into ground disposal, with a level of pollutants higher than World Health Organization standards. The wastewater is full of suspended solids, up to 2,600 milligrams per litre at the Cité Verte station versus a standard value of 30 mg/l. It also contains high levels of phosphorous (27.9 mg/l versus a standard of less than 1 mg/l), ammonia nitrogen (around 80 mg/l for the Grand Messa and Cité Verte stations versus a standard of 0.5 mg/l), faecal coliform and streptococci (from 103-107 UFC/100 ml), organic matter, and heavy metals such as cadmium, lead and zinc (Nguendo Yongsi 2008; Hien et al. 2008). This leads to fears that pollutants will soon exceed the ground’s self-cleaning capacity, increasing groundwater pollution at a time when 65% of residents have no running water and depend on wells and springs. Such situations accentuate faecal exposures that cause diarrheal diseases and account for 13% of infant deaths worldwide. To make up for the government’s abandonment of sanitation services, residents turn to independent sewage collection and disposal services, although as we will see, their proliferation also affects urban health.

**RISKS VARY ACCORDING TO NEIGHBOURHOOD**

A cross-sectional epidemiological study of Yaoundé showed the diarrhoea prevalence rate averaged 14.4% among survey participants. The type of wastewater treatment used in each area determined important disparities between zones (Figure 2). Diarrhoea prevalence rates proved highest where people disposed of sewage

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3. The IRD (Institut de Recherche pour le Développement), the Pasteur Centre of Cameroon and the University of
directly into the environment; in general, the rate topped out in the so-called spontaneous or unplanned neighbourhoods at 73.2%, and more specifically in spontaneous neighbourhoods around the centre of town at 38.4%. In these types of neighbourhoods, people generally dispose of wastewater via a small drain carved by rainwater that empties into a ditch in the street. These drains are rarely maintained and slalom down hills and between houses, quickly transforming themselves into pools of soapsuds that are sometimes colonised by mosquitoes. By maintaining a certain level of moisture on impermeable soil, this wastewater disposal practice encourages the growth of microorganisms. It is also conducive to certain kinds of nematode eggs that cause diarrheal outbreaks in the city. In planned working-class and modern residential neighbourhoods, the highest diarrhoea prevalence rates occur primarily in households located in minimally-developed areas (sold by the city council through a housing programme, MAETUR),4 and in recently-moved households not yet connected to the water distribution network.

Such is the case in the Maison Blanche and Ngouso-Yanda neighbourhoods. The highest diarrhoea rates occur in the old, planned working-class neighbourhoods such as Nkomkana, Mballa IV, Minboman III and IV. High rates also occur in central “spontaneous” neighbourhoods such as Mvog Mbi, or those around the centre such as Etoa Meki (Nguendo Yongsi 2009). Wastewater tossed into a courtyard can only, at best, run through channels cut into the dirt by erosion or by the inhabitants. The absence of coordination between many individual actions results in communal harm: everybody tries to make sewage run away from his or her plot of land without paying attention to whether it runs into a neighbour’s plot. Health risks are lower where there are slopes that drain more quickly, as in the urbanised edge neighbourhoods of Mballa III or Bilono. On the other hand, health risks rise in low-lying areas where water stagnates in indentations and in smelly black puddles, and where all sorts of potentially disease-spreading insects swarm. High rates of diarrhoea occurring around the fringe of the city centre arise, in part, from human occupancy in these low-lying, swampy areas.

If people have access to clean drinking water drawn from areas far from human habitation, the consequences of poor sanitation systems and wastewater disposal into the immediate environment may prove less Paris Ouest La Défense conducted a research programme that aimed to analyse the social and spatial disparities in diarrheic diseases in children less than five years of age in Yaoundé. The survey took place in May 2002 and examined more than 3,000 children in 20 neighbourhoods.

4. MAETUR is the Mission to Develop and Equip Urban and Rural Lands.
serious, at least in the short term. On the other hand, people who live in badly or un-developed urban spaces usually find access to clean drinking water quite difficult. They more often obtain water from poorly-protected, polluted, shallow wells. Individual sanitation systems, based more on do-it-yourself skills than genuine expertise, carry even greater risks than collective systems. That said, diarrheic diseases result from a combination of physical, social and environmental factors within a geographical area. They correlate to environmental disposal of wastewater, but also to population density and education levels of urban residents – people who do not always understand the risks they incur through such non-management of their environment.

INNOVATIVE STRATEGIES
Sewer systems may not prove the best solution for developing countries. Building sewer networks would be relatively expensive in many such countries because their cities tend to spread out over large areas. Furthermore, simply building more wastewater treatment stations would not suffice: such stations require maintenance, as do the sewage pipes. The challenge appears even greater given that, at present, some African cities cannot even maintain their simple open gutters. In addition, gutters run randomly in neighbourhoods, without connections to larger-capacity sewage systems. These systems’ insufficiencies were particularly conspicuous in Ouagadougou during the record deluge of September 2009, when 260 millimetres of rain – nearly a third of the annual total – fell in one day. All the same, a network of pipes built especially for the sub-Saharan milieu might possibly have reduced the damage to the city centre. The present circumstances call for solutions better-suited to the context, such as individual dry pit latrines, pour-flush latrines, constructed wetlands, and so on.

In nineteenth-century Europe, sanitation infrastructure, like water and electricity networks, depended on subsidies for installation. Cities followed a course of decentralisation in the twentieth century (where responsibility devolved upon local rather than national authorities), using taxes, state and federal subsidies and loans to extend these networks and hook-ups. In developing countries at the beginning of the urban population explosion, such infrastructure was financed by the public sector or semi-public funds. However, structural adjustment programmes and scattered donor funds have led to a drastic reduction in available aid money. Aid funds spent on sanitation sometimes produce the opposite effect of that intended. For instance, sanitation works sometimes have restricted spatial scope or lack coordination with other works, as when gutters are built alongside shortened roads or when they do not form part of an overall urban plan. Furthermore, the simultaneous decentralisation of authorities’ responsibilities has made it impossible to raise donor funds. Other solutions need to be explored for financing infrastructure essential to improved living conditions and environmental protection – solutions such as rate-setting, cross-sector subsidies, sharing costs of managing services, drawing on national contributions in the name of solidarity, and so on.
Furthermore, the situation in developing countries today differs greatly from that of Western countries when they first addressed urban environmental issues. In Europe at the time, the urban growth rate was slower since a reduction in both birth and death rates had already taken place. In addition, Western countries had more resources, in contrast to developing countries today, where even water is less available and where it also seems quite difficult to streamline services. Even in Western countries, public hygiene policies were not implemented overnight. They took shape through legal frameworks that initially focused on techniques rather than on an overall system, and that provided a rather limited vision of the urban environment and its concerns. Today, by contrast, one can scarcely imagine environmental improvement and preservation succeeding without community support and participation.

The stated ambitions of the international community, and the investments required to fund that ambition, will not suffice unless local residents recognize the importance of environmental care for ecological and human health. Inertia is certainly a strong force, as seen in the cholera epidemics that strike an increasing number of cities in Africa. Ouagadougou did not escape a cholera epidemic in 2005, despite having won the United Nations prize for environmental efforts at the 2003 Africités congress of African mayors. Although local health authorities stressed the importance of good hygiene habits to protect against faecal contamination, as soon as the epidemic was over, merchants took up their former places along the roads without worrying about dust or poisonous effluvia in the air. Meanwhile, households hit by the disease abandoned efforts to fix up their home plots to ensure better hygiene in the future. However, improvements and progress would only require minimal political, individual and community commitment. The connections between the environment and health have long been well-known, but few research studies exist about the spatial and social disparities in health within cities. The preconception that people live better in cities because of access to schooling, healthcare, equipment and commerce must be reassessed. Simple availability of facilities and services does not guarantee their effectiveness. Other social, economic and cultural barriers in the city can prevent their use (Fournet, Rican and Salem 2006).

OUAGADOUGOU: OBSTACLES TO IMPLEMENTING WASTE MANAGEMENT

The management of household solid waste poses another challenge for African municipalities. They encounter great difficulties in providing waste management services because of rapid and uncontrolled population growth and changes in consumption habits that increase waste volumes. The capital of Burkina Faso, Ouagadougou, attempts to meet the United Nation’s international guidelines for environmental preservation through suitable urban policies. Between 1996 and 2006, it underwent population growth estimated at 5.2%, bringing its total population to 1,475,223 inhabitants. Today, the city produces 300,000 tonnes of household solid waste per year. That number may reach 900,000 tonnes in 2020, of which less than half will be treated.
From Burkina Faso’s independence in 1960 until the end of the 1980s, a municipal service known as DINASEНЕ⁵ offered a highly centralised solid waste collection system. Sanitation services in Ouagadougou were reorganized in 1986, under the influence of both the international community and the Burkinabe government. During the revolutionary period beginning in 1983, and then under the “rectification” regime since 1987, a “clean city” campaign has combated the accumulation of filth. Urban cleanliness and sanitation became national priorities, while improving the quality of life became a pillar of the government’s development programme: its goal was to rebuild neighbourhoods considered unhealthy. Urban Development Projects (UDP) became fundamental tools for implementing waste management policies. Starting in 1986, the Second UDP put seven dumpsters and 115 solid waste cans in place. In 1991, the Third UDP entered the solid waste collection sector by including new participants from the waste management field, thanks to Structural Adjustment Programmes (Arcens 1997; Bayili 2000; Tidiane 2005). In 1996, ONASENE’s⁶ breakdown led the government to dissolve it and transfer its responsibilities to municipal technical services as part of an emerging decentralisation policy. The city thus found itself in charge of sanitation, the fight against insalubrity, pollution and nuisances, and the collection and discharge of household solid waste. Private companies perform these services for households on a monthly subscription basis, for rates that vary according to the volume and frequency of collections. The city also launched an ecologically sound solid waste management programme, and wastewater became a priority issue. The city devised a way to improve collecting domestic residues, as well as those from retail shops, workshops and offices, and financed these efforts on the principle of “the polluter pays.”

In addition, a National Action Plan for the Environment was adopted as a component of an “Agenda 21”⁷ for Burkina Faso (Meunier-Nikiema 2005). Enacted laws reveal a relatively recent interest in protecting the environment. The first,⁸ from 1998, forbids “keeping or abandoning urban waste in conditions that encourage nuisance animals, insects and other vectors of disease that can harm people or property” (Meunier-Nikiema 2007). In 2005, another law⁹ pertaining to public hygiene introduced terms for pre-collection and controlled discharge in the waste-elimination process. Obligatory waste collection was extended to all neighbourhoods and the city was divided into twelve zones, each assigned to a private collection company.

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5. National Directorate of Maintenance, Cleaning and Beautifying Services (Direction Nationale des Services d’Entretien, de Nettoyage et d’Embellissement)
7. Agenda 21 is a sustainable-development related programme run by the United Nations.
that provides “proof of use” receipts to customers. Thirty-five pre-collection centres were built throughout the city. A treatment and waste-recovery centre that combines sorting, recycling, composting and technical burial was set up on the northern edge of the city, near the village of Polesgo.

**WASTE COLLECTION SYSTEM MALFUNCTIONS**

Laws are hard to enforce when a large portion of the population does not understand the link between disease and solid waste thrown into streets. Managing household waste depends on the capacity of companies to satisfy potential demand, peoples’ interest in their environment, and their living standards. The 1996 national census10 showed the percentage of heads of households using diverse means of waste disposal: 31.1% used an individual dustbin; 27.8% threw household solid waste onto piles of filth; 13.1% threw solid waste into the street; 11.6% used a solid waste can; 8.3% threw solid waste into pits; and 8.1% used another means (Fournet, Meunier-Nikiema and Salem 2008) (Figure 3). The census results demonstrated a clear difference between habits in central and peripheral districts: in the city centre, the majority used individual dustbins, or solid waste cans provided by the municipality.

The opposite held for the city’s periphery. Excepting residential neighbourhoods such as the *Zone du Bois* in the east or part of the *Patte d’Oie* neighbourhood in the south, people more or less haphazardly discarded solid waste in public spaces. In neighbourhoods where people with an average standard of living lived alongside people with a lower one, behaviours varied more, as in the *Tampouy* neighbourhood in the northwest of the city. The exterior ring thus delineated shows a city confined to certain limits in managing waste. Such spaces demonstrate discontent with public services, whether health- or education-related. This situation benefits the relatively scarce private services that residents may be able to afford but whose quality is unproven. Moreover, the lack of pre-collection points throughout Ouagadougou has led informal operators as well as official private companies to illegally discharge household solid waste on reserved city land or empty lots, or else to use wildcat dumps on the city’s edge. Improving the waste collection circuit has therefore become urgent, a task that draws on findings presented at various environmental conferences.

**INDIVIDUAL WASTE MANAGEMENT BEHAVIOURS**

The first obstacle to constructing a common waste management procedure is its use as a source of organic material for urban agriculture. In Ouagadougou, a portion of the collected household solid waste is discharged onto agricultural land along the urban fringe. However, such waste no longer consists only of biodegradable

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10. The census was conducted in areas of 1,500-2,000 people, which requires one-and-a-half to two days of work by a census agent.
FIGURE 3 WHAT PLACE FOR THE DUSTBIN IN OUAGADOUGOU?

Waste disposal in Ouagadougou (Burkina Faso)

Most-used means of disposal:
- Dustbin
- Waste can
- Pile, street, pit

(Typologies shown)


Pre-collection centre (2003)

Boundaries of pre-collection sectors

Enumeration area

Tanghin Neighbourhood

Dammed lake

Sources: based on a map by A. Meunier-Nikiema and E. Cadot (AUF-IRD); INSD, RGPH (1998).

Atelier de cartographie de Sciences Po, novembre 2009
products. Furthermore, while village residents can do as they like with their private spaces – a Moaga proverb says “The dog is master of his courtyard” – small home plot sizes drive urban dwellers to use public areas for what they cannot do in their own spaces (Déverin-Kouanda 1993). Such behaviours are especially noticeable among new city residents. People born in the city or long-time residents are more sensitive to solid waste collection and cleanliness issues than newly-arrived residents, who maintain rural practices and seem little bothered by waste accumulations. Outside of subdivisions or council lots, housing density does not leave much empty space for use as informal public dumps, in contrast to planned housing areas. Indeed, in such spaces and wherever there are high densities, residents will continue to discard waste outside of their own lots. This may less reflect personal choice than the simple lack of basic city services.

Even if the city makes people think of their environment somewhat differently – because high density and limited space create nuisances linked to household solid waste – old behaviours clearly have not disappeared. For this reason, the government has difficulty exporting new forms of environmental management beyond the largest cities in the country, even as smaller cities face increasing amounts of waste produced by urban living. In developing countries, recent public policies aimed at protecting the environment, improving quality of life and fighting pollution do not stem from the urgency of the public health situation, but rather from global directives coming out of grand international conferences. In any case, one might question whether people in developing countries perceive a link between premature death and pesticide exposure or smoke emissions, given the many forms of social aggression they experience daily. Furthermore, developing countries’ public health policies are more often directed toward care than prevention.

The lethal London fog of 1952 played a decisive role in creating public policies to control air pollution, policies later adopted by the other European countries (Logan 1953). It is by no means certain that pollution issues will similarly increase governments’ awareness in developing countries. Over the last twenty years, successive health policies in developing countries have focused on primary care. The Bamako Initiative finally created space for the subject of urban health, which had been considered privileged compared to its rural counterpart. These new policies took the shape of creating districts and implementing community participation, cost recovery, vertical and integrated programmes, among other strategies. They did not use any national contexts to frame their structure and were far less interested in prevention than in curative care. According to the French philosopher and physician Georges Canguilhem, health is not an ideal state so much as “the ability to overcome crises” (Canguilhem 2009). One finds two prevalent depictions of health in current policy thinking. In the first model, health appears conceived in terms of illness and the healthcare system becomes the determining element. The second model calls up a vision of public health where social, economic, individual and collective factors play a role. In developing countries, it is always the first model that underpins the conception of health policies.
CONCLUSION
Most citizens, along with economic, political, social, sports and cultural services and activities, concentrate in cities. To support this activity, cities develop complex relationships with their environment. Theorists have described the notion of “the urban metabolism” (Barles 2005). The description of sanitation in Yaoundé and of waste management in Ouagadougou shows the city is not a unitary system onto which an engineer’s management model can be applied. Urban growth management in developing countries can only draw on local solutions adapted to a given society’s resources. These solutions range from reducing pollution sources to promoting a better-quality environment. They must take into account that the passage from a rural milieu to an urban one brings changes in perception of space: one moves from an open to a closed space, where the difference between private and public space becomes more important. Urban residents have to learn about this difference. They must not conceive the urban milieu as a natural environment in the biological sense of the term, but as a built one. Consequently, it is up to people living cities to construct a sustainable environment, without seeking to preserve a natural environment that no longer exists. This quest implies and demands that urban dwellers become conscious of their environment, and acquire the will to develop it in the most sustainable way possible. ■
China’s most dynamic region is the metropolitan area that encompasses the Pearl River Delta (PRD) in Guangdong Province, together with the special administrative regions of Hong Kong and Macao. This 42 square kilometre area is China’s wealthiest region and its most economically advanced. Intense industrial activity occurs within this very small geographical area, where GDP has increased from US$89 billion in 2000 to more than US$300 billion in 2007, and the average real rate of GDP growth between 1980 and 2006 exceeded 16%, well above China’s national growth rate of 9.8% (Enright et al. 2006: 4-6). Such a rapid pace of growth carries a price tag. The environment has significantly degraded, in particular as regards air quality. Much can be learnt from how the PDR region is dealing with air pollution, and from the challenges of prioritizing public health, defining air quality standards, accessing reliable data, integrating government functions, and achieving intra-regional cooperation. Cities and metropolitan areas in China (and elsewhere) need to integrate various disciplines as they chart public policies to address pollution and its effects. The next decade could see much larger investments in environmental and ecological protection in the whole PDR metropolitan region.

The PRD is one of the world’s most active export production regions. Indeed, it is where China’s export manufacturing capacity originated in the early 1980s (Enright et al. 2007). It is a major manufacturing centre for everything from telecommunications equipment to textiles and toys, appliances and paper to auto parts, mobile phones and petrochemicals (HKTDC 2008). The movement of raw materials, parts and components into the region for production, and the shipping of finished products to global markets place Hong Kong and Shenzhen among the world’s ten largest container ports.

The entire region is affected by emissions (including carbon dioxide) arising from these activities, including pollution from land and sea transportation. The gradual loss of visibility in Hong Kong evinces its dramatic increase in air pollution (Figure 1). From the mid-1990s, the problem became much worse, and by 2003-04, there were some months where most days were hazy. This problem is pervasive throughout the whole of the PRD.

Air pollution has created a new disease burden for the people of this region, the extent of which
is only now becoming clear; many gaps remain in understanding how air pollution affects the health of the approximately 50 million people of the region. Annual avoidable deaths attributable to 2006 pollution levels were conservatively estimated at 10,000, with 94% occurring in the PRD and the rest in Hong Kong and Macao (Wong 2008). Moreover, air pollution was responsible for some 440,000 hospital bed-days and 11 million outpatient visits. The costs associated with air pollution amounted to RMB 1.8 billion a year in the PRD, HK$ 1.1 billion in Hong Kong, and HK$ 18 million in Macao. Adjusted for differences in per capita GDP across the region, the yearly health-related costs of air pollution in the PRD are seven times higher than in Hong Kong, amounting to RMB 6.7 billion (Hedley et al. 2008).

Experts see these findings as the “tip of the iceberg,” since many residents in the region require doctor visits and hospitalization, and even succumb to premature death. There is considerable pain and suffering as well, the cost of which is difficult to calculate in economic terms. Thus, the monetary costs represent a small part of the real price of air pollution-induced health impairments (Hedley et al. 2008; Loh et al. 2008).

In the PRD metropolitan area, the first challenge is determining where public health fits in a long list of priorities. In most cases, the people are simply unaware of the ways air pollution compromises their health, as shown in Figure 2. A related challenge for the authorities, and for society as a whole, is viewing environmental and health protection as drivers of economic development, and not just as “costs:” cleaning up pollution is an economic activity and a path to development.

The second challenge concerns how to set air quality standards. Aggressive emissions reductions inevitably affect vested interests in the power-generation, industrial and transportation sectors, which usually command considerable influence in the political process. In Hong Kong, citizens rather than civic authorities have pushed to tighten air quality standards using the 2006 World Health Organization guidelines. This was accomplished after several years’ support for new research that focussed on the health impacts of air pollution on the Hong Kong public (see Trumble 2007).

The third challenge entails comprehensive data on emissions and health for policy-makers to devise evidence-based solutions. Specific competencies needing development include long-term cohort studies, collecting and compiling accurate air emissions data, and accessible reporting – all vital, given concerns about data reliability in the PRD (Wong 2008).

The fourth challenge is to understand the need (and find the political will) to integrate government functions dealing with environmental protection, transport, policing, city planning and public health, to achieve good air quality and public health management. Even in the case of Hong Kong, the authorities prefer “end-of-pipe” solutions than integrated ones because the former are comparatively easy. However, end-of-pipe solutions have proven insufficient to clean up roadside pollution in densely-populated Hong Kong. Good results will require their coupling with planning, well-designed management and pricing initiatives.

The final challenge has to do with intra-regional collaboration. Air quality standards, laws and administrative systems within the PDR region vary quite significantly. However, since 1999, authorities in Hong Kong and Guangdong Province have begun a regional emissions inventory that will be updated on a regular basis, and both sides agreed in 2002 to reduce emissions by up to 55% by 2010 on a best-efforts basis.
basis. Governments need to make significant investments toward monitoring emissions, collecting data, and training a workforce competent to handle and test samples and to interpret the results. Solutions for air quality management require harmonized standards and sustained efforts that stretch from environmental officers to universities.

Recently, China’s National Development and Research Commission (the national planning authority) published an Outline Plan for the development of the PRD that calls for increasing per capita GDP and sustaining 12% annual growth (NDRC 2008). The plan’s weakness is that it lacks discussion about the demands on energy resources and fragile ecosystems. The Outline Plan embodies the conflict between growth and achieving sustainable development, and typifies the struggle in many regions. The issue of growth-related public health impacts, now under debate in Hong Kong, carries a spill-over effect in the PRD – because while Hong Kong can clean up its own emissions sources in power generation and road transportation, it must collaborate with Guangdong Province to reduce emissions in the entire region. Moreover, Hong Kong manufacturers have a responsibility, and should have the self-interest, to clean up pollution in the province, since emissions from their factories in the PDR and from its port and logistics activities affect Hong Kong residents, too. Beyond government efforts, universities, private philanthropic bodies and non-governmental organizations such as the Clean Air Network also have crucial roles to play in supporting public health research and civic advocacy. All these efforts and increased awareness of the value of clean air could signal the next phase of industrial transformation – a more sustainable one where public health plays a greater role.

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“CITIES AND METROPOLITAN AREAS NEED TO INTEGRATE VARIOUS DISCIPLINES AS THEY CHART PUBLIC POLICIES TO ADDRESS POLLUTION AND ITS EFFECTS”

CHRISTINE LOH
The bigger a city is, the more complex its relationship with the hinterlands that surround it. To obtain the resources that it lacks, a city must either impose its demands upon these hinterlands or negotiate a sharing arrangement with them. Water is a noteworthy example because the invention of water purification added a qualitative dimension to the quantitative issue. Since the Industrial Revolution, three main urban water supply strategies have developed, each relying upon a combination of government, technology and economics. Following a phase where technical solutions – water treatment – dominated, there is now a return to cooperating with rural areas to prevent pollution of upstream drinking-water sources.

THE CITY RETURNS TO ITS HINTERLANDS FOR NATURAL RESOURCES

Since Antiquity, empires and kingdoms have sought to supply water to their capitals, and sometimes to other cities, by other means than increasing the number of wells in their own territories. The first example that comes to mind is the Roman aqueducts. They still serve as reminders that the Mediterranean climate, more than that of other areas, required water from distant sources. Similar means were used elsewhere around the world. For example, at the beginning of the first century A.D., China diverted waterways to irrigate plains and to supply centres of government. At the time, this supply was used indiscriminately for agriculture, households (public fountains) and craft-production purposes. These conditions persisted until the nineteenth century, except during the Classical period in Europe, when urban development grew out of a proto-industry based on decomposition and putrefaction of organic matter, such as flax maceration. Neo-Hippocratic physicians then found a new reason to bring water to the city: to wash it clean and flush out the “miasma.”

This could be accomplished either by pumping water from a nearby river, or by building new aqueducts to carry in water assumed to be clean. Increasingly-polluted wells in urban territories no longer supplied enough water. Cities needed concessions to extract water from distant regions, often at the expense of local users, and this required government intervention. With state support, the capitals and large cities brought in water from over 100 kilometres away, whilst other cities continued to draw their water from rivers and alluvial groundwater.

The situation changed with the discoveries of chemists and biologists such as Ebert, Koch and Pasteur: microbial threats required treating water, first by filtration,
followed by chemical treatment. Since water now had to be treated regardless of its source, water purification plants had an advantage over collecting local surface water. The technology reduced cities’ dependence on their surrounding environment and on the government. Later, the development of wastewater purification techniques would further increase cities’ independence and draw the line between city water – the water supplied (and discharged) by public utilities – and water as a natural resource.

By the end of the twentieth century, advances in scientific knowledge made treatment solutions increasingly expensive. This now induces cities to return to the hinterlands in their quest for cleaner water resources. These efforts require negotiated solutions, such as cooperative arrangements with farmers and payments for ecosystem services. These experiments are still a long way from water markets. Yet we will close this chapter with the case of San Diego – a city that buys water from an irrigation district in Southern California – illustrating the new city-hinterland paradigm.

MORE WATER FROM FARTHER AFIELD

In Europe at the end of the eighteenth century, urban growth and industrialization created an unprecedented problem: water – clean water, if possible – needed to be imported to cities. The rising population density exacerbated the risk of epidemics, particularly given the levels of waste allowed to fester in the streets. In addition, there was the risk of fire, primarily in cities where buildings were made of wood, as in Northern Europe and the United States. The obvious solution was to pump nearby surface water. Fortunately, most cities were built along a waterway. They already used the flow’s energy to pump water to a higher elevation than its source – for example, with a hydraulic ram or impulse pump. However, during low-flow periods, there was little or no water left to draw, and until the steam engine was invented, no adequate pumping technology. One alternative was to collect water from sources or streams at higher elevations outside the city, so that the water would flow downhill by gravity. While this water was usually cleaner, it was not as plentiful as water drawn from the river. To remedy this situation, many new catchments needed to be built, and growing concerns over public health prompted the cities to choose this alternative.

This raised various legal and financial issues. A city needs special authorisation to withdraw water from outside its own territory, because in the end, this will infringe on the water rights of local users, especially if it creates a shortage. Moreover, water supply systems of this kind are capital-intensive, and most cities did not have the financial wherewithal to pay for them. As a result, they turned to the state to help implement their projects. The lack of funding meant that many of the first private-sector water supply companies merely pumped water from the river and delivered it in its untreated state. Because many people could not afford to pay for service, the water companies served only affluent areas or business districts. By contrast,
aqueducts from outside the city supplied public buildings and fountains. Water was free and there was no tradition of paying for it except among the affluent, who early on had water piped into their homes and paid a flat rate for the service.

In Switzerland, where mountain streams abound, water was harnessed as a source of power to run factories in cities. It was also available to provide a good quality supply to city dwellers. As a result, locally administered public water and energy utilities developed fairly rapidly through the creation of municipal companies. Germany focused more on pumping groundwater or naturally filtered surface water through the riverbanks (*Uferfiltrazion*). This was feasible because surface water was abundant, and the practice continues to this day.

England began to set the pace of innovation at the beginning of the nineteenth century. Industrialization and urbanisation had come early to the country, and clever, practical-minded “mechanics” (engineers) would invent public utility network technologies just as the central government was devolving infrastructure management to municipalities. This is how England came to invent “municipalism,” or municipal involvement in the local economy. This system spread to the rest of Europe within a few decades. While private companies did initially deliver water services, in many cases local authorities took over management of the networks to universalize the service, even before the discovery of bacteria demonstrated the importance of extending services. Furthermore, because England lacks high mountains and abundant aquifers, it had to turn to surface water, which accounted for three-quarters of the total water supply. In addition, British law on water diversion and pollution was (and remains) highly restrictive (Barraqué 2001). Water had to be pumped from rather polluted rivers, which empirically led to the invention of purification by filtration. The English experience would then strengthen local water management across Europe, as will be shown below.

The situation was somewhat different in Scotland, where water is abundant; Glasgow was able to obtain water from a Highlands lake 55 kilometres away, with government assistance, and concurrently terminated a contract with the private company that had provided poor public service (Maver 2000). In France – a large country with a varied climate and a plethora of small communes, left as a legacy from the Revolution – different kinds of arrangements evolved. These ranged from building aqueducts that conveyed water from distant sources to Paris and Marseille, to pumping water out of the ground and from rivers, as in Lyon.\(^1\)

Ito sum up, in the initial stages of urbanisation, water supply was regarded as a matter of hydraulics and civil engineering, and no one foresaw that this approach

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1. In Paris under Napoleon III, owing to the efforts of public works engineers such as Eugène Belgrand and his successors, the city obtained water from sources some 100 kilometres away. The catchments stood at a higher elevation than the city and water flowed down under the force of gravity via a system of siphons and aqueducts, thereby requiring little energy. Today, Paris still gets over half of the water it uses from this faraway source. By contrast, its suburbs draw nearly all of their water by pumping water from the Seine, Marne and Oise rivers.
would eventually test financial and technical limits. The insidious outcome that prevailed with this “more water from farther afield” policy was the discharge of untreated effluent into the rivers, gradually turning them into sewers (Tarr 1996). This technical option was also bound to reach its limits. Over time, urban growth and the increasing variety of water uses inevitably led to rivalries, ultimately bringing the local water authorities under the stewardship of higher levels of government. Moreover, distant aqueducts did not supply adequate water as a rule, or only did so at prohibitive cost. This happened in Lisbon, where the Águas Livres Aqueduct – a source of local pride built in the eighteenth century – would elicit nothing but derision from foreign engineers a century later.

During the first half of the twentieth century, water conveyance over large distances experienced new developments, as nation-states grew more involved in economic development and financing of large, multi-functional hydraulics projects. Dams and reservoirs regulated water flows and would generate electricity, develop irrigated agriculture, and supply more water to cities, while helping to prevent floods and extending the waterway navigation season. This model found its strongest expression in the United States, in the form of the Tennessee Valley Authority and the California water transfer arrangements. Low population density made it easier to implement the model: rivalries would not emerge until later. The model also spread across Europe, particularly in countries under authoritarian rule and in certain
colonies. The dictatorships in Italy, Portugal and Spain used the Mediterranean climate as an excuse to push through the major hydraulics projects that were part of their nation-building plans. They quelled any controversy over water resources versus improved public services. In Brazil, for example, the United States provided aid during the military regime of 1965-1985 that supported the expansion of hydroelectric projects, under a plan (the Planasa) to modernize public water utilities (Barraqué et al. 2008). By contrast, in wealthy, industrialized Europe, the cities would take advantage of the invention of water purification to overcome rivalries and dependency.

CLEANER AND CLOSER

Following the discovery of germs, water quality analyses evolved appreciably and a specialized branch of chemical engineering known as sanitary engineering focused on preventing the contamination of cities. Prevention, in the form of a universal water supply first filtered then purified, appeared preferable to treating people after they became ill. After all, an epidemic could kill the wealthy living in comfort as well as the underclass in slums. (Today, in large Third World cities where modern medicine protects those who can afford it, public utilities do not operate in the same spirit of solidarity as their European counterparts did a century ago.) With the advent of sanitary engineering, drinking water criteria multiplied and became more scientific, so the effects of water treatment could be measured. By the early twentieth century, the main chemical processes had been invented for purifying drinking water and for wastewater treatment.

From that point on, cities would rapidly achieve greater independence from water resources and other water uses. Because surface water could be purified to make it drinkable, waterworks could be built close to the city, and treatment costs offset by savings on transportation costs. Similarly, pollution from wastewater discharged by the city into the aquatic environment downstream could be reduced through wastewater treatment. Sewage treatment plants began to proliferate in England, Germany and the United States before World War II, and in the rest of continental Europe during the 1960s, with the backing of central governments. Water supply became a public service that was local and financed by the consumer rather than through taxes.

In Paris, the technical shift to drinking water purification occurred at the beginning of the twentieth century. At the time, it was thought that water was in short supply and that sources needed to be found farther and farther afield. Even the possibility of bringing water from the Loire was considered – an idea dating back to Louis XIV’s plan for supplying the fountains at Versailles. However, the Loire’s summer flow dwindles at the very time when additional water is most needed. In 1890, the French engineer Duvillard drafted a technically feasible project to
bring water to Paris from Lake Geneva, 440 kilometres away. Advocates developed comprehensive arguments to gain support for his project – it would do away with shortages forever, bring in high-quality water, and extend the navigation season, while the constant additional flows would further dilute effluent releases: the City of Light required enormous quantities of water. The Council of Paris held serious debates over the project and the engineers fine-tuned their calculations. But then a typhoid epidemic broke out, and its origins were traced to a distant supply source, the Loing River. This showed that even remote sources could be contaminated and that water required purification regardless of its origin.

In 1902, Paul Brousse, a Council of Paris member known for his “Possibilist” positions for “municipal socialism,” inaugurated a waterworks in the upstream suburb of Ivry. It was a model slow filtration plant – a showcase for this process in its heyday, and in fact one that has recently undergone renovation. Paris, like other European cities, then turned to a sustainable alternative: draw and treat water locally, and stop transporting more high-quality water over long distances. The Council of Paris finally shelved the Lake Geneva project in 1919, for technical reasons and strategic considerations: it was feared that if war broke out, Germany would attack the aqueduct and shut it down, thereby forcing France to capitulate.

As water treatment plants proliferated, a new system came about: economies of scale became an inducement to concentrate water management units, and joint boards developed in many countries. Although the initial infrastructure would be funded primarily through government subsidies (i.e. taxes), in continental Europe water treatment was generally viewed as a consumer convenience. This reinforced the notion that the consumer should pay for the water piped into his or her home on a volume-consumed basis. This shift towards commercialized public service gradually spread across the continent, but not to England and Ireland, where consumers still usually pay for water through a local tax assessed on the rental value of their residence. The shift made the utilities more financially independent; they could add costs for infrastructure depreciation and replacement provisions onto the consumer’s water bill. This is why many cities created joint public-private companies and, in some cases, private companies that they own. These have the combined advantage of government legitimacy and private-sector flexibility. In France, government-mandated restrictions on creating municipal corporations led joint boards to grant lease and management contracts to ever-larger and more consolidated private operators.

Another advantage to billing for water was that once all or most city dwellers were connected to public supply, a small increase in water price could generate enough money to pay for new connections, primarily in rural areas. In France, FNDAE, – a national water supply development fund – was created in the 1950s to help connect small towns and villages for whom bearing the full cost would have been prohibitive. Major cities in developing countries – which often lack this kind of social
solidarity – currently face a similar problem when expanding public utility services. Most European countries eventually found it most convenient to add sewer service charges to the water bill, as a way to help finance expansion of sewer systems and sewage treatment plants.

Ultimately, the most widespread system now in use is what is known as urban water, i.e. “city water” and sewage, plus storm water management where applicable. Treatment technology allows for the sanitary engineer’s fantasy: the water treatment plant and sewage works form a boundary between the city water and the water resource. On each side of this boundary, there are two different legal and financial systems. The right to city water is clearly distinct from water rights and resource-sharing. The cities are not dependent on the hinterland water, because they can produce drinking water from even highly polluted sources. Wastewater can also be recycled and the effects of wastewater discharge drastically reduced. In this fantasy, technology can do anything; the only issue is money. But new factors have emerged, making this fantasy unattainable and requiring cities to return to the hinterland for water. But what does “return” mean in this context?

ENVIRONMENTAL ENGINEERING AND A RETURN TO THE HINTERLAND

A number of signs have pointed to a new crisis in public water and sewer services. First, the inclusion of sewer charges in water bills has caused water prices to more than double, particularly when subsidies dry up for capital expenditure on sewer systems. It has become apparent that in the long term, maintenance and replacement of the massive infrastructure developed over time will prove extremely costly, because after the initial investment, government revenues and taxes have no longer funded or subsidized these systems. They have been paid for through water bills, especially once neoclassical economists advocated that the full cost be passed on to the consumer. Water prices have spiralled upward everywhere, raising public opposition in countries where the private sector plays an important role in public services, such as in England and Wales, France, and Latin America.

Because of these price increases – coupled with a growing awareness of the threat of water scarcity – some customers have turned away from the utility or cut back their use. This raises an issue previously obscured by decades of expansion in consumer-financed water supply. The supply system does not sell a product; it provides what is known as a “club good.” In fact, infrastructure depreciation accounts for the bulk of the utility’s costs, while operating expenses represent a much smaller fraction. An investment in a water supply system generates about one-third of the revenues derived from investing in a power supply network. As a result, if demand falls, the cost of “membership” in the “club” needs to be increased for the remaining customers. It becomes risky to rely exclusively on consumption-based billing to cover the full costs of water and sanitation services. Indeed, what will happen to the poorest people? Will they be deprived of water if they can no longer afford it? Can we figure out a new system of territorial governance, thus reducing the need for costly technology?
Lastly, the quality of tap water adds another crisis factor. Advances in water quality monitoring have not only raised drinking water standards; they have uncovered growing numbers of substances than can prove hazardous to public health. As a result, water treatment costs have increased while public trust has eroded.

Throughout the history of public utilities, governments and engineers essentially reasoned on the supply side, during both the infrastructure development and water purification phases. The idea was to provide increasing supplies of water of the highest possible quality to be used for growing numbers of public and private purposes, with economies of scale as the key. And while investing in technology has given the cities a great deal of independence from water resources and those who are in charge of allocating them, the technology race now appears to be too expensive. As a result, new approaches are emerging, together with new engineering disciplines, including urban and environmental engineering.

Contrary to what economists may claim, demand-side management does more than simply find the price that will achieve optimum supply/demand equilibrium. Rather, the issue is to develop technical and regional water service arrangements, using a controlled, dynamic approach to assess the effect of demand on supply and vice-versa. If demand increases and the technical system reaches full capacity, it becomes essential to save water, since the cheapest water is that which has not yet been used. One possibility is to encourage owners of large gardens and swimming pools to look to sources other than tap water for these less critical uses. Conversely, if demand for drinking water falls – a trend that began in the 1990s in many European cities and even earlier in the United States and Switzerland – the infrastructure should be re-sized, reflecting a change in demand that still needs to be further assessed.

**NEW POLICIES AND STRATEGIES**

In sanitation, similar questions require new answers: how big an area can a centralized system serve before reaching the point where decentralized solutions or semi-central systems may be preferable? Can cities shrink storm-water drainage systems by managing rainwater runoff and by retaining storm water on residential parcels? Public water utilities can also cut costs by adopting new regional strategies within their environment. This brings to mind water pollution in drinking water catchment areas resulting from intensive farming nearby.

In response to this problem, cities can either find new, more protected sources, buy the required land and plant trees to create “water sanctuaries,” or treat the water to remove nitrates and pesticides. There is a fourth solution, often applied in Germany and the Netherlands: “cooperative arrangements” with farmers who raise crops in the catchment runoff area. Under these arrangements, farmers receive compensation and support for switching to practices that ensure that raw water meets or will
meet the standards for water that is to be turned into drinking water. In Germany, a study found more than four hundred cases of these local arrangements, providing support to farmers for an average period of fifteen years. The cost of these arrangements is charged back to consumers. This strategy is a way to obtain a supply of water that does not need to be treated for pollution from agricultural runoff, and reduces costs of treatment technology by one-half to two-thirds. Similar arrangements exist in France; for example, the city of Paris uses distant “abstraction points” or remote ponds and small reservoirs. However, the development of agricultural corporatism and the very large number of small water management units have delayed adoption of such arrangements – thereby favouring development of water sanctuaries and utilities’ consolidation.

In the United States, these new policies are called “Payments for Ecosystem Services” and cover measures to reduce erosion, protect bio-diversity or conserve water resources, *inter alia*. New York is a well-known case in point: during the past century, the metropolitan area has drawn its water from a relatively undeveloped area, the Catskill Mountains. Protection of reservoir land has provided an abundant water supply (per capita consumption is two-and-a-half times higher than in Europe) without the need for filtration. However, advanced analysis techniques have found a risk of contamination by parasites such as *cryptosporidium*, so the Environmental Protection Agency has asked the city to filter its water. New York managed to obtain an exemption through extensive negotiations with the Catskills Region and agreeing to further reduce pollutant releases.

There are many more examples of how land-based solutions have partially replaced technological solutions, primarily in the areas of flood risk mitigation (which protects cities by creating flood containment areas elsewhere, even by compensating rural residents if necessary) and water shortage prevention. These approaches require a new type of governance geared to negotiating issues related to water and sharing in terms of its quality and quantity. Cities can no longer merely collect water and purify it. They must get involved in new, integrated watershed management policies.

Paris is a clear illustration of this recent development: it has increased protection of its remaining distant collection points, and helps manage water resources during low-flow periods (Figure 1). As early as the 1930s, it had become clear that the city would run out of water in the event of summer drought. After World War II, the low-water problem was finally solved by building major dams and reservoirs upstream on the Seine, Marne and Aube rivers – projects “sold” to the public in part for their role in flood mitigation. In the 1980s, a project to build a fourth dam with a direct water pipeline to Paris (colloquially called the “Chirac Pipe”) was shelved because public and private water producers had foreseen the political difficulties it would entail; they installed alarm systems to shut off the water intake in the plants in case of accidental river pollution, and made sophisticated improvements to the plants themselves. Moreover, for the first time, demand for drinking water...
water in Paris, as in many European cities, has levelled or declined. Over the last fifteen years, demand has dropped by 25% in the city of Paris proper, and has also contracted in the inner suburbs. Eventually, the Ivry waterworks mentioned above will become redundant and be closed down. Similarly, a highly complex institutional arrangement has developed for wastewater and storm water treatment, to coordinate the efforts of different tiers of government: municipalities for sewer systems; the inner suburbs’ counties for collectors and rainwater management; the SIAAP, an inter-county sanitation board managing the largest collectors and waste water treatment plants; along with the region and the Seine Normandie water agency as planning and funding institutions. All these organizations must work together, which is no small accomplishment. The case of Paris is one example among many. It shows that attaining an economically, environmentally and socially sustainable system requires good multi-level governance.

**SOUTHERN CALIFORNIA IS THE BIGGEST AND BOLDEST EXAMPLE OF WATER TRANSFER ARRANGEMENTS IN THE WORLD**

In Europe, cooperative arrangements aim mainly to restore the quality of raw water. In the United States, the best-known high-volume water transfer arrangement concerns Southern California and the “water market” between San Diego and the Imperial Irrigation District. Southern California has perhaps created the biggest and boldest example of water transfer arrangements in the world today, outside of China. In the early twentieth century, the Federal government embarked upon a major programme to realize Thomas Jefferson’s agrarian ideal by populating the country with small farmers. Congress passed appropriations for ambitious irrigation projects that were also designed to supply electricity. In California, these projects included a transfer of water from north to south to irrigate the Central Valley, which stretches over six hundred kilometres, followed by the California Aqueduct that spans the valley’s entire length. Dams were also built on the Colorado River to generate electricity, provide water for irrigation and control the rivers untamed flows. To supply more water to the urbanizing southern part of the state, the Metropolitan Water District was formed in 1927, as a Colorado water wholesaler to other water agencies (Erie 2006).

Agricultural water development and deliveries, devised in the early twentieth century with federal funding, de facto assured the supply for Southern California cities (Figure 2). The 1922 Colorado River Compact allocates water flowing from the Colorado among the seven states that share a watershed covering more than 600,000 square kilometres. The allocation was based on mean annual flow, and demographic and land use data available at the time. Even then, California was the most populous state – and thus obtained the largest share of water – just over

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2. Syndicat interdépartemental pour l’assainissement de l’agglomération parisienne
one-quarter of the total. Mexico, through which the Colorado flows before spilling into the Sea of Cortez, was left with 1.5 million acre-feet of the (more than) estimated 16.5 (maf).

At the time of the 1922 allocation, Imperial County’s Imperial Irrigation District (IID) received three-quarters of California’s allotment. The remainder went to other farm irrigation districts. As urban growth spread along the coast, the urban water supply proved insufficient. This was particularly true for San Diego County – the second largest metropolitan area in the state, and an MWD member agency. For some twenty years, the San Diego County Water Authority chaffed at its dependence on the MWD for its water supply and worked hard to get access to its own supply of water, independent of the MWD – something it obtained in 2003 through a complex water transfer arrangement (Figure 3). This opened a new chapter in the long history of controversies among the operators drawing their water from the Colorado River (Pincetl and Katz 2007). The agreement results from the Federal government’s cuts in California’s water allotment: under the 1922 compact, the state was entitled to 4.4 maf, but it drew 5.5 maf on a regular basis because the other states did not use their quotas and the flow of the Colorado remained high. However, at the end of the twentieth century, as Las Vegas and Phoenix grew at a dizzying pace, Nevada and Arizona claimed their due share.

The transfer arrangement provides sufficient water to meet San Diego’s projected urban demand based on annual population growth estimates and minimum per capita consumption of 200 gallons per day (gpd) and up to 280 gpd in the summer (local resources supplying only 20% of the water). But the San Diego County Water Authority, which sets the price of raw water and wholesales it, is not directly involved in demand-side management: the more water it sells, the more money it makes. Consequently, the allocation agreement does not include any water conservation measures. Yet estimates indicate that the potential for water conservation and efficiency improvements in California exceeds what has been currently achieved. In a report on the potential for urban water
conservation in California, the Pacific Institute showed that water use could be reduced by 33%. Even with current technologies and policies, residential water use could be as low as 60-65 gpd without any change in the services actually provided (Gleick et al. 2003). Building more apartment complexes would increase efficiency, but San Diego has separate decision-making authorities for urban development and water supply management, preventing effective action in this area.

Moreover, the San Diego County Water Authority is the water wholesaler. It does not directly sell water to users and does not have the authority to require water conservation. Further, any conservation of water would reduce water sales, impinging on its profits. There has been no attempt to decouple water sales volume from revenue, thus maintaining a need to sell increasing volumes of water to grow. Finally, government institutions and purviews are notoriously fragmented at the local level in the United States, with little coordination or integration of planning and service delivery. Each service is provided independently of the other, and land use planning occurs separately as well. In contrast, the most striking aspect of the new urban water policies in Europe is their attempt to reduce the scale of future investment (and therefore of water bills) through demand-side management and by replacing sophisticated technology with new, integrated land management approaches.


China’s large-scale dams have had enormous impact on the environment and people, creating polemics within and outside the country. Massive water projects show how the Chinese government and provinces manage natural resource distribution, by imposing central planning for regional development and recognizing the importance of cities.

Two massive Chinese water projects – the Three Gorges Dam and the South-North Water Transfer Project – and the debates they sparked within China’s ruling political classes illustrate how cities negotiate with surrounding territories to secure resources and facilities essential for their development.

The long history of the Three Gorges Dam starts in 1919, when Sun Yat-sen, the founder of the Republic of China, conceived a dam project sited in the Qutang, Wu and Xiling gorges. The project was debated and studied all through the 20th century, advancing or not as political momentum, construction capabilities, international cooperation and the floodwaters of the Yangtze River ebbed and flowed. Construction of the world’s largest hydropower dam finally started in 1994 and finished in 2005, when 40 billion square metres of fresh water began to fill its reservoir.

The dam’s construction had three primary objectives: flood control, electricity production and increasing navigation capacity between Shanghai and Chongqing. These goals positioned the Yangtze River as the spearhead of development in Central China. Part of this strategy was the 1997 creation of the provincial-level Chongqing Municipality at the upper reaches of the dam’s reservoir: its special status put it directly under administrative control of China’s central government. The Chongqing Municipality, as the sole provincial municipality in western China, and the Three Gorges Dam are central to the development of China’s interior and the Chinese government’s plan for the territory. Their creation appears as the result of inter-regional negotiations, in which the four provincial Chinese municipalities – Beijing, Tianjin, Shanghai and Chongqing – play leading roles.

The Three Gorges Dam project encountered strong opposition both inside and outside China. On 3 April 1992, the Chinese National Assembly approved the Three Gorges Dam project with 1767 yea votes; there were, however, 177 nay votes and 689 abstentions. Such strong opposition to a government project was exceptional. Numerous international

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1. The Three Gorges Dam is designed to protect the middle and lower Yangtze River from hundred-year floods. Experts claim the 1998 flood that devastated nearly 200 million Chinese could have been avoided if the dam was in place (Sanjuan 2001).

2. Twenty-six 700-megawatt turbines are planned, for an installed capacity of 18,200 megawatts and an annual average yield of 84.7 terrawatt hours, enough to supply about 5% of China’s 2009 electricity consumption (Hao 2003).
non-governmental organizations and Chinese scientists also opposed the project, and the World Bank and the American Import-Export Bank pulled out of planned financing. Their concerns were legitimate, since so large a project is full of uncertainties, risks and negative environmental and social impacts. For instance, when 632 square kilometres behind the dam were flooded, one to two million people lost their homes; they have yet to receive promised indemnification. The Three Gorges region was one of the cradles of Chinese civilization (Shen 2000); the Yangtze River now covers vestiges of 5,000 years of history. The dam’s construction created many environmental threats, including: erosion around the dam site, erosion of the river’s delta, increased salinity of groundwater and land at its mouth, a reduction in biodiversity, and degradation of water quality. Furthermore, the aims of hydroelectric production and flood control could be achieved by lower-cost and lower-risk means. That left one chief motivation: to develop China’s interior using the Yangtze River’s East-West axis and to structure it around the dam.

Opposition also arose from the proposed reallocation of resources within China. The dam project aimed to resolve the chronic lack of water in Northern China, in particular around the region of Beijing. In fact, the height of the Three Gorges Dam (at 185 metres a long-debated issue among scientists and the authorities) reveals a hidden reason for its construction that has since come into the open: to facilitate the South-North Water Transfer Project (Figure 1) (Bravard 2001). Another huge government initiative, this project proposes to divert up to 45 cubic kilometres of water from the Yangtze River watershed to Northern China, Beijing and the northern port city of Tianjin. The costs are projected to reach about $60 billion (Shao 2003), far exceeding the cost of the Three Gorges Dam. This initiative, too, is thought to carry many social and environmental risks. The water diversion project has received less media attention that did the Three Gorges Dam because of internal politics in China: it goes to the heart of the regional balance of power.

Construction of the North-South Water Transfer Project was officially launched in 2002 by China’s State Council, and comprises three primary routes. The Central route will provide water to Beijing through a gravity-fed 1230-kilometre canal that will pass under

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3. The 632 km² of land flooded by the reservoir included: 1,300 factories and mining complexes, 1,500 slaughterhouses, nearly 300,000 m² of public latrines, 178 garbage dumps, 40,000 cemeteries, several hospitals, and nearly three million tonnes of waste of all kinds, all sources of multiple pollutants (Savoie 2009).
the Yellow River through a nearly 7-kilometre long tunnel (Berkoff 2003). The Central canal helps explain the debate about the height of the Three Gorges Dam: the 185 metres agreed to in the final project negotiations (Sanjuan 2001) is high enough to facilitate the transfer of water by gravity (Bravard 2001).

The Three Gorges Dam thus appears as a key element in this water transfer project. The water diversion aims to provide more water to the drier northern part of China by transferring large flows from the Yangtze River watershed to the Yellow River and Beijing, and beyond to the rest of Northern China, where increasing scarcity impedes development. The opposition votes at the Chinese National Assembly therefore understandably reflect regional rivalries, particularly between Beijing and Shanghai. Shanghai is the economic capital of China and must contribute a large share of financing to the projects. Unlike the development of a navigable route along the Yangtze River, which will benefit the development of Chongqing and the Port of Shanghai at the river’s mouth, the North-South Water Transfer Project will benefit the northern cities of Beijing and Tianjin, while costing even more than the Three Gorges Dam.

Beyond serving as points of negotiation between major Chinese cities, such projects also ensure the legitimacy of the Chinese Central Government. They reinforce its position as the master of structuring China’s territory, working to maintain the country’s unity and national solidarity, to distribute economic development across the country, and to maintain a balance between Beijing and Shanghai. The government in Beijing also wants to show how strongly it holds the reins of the country through such symbolic projects.

China is a specific, concrete case that exemplifies how a city must negotiate for resources with its surrounding hinterlands. The speed of economic development, vast inequalities in resources and the size of the cities in China ensure that a city’s negotiations go beyond its near hinterlands to encompass far more territory. One city’s requirements confront the needs of other cities, and a balance between them must be achieved – a balance of power in which the Chinese Government finds its central place.

**Works Cited**


The biblical antiphony of city versus country resembles that of farmer versus rancher. Each side disagrees with the other on just about everything except the terms used to describe urbanization — explosive, rampant and unbridled — and the city — dangerous and unhealthy. The Garden of Eden is rural and never urban.

Some view slowing the growth of the urban development cancer as a matter of agricultural policies: keep the masses in the country and stop the rural exodus. In this view, the exodus hurts the countryside by robbing it of strong arms and backs. It is equally unfortunate for the city, which is overrun by migrants and the unemployed. The rural exodus is induced by urban food policies that favour low-cost imports over higher incomes for country dwellers.

Others view slowing urbanization as slowing development and economic growth. The parallels between the rate of economic growth and the rate of urbanization are considered proof of this point. The city is not only a result, but also the engine of development and growth. The poor quality of the urban fabric reduces the engine’s efficiency. This poor quality is caused by an anti-urban bias in public policy that leads to spending more on rural areas than on cities. Infrastructure investment must be increased in urban cores to address economically harmful congestion, in the peripheries to accommodate new inhabitants, and in transportation services needed to link the core with the periphery, for the daily concentration and nightly dispersal of commuting workers.

In the developing countries of Africa especially, devising a sustainable city requires avoiding controversy, overcoming obvious conflicts, and seeking continuity, bridges to common goals, and exchanges between rural and urban spaces. Indeed, very dynamic population demographics and growth that creates few manufacturing jobs promote urban “bloat;” meanwhile, the countryside must support and accommodate even more people and thus grows more impoverished. On the urban side, there are “spontaneous” neighbourhoods, the “informal” economy and under-employment. On the rural side, one sees even harsher effects: stagnation in yields and production; difficulties in land acquisition, credit and access to internal markets; soil degradation, deforestation and a reduction of arable land available per farmer, and a shortage of land for landless young people. In fact, analyses show that poverty is most common and
most intense in rural areas. However, one should not conclude that only the countryside requires intervention. The urban destiny of certain country dwellers is also part of the solution. But under what conditions? Under what timeline? In which proportion? The answer to these questions is critical for the balance of agricultural versus industrial and services policies, and for cities and rural areas.

Today, climate, energy and food challenges, as much as the pace and nature of change, invite us to re-think agricultural policies and urban policies in a combined form. For example, it is useful to re-think policies by reasoning along two scales. First, at the territorial scale, one may determine the geography of allotting land, forest, water, social and human resources. Then, at the scale of the city and neighbourhoods, comprising both activities and people, one may address the quality of urbanization.

THINKING OF URBANIZATION IN TERMS OF AGRICULTURAL POTENTIAL

For the farmer, the city is a marketplace. The city’s growth benefits him, inasmuch as the city’s residents consume local agricultural products. As the percentage of farmers in the population shrinks, the individual farmer increases the size of his clientele and therefore his income and ability to invest. Furthermore, the agricultural market towns and administrative seats offer the services most needed to modernize agriculture: commercial and financial services, information and news, training and medical care. However, this virtuous synergy cannot be uniform everywhere. The distance from the city and attendant transportation costs (to access city services and to deliver products and inputs to the fields) cut into agricultural producers’ incomes. For this reason, opening a region by building and maintaining rural roads is a classic and essential component of all agricultural policies. Increasing costs for fossil fuels will confer an increasing competitive advantage to the rural areas with the best train service.

Nevertheless, an isolated rural market town will stagnate and fail to provide all needed services to its hinterland. Good connections between the rural market town and somewhat larger metropolitan areas are indispensable for the town’s growth. Agricultural potential should influence choices in developing the territory and implementing communication and transportation infrastructure. That potential is inevitably unequal and subject to change. Climate change increasingly affects agriculture in some regions, where productivity will reach its limits. In other territories, conditions will become more favourable for expanding agricultural activities. Some market towns in the countryside will wither; others will grow and prosper. If those responsible, respectively, for agriculture and for urbanism and infrastructure can share the same analyses, they can optimize their investment choices.

AGRICULTURE AROUND THE CITY

It is a universal fact that the value of urban land depends upon its distance to the centre of town. The productivity of farmland is often higher on the periphery of cities, where labour-intensive activities such as truck gardening or market farming benefit greatly from proximity to markets. This is one of the factors behind the higher price of land on city peripheries. However, the prospect of transforming farmland into developed land confers greater value still. Wherever there is urban sprawl, there is a reasonable potential for this transformation. In developing countries, the periphery of cities becomes a theatre of unequal transactions and social tensions, whenever management of land rights in rural areas remains flawed and planning for urban expansion is done after the fact. Progress in local governance and land management (by rights within the competence of local authorities) is critical in these areas. Furthermore, long-term planning is needed to determine whether such lands are destined to become urban or not.

In this context, trade-offs can be made between the urban fabric and farmland; securing existing rights should be the main concern, and the quality of the urban fabric the prime objective – and equally,
the best use of the land for the nation. For example, urbanizing highly productive, rare, irrigated land is questionable if other options can be explored. Above all, thinking about a new way to structure a uniformly dense urban fabric could integrate urban agricultural spaces. These spaces could ensure useful quality-of-life functions, such as the mixing of social classes, employment, multiple uses, storm water management, green spaces and leisure. The technical and economic characteristics of this more intensive and market-oriented urban fringe agriculture would likely justify cooperative assistance. Furthermore, such urban farms would be better able to co-finance such assistance than other agricultural areas.

Treating solid waste and water management are two other urban policy issues that agriculture can address. Many developing cities produce large amounts of organic waste. Feeding the city generates flows of organic material, whose sorting, recycling, stocking and purifying prove very costly. Urban fringe farmers would benefit if such organic matter returned to the fields as compost. Furthermore, methane gas emissions from such waste products are not exploited. The problem is not new, but until now, policies have emphasized collecting and treating unsorted (and therefore contaminated) garbage, which cannot be returned to the fields. However, as urban consumption in developing countries rapidly evolves towards eating out and processed foods, it becomes possible to take decisive action upstream with the consumer – as well as with wholesalers, slaughterhouses, canneries and restaurant services – by implementing more efficient waste transformation processes.

Water poses another problem. In addition to the visible effects on surface water such as eutrophication (the build-up of excess nutrients that leads to algae growth and oxygen depletion), inappropriate use of fertilizers and pesticides have direct effects on groundwater and thus on drinking water quality. Agricultural practices in areas surrounding a city’s water recovery plants are therefore very important. Such issues come back to the technical advice that urban fringe farmers should receive. While their easy access to fertilizer and pesticides promotes intensive growing practices, farmers rarely make optimal use of such resources, harming their health, product quality and incomes.

Elsewhere, cities produce large volumes of used domestic and industrial water. Assuming a rational use of agricultural inputs as mentioned above, urban fringe farmers – particularly in the periphery of Mediterranean cities – should re-use these urban wastewaters. Thus, at a national as well as a sub-regional and city scale, choices exist that could improve the quality of urban growth and make the city an engine of rural transformation. Though this does not occur often, their implementation should allow all stakeholders to forge optimal strategies together.
For many people, providing access to drinking water and sanitation in urban areas means extending water utilities. However, the very nature of urban growth in developing countries renders this solution questionable, both technically and socially. Today, cities in developing countries offer a wide variety of water delivery services, depending on each locale’s physical constraints and income. These new services require new utilities-management institutions, which must define common rules, consider consumers’ needs, and become incorporated into cities’ policies.

An intense debate has emerged about how liberalization and privatization affect the relation between water utilities and urban spaces. In developed countries, urban fragmentation is often viewed as a potential threat, because it simultaneously destabilizes earlier models for both utilities management and the city. Conventional utilities – based on monopolies, egalitarian access standards and government’s power over consumers – are being transformed, as is the “Fordian” urban model – domestic mass production with a range of institutions and policies supporting mass consumption, along with Keynesian demand management.

In cities in developing countries, where “integrative” water utility networks remain a rarely attained ideal, economic efficiency has dominated policy over the last thirty years, albeit with little success. New forms of unconventional utilities promise greater progress in social cohesion, urban integration and economic balance, if they can be effectively governed and regulated.

Indeed, renewed interest in the integrative function of utility networks raises questions of accessibility and social justice, while the relative failure of conventional utilities drives the formalization of private, informal offerings, previously kept outside of legal and statistical frameworks. Thus, in cities with mixed populations, the diversity of service needs becomes a vector for technical, managerial and institutional innovation. This leads to the emergence of “composite” water supply systems – a combination of conventional and alternative distribution systems – that are directly based on the diversity of service needs and their evolution. These multiple, composite water distribution systems turn the paradigm of a unitary network and its...
economies of scale upside down; they prompt a reinvented vision of infrastructure policy, in which the unitary model may not best support the public interest.

**UTILITIES AND CITIES IN DEVELOPING COUNTRIES: AN ONGOING DISCONNECT**

Weak institutional capacities, a lack of capital, and poverty restrict utilities’ integrative role, leading to three different situations. Water distribution networks may be nearly completed, but remain unable to offer affordable services to the poorest people, as occurs in South Africa or Chile. Or, as in Brazil or Morocco, a high percentage of citizens may be connected, but large pockets remain of excluded illegal and/or very poor residents, raising questions about the network's technical and commercial suitability. Finally, in areas such as West Africa, water distribution networks still need to be built, with subsidies for the poor. “New” ways of addressing urban water access issues in developing countries spring from the reconsideration of conventional utilities: these are now seen as expressions of simplistic, socio-technical compromise, instead of as solutions for real urban conditions.

Conventional water utilities’ business models have led to rationing. Proposals for change first focused on the respective merits of public and private interventions in water management services. The national or local public enterprise model dominated up to the 1980s, with varied success. Thereafter, the presumed efficiency and superior management models of private enterprises led to an international “consensus,” incarnated in public-private partnerships and various types of leasing, concession and management contracts. These arrangements have achieved only modest results, and no empirical analysis has shown their efficacy beyond doubt. The defects of delegation, so well analysed in developed countries, often amplify in developing countries because of information asymmetry, lack of transparency, inadequate investment, and so forth. Contractual frameworks often fail to ensure the fair sharing of risk over time. In addition, regulatory agencies created to resolve these problems fail at their task. Finally, performance and results, in terms of pricing, investments and attention to the needs of poor people, do not meet expectations. The rate of contract signings has slowed since the late 1990s, and continuance of existing ones has come under closer scrutiny, particularly with regard to improving their governance.

What lessons do the institutional reforms of the 1990s teach us? While largely considered failures despite the substantial means invested, the reforms indicate that the form of ownership matters less than the nature of services in achieving urban integration. The conventional water utility model, based on large infrastructure, centralised management and service equality for everyone, has entry costs that are too high for the poor (Kayaga and Franceys 2007) because of technical factors (too-high standards) and judicial ones (illegal land tenure) as well as political issues. In many cities, governments’ financial and political commitments to the water sector are too weak, and people without access have few ways to voice their needs. Furthermore, water sector reforms have been incapable of reconciling
formal institutions (and the rapidly-changing organizations that are supposed to represent them) with informal institutions such as beliefs, customs and values that evolve more gradually. This discord proved crucial in some conflicts that terminated delegation contracts.

In many cities, governments’ financial and political commitments to the water sector are too weak, and people without access have few ways to voice their needs

In nearly all cities, unsatisfied needs mean that conventional utilities exist alongside other uncontrolled – and most often illegal – commercial modes of water supply. Recourse to conventional and unconventional water suppliers nearly always combines use, price, taste and accessibility criteria. Alternative offers develop primarily in the spaces not served by the dominant operator, in inverse proportion to its extension of services. Financially autonomous, the alternative water operators do not receive government subsidies and typify the informal economy – excluded from census data, untaxed, weakly capitalistic, legally vulnerable. They are very active in water delivery services and sometimes in water production, using private borehole wells. Even if they copy each others’ practices enough to show some uniformity, alternative commercial offerings remain varied, artisanal, and more expensive per unit compared to conventional utilities’ services.

These characteristics do not exclude social integration. The widespread use of these decentralized suppliers leads to standards of water access compatible with the lack of a network. Consumers are integrated in social and commercial networks that assure various water qualities (drinkable or not, free or fee-based) and services (home delivery through door-to-door sales, from a public or a private standpipe, with or without quality and reliability guarantees, with or without subscriptions, and so forth). But given their dependence on non-regulated markets, households are rarely in a position to negotiate supply terms; they pay ten to twenty times more for each unit of water than households connected to a conventional utility’s distribution network. Given the catastrophic delay in sanitation services, consumers reap only some of the health benefits commonly attributed to drinking clean water. In urban areas lacking individual private entrepreneurs, non-governmental organizations and decentralized aid sometimes provide infrastructure-financing initiatives. Infrastructure management generally relies on commercializing (selling) water, contracting local small operators, and organizing consumers’ collectives into not-for-profit groups or committees that take over infrastructure operations and regulation. These more or less formal community groups resemble “community privatizations” and are a variant of commodification (Jaglin and Bousquet 2009).

This abbreviated overview of alternative commercial water channels does not represent all real modes of supply, because forms of free water access also exist. Fee-based drinking water is often only one option among many – others include rainwater, ponds, borehole wells, rivers, and so on. In fact, individual or collective water network connections can also encourage different consumption patterns according to sanitary criteria (drinking quality) and/or practices (water in the home) rather than relying solely on the utility’s network. Consequently, the first
challenge in improving water services’ integrative function is to rethink their expansion and generalization, starting with the diversity and dynamics of existing supply systems.

**DIVERSE TO INTEGRATE?**

While policy analysts agree on the diversity of situations, there is no consensus on the definition or choice of the best water-services solution. Meeting this challenge requires rethinking all the rules that organize and frame the services: functional parameters, participants, standards and regulatory tools. However, if one starts from existing systems and practices, one soon confronts the corporate interests sustaining conventional utilities’ professionals and their representations of urban “acceptability” standards, as well as the power struggles between conventional water operators and smaller, alternative operators.

Despite these restrictions, recent changes indicate that the search for new arrangements depends on “untangling” this diversity, based on two important innovations: abandoning the “one-size-fits-all” principle of unitary systems, and adopting the principle of “progressive standardization.” The main challenge is to think about the coexistence of all formal and informal channels of service delivery and to regulate their interactions, whether these be competitive or cooperative. Several scenarios can be imagined, such as the integration of delivery channels in a hybrid system, their coordination in composite systems, or their juxtaposition. Juxtaposition describes many current situations; integration remains the least probable outcome in the short term, because it requires mixing cultures and making culturally incompatible socio-technical compromises. On the other hand, coordination of composite utilities systems is a plausible scenario now gaining visibility (Blanc, Cavé and Chaponnière 2009). It requires shifting traditional standards and experimenting with innovative operational arrangements, for which we will provide some examples below.

**INNOVATION AND SERVICES DIFFERENTIATION**

Thinking about drinking water has long centred on binary distinctions: water utility networks for city dwellers, wells and boreholes for villagers. These two modes of distribution reflect distinct rationales for technical and institutional channels. The effects of the urbanization of poverty and the resurgence of health issues on the one side, and the demographic and spatial dynamism of urban peripheries and small towns on the other, upended the imperviousness of supply systems in the mid-1970s. These factors pushed a progressive hybridization of water supply systems, offering new technologies: mini-networks linked to surface water pumps or motorized borehole pumps – with power supplied by the electricity grid, solar panels or generators – and water pipes feeding street fountains and private connections. Created in response to the needs of small towns and villages, these hybrid systems have expanded as legal frameworks are overhauled and decentralization implemented (Jaglin and Belbeo’ch forthcoming). The idea of service differentiation has also gained ground in large cities (Jaglin 2008), propelled by the need to articulate supply with ability to pay. Current experiments
adapt conventional solutions for customers of modest means and irregular incomes, by lowering the cost of connecting to the network and by applying innovative sales technologies. Local governments and private enterprises have initiated these experiments whenever an operator confronts the cost of secondary networks and managing low-margin customers. Efforts initially address connection costs, which include license fees owed to the operator and expenses associated with plumbing and supplies. Aid for connections rests on micro-credit in some cases, but may incorporate costs in mortgages, subsidies and even cash contributions.

The municipality of Windhoek, Namibia, adopted a frequently-amended development and upgrading strategy at the end of the 1990s. It defines service levels according to income categories, and connection costs may be included in the sales price of land and payable on credit. Durban, South Africa, has bolstered this approach by thinking about ways to control consumption and costs. Innovations such as electronic pre-payment systems also attempt to reconcile the accounting requirements of a water-supply business with piecemeal purchases and the low-income culture of extended micro-payments. These experiences – to which the large Latin American concessions of La Paz-El Alto and Buenos Aires have also contributed (See Box 1) – take into account the diversity of water supply modes on one hand, and urban socio-economic disparities on the other, thus supporting compromises between the right to water and cost recovery.

Private water supply operators use various entrepreneurial models. The many small, informal private operators working in urban water supply can appear unacceptable at times because their services are substandard, and providential at others because they provide services conventional utilities cannot. Although long-denigrated and considered uncompetitive, small private operators now seem attractive because of their entrepreneurial and proactive character and their flexibility. They provide a counterpoint to larger public-private partnerships that have disappointing results, and promote renewed interest in the virtues of the private sector and poor residents’ “ability to pay.” They push the boundaries of public and private, legal and illegal, commercial and non-profit, thereby opening new opportunities for collective water service solutions. Different arrangements emerge according to geography and proximity to water networks, and unorthodox partnerships form around the edges of conventional water utilities.

The reorganization of public water supply for two million people, centred around street fountains in Port-au-Prince, Haiti, exemplifies a partnership between neighbourhood organizations and the municipal water utility, Camep. The programme, started in 1995, organized water supply to slums through mini-networks of fee-based street fountains managed by not-for-profit neighbourhood water committees. Such an arrangement guarantees infrastructure compatibility, as well as management autonomy for the slums’ water supply: behind the collective metre, the water
committee takes care of its internal network, buying water wholesale for far less than the normal retail price. After paying Camep (the wholesaler), the committee pays its saleswomen, indemnifies its members, finances maintenance operations, and may invest excess funds (Matthieussent 2004).

In Maputo, Mozambique, the individual entrepreneur model dominates. The large, private water management operator, *Aguas de Moçambique*, excludes about a third of residents from service: they turn to small private operators for water from private connections or street fountains. Private operators own pumping apparatus that they connect to mini- “spaghetti” networks equipped with individual water metres and flexible above-ground pipes (Blanc et al. 2009). Propelled by international donors, Maputo’s water policy aims to give small private operators a greater role in providing urban water in cooperation with *Aguas de Moçambique*. The policy envisages formalizing licenses, providing a legal framework for financial partnerships, providing technical and professional training, and reorganizing the water market through mergers of “informal” supply channels. Other models also exist, such as the “collective entrepreneurs” of Zamcargo, a settlement neighbourhood in Dar es-Salaam, Tanzania. It had a population of approximately three thousand people in the mid-2000s. Water arrives through a micro-network made up of three fee-based “water kiosks” (installed via international donor funds, together with a few private connections for wealthier residents. An elected committee manages the service, using fee income to pay operating and maintenance costs.

These decentralized water supply channels suggest several avenues for further exploration; they respond to variations in demand based on socio-demographic changes and transformation of the built environment. They are not very “capitalistic,” meaning they do not need high investment levels to start their activities, and offer technical flexibility, with systems easily redeployed to new areas. Hybrid governance structures assure their management, mixing communitarian with commercial purposes in a manner especially well-suited to prevailing socio-

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**BOX 1**

**PARTICIPATORY WATER SERVICE MANAGEMENT MODELS IN BUENOS AIRES**

Since 1993, the Argentinean water authority, *Aguas Argentinas*, has sought ways to extend the water supply network within its concessionary area. In 1999, a community development division was created; its aim was to define a policy for low-income neighbourhoods. The division launched a series of approximately forty projects known as “participatory management models,” which aimed to extend or normalize services based on a tri-party contract, as follows:

- The neighbourhood community initiates the service request, and at least 80% of residents must be in favour of the project. The community must be able to organize, choose representatives, and furnish labour during the works phase. The municipality ensures it will undertake works under its purview, such as opening roads, and will provide gloves, shovels and other tools, along with distributing government subsidies of 150 pesos per month to heads of households who participate in a community work programme.
- The contractor ensures project feasibility, furnishing supplies such as pipe and keys, training labourers, and communicating with the entire community.
- This methodology, based on social intervention, makes it possible for low-income neighbourhoods to become *Aguas Argentinas*’ customers, and avoids creating a second-rate service.

Source: Botton (2006: 75-89)
economic conventions. However, these arrangements only develop at the edges of conventional water utilities where market conditions are favourable, without any pretension of becoming universal. Their inclusion in composite systems comes from their articulation with conventional networks and through their extension into yet-unserved urban areas.

**KEY FACTORS FOR URBAN INTEGRATION THROUGH COMPOSITE SYSTEMS**

How can planning, management and regulation of these composite systems preserve their vital diversity? A conventional utilities network addresses technical, pricing and socio-political solidarity issues in specific ways unsuitable for composite systems: the latter require new and different governance as well as administrative rules and guidance to address these key issues. We hypothesize three conditions for reducing fragmentation and promoting urban integration and solidarity through composite service systems: common rules, principles and values; mechanisms to share competencies, financing and natural resources; and redistribution through rates and taxes. Integration of composite systems thus rests on the ability to “govern” diversity. “Polycentric governance” approaches (Falk, Bock and Kirk 2009) furnish useful analytical and theoretical approaches for the shape of such governance systems. Each utility unit or sub-system should have sufficient autonomy to conceive and adjust its operations quickly – i.e. allowing it to solve a collective problem (such as water supply) while benefiting from support and resources from higher levels of the system.

Government subsidies must be reinvented and costs adjusted for financing requirements. After certain dogmatic excesses in the 1990s, discourse and practices have given government subsidies a new image, especially for infrastructure extensions and connecting housing to supply networks. Cross-subsidies¹ between users, loans, various land and property taxes and rates, and social housing policies that include the cost of infrastructure: such have been the main mechanisms for subsidizing the poor in relatively rich cities such as in Cape Town, South Africa, or Santiago, Chile. Other approaches are necessary elsewhere, especially for public financing of private connections in poor cities. Development projects relying on international donor funding tend to use “output-based aid,” which targets grants to specific beneficiaries contingent on their meeting performance criteria. This aid mechanism, designed to reinforce a sense of public responsibility, leverages public funds; it is disbursed based on actual results achieved. It could be used to finance public funding of private connections in Senegal and Burkina Faso, for example. However, there are few extant cases of large-scale applications, and mechanisms to extend such aid to informal channels do not yet exist, although they are under discussion.

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¹ Cross-subsidies mean some customers pay higher rates than others, in such a way that the services provider can still achieve adequate revenues based on all customers' payments.
Subsidizing poor peoples’ water consumption is still controversial. South Africa’s change of policy at the beginning of the 2000s is significant: it now guarantees a minimum of six square metres of free water per month per household, after imposing water rates on all services previously. However, the failure of private water management services in Mali between 2000 and 2005 demonstrates that funding water consumption via user cross-subsidies does not succeed everywhere: middle-class customers’ excessively high rates caused the breakdown (Leborgne 2006).

Subsidizing informal channels is crucial for financing some externalities. In Cambodia, a development project chose to concentrate on water quality as its priority because there was little regulatory or popular pressure for it (Mahé 2006). Funding informal channels is also critical in providing water access to the very poor. Unconventional services propose sales and payment terms that suit the needs of low-income consumers, such as very small payments over time, purchases on credit and deferred payments. However, beyond socio-economic arrangements based on proximity and trust, such transactions do not include redistribution or solidarity mechanisms. In Maputo, Mozambique, small private operators cover highly-populated neighbourhoods that Aguas de Moçambique does not serve, but that nonetheless have electricity service. This means that the water services, more expensive than those of Aguas de Moçambique, primarily benefit households with average rather than low incomes. In another urban context, the same logic asserts itself with less dramatic results: in small towns in Cambodia, only 10% of households are excluded from water supply services. The incentives and tools to finance social and spatial equity in composite systems have yet to be invented.

Regulatory issues and terms must adapt to each situation. Funding is strategically central, but does not ensure the continuity of a water supply system. New arrangements bring increasing numbers of participants into play. Contracts that identify the parties involved and clarify their roles are preferred for organizational stability. The contract is a “must-have” tool for guided apprenticeships. Despite its rapid diffusion, however, it remains fragile in many circumstances, no more than a list of reciprocal commitments with no real legal guarantee, a partnership whose essential terms of operation remain undecided.

Composite water distribution systems are also distinctive because they offer differentiated services. How can they be regulated to encourage urban integration without making them uniform? It is certainly necessary to separate “universal” elements, such as sanitary standards and a definition of minimum acceptable service, from characteristics that may vary from place to place. Such clarifications may create conflicts, requiring subtle judgements that can only function if backed by large groups of consumers and all water producers. Composite systems face the challenge of “relative standards.” Sharing low-cost techniques and using inexpensive manufactured products is essential to ensure informal supply’s profitability. How can regulation of their relative standards coexist with the other, more stringent standards used by the system’s conventional operator?
Environmental issues also spark questions. Pumping groundwater in large cities conjures the risk of depletion, or else contamination of water tables through uncontrolled discharge of grey water. While neither conventional nor informal water supply models account for environmental conditions, they produce unequal consequences in this area. These arise immediately in informal channels poorly equipped to deal with ever-deeper or more distant water sources; conventional services, by contrast, have the means to obtain and treat such water before distributing it. How can “companies” with very different levels of responsibility and means share the burden of environmental efforts? Rapidly growing cities experience changing situations, and conflicts between conventional and unconventional services are inevitable. How can the development of their respective services be regulated, i.e. through competition, eviction, complementarity, and cooperative arrangements? Evidently, some urban integration concerns play out in the strategic management of these interactions: one risk of composite systems is that they can make intra-urban inequalities concrete and enduring. Monitoring this presupposes use of tracking tools and indicators for the entire composite water supply system – tools that do not yet exist. Finally, these interactions put competing “visions” of water service into play. Simply acknowledging existing supply sources will not ensure their peaceful coexistence. For example, the goal of widely-available, essential services at minimal consumer cost requires different modes of exploiting fresh water than that of services complying with modern environmental standards. These goals are equally legitimate and difficult to reconcile with other concerns: allocations of public or private resources, lifestyles, contributions of city dwellers still awaiting supply, and consumers historically responsible for the degradation of shared resources. Composite systems internalize many conflicts that conventional services seem to escape; creating cooperative processes that bypass such conflicts is critical to public water service continuity in developing countries.

Governance systems must also be adjusted. Once we accept the principle of progressive urban deployment of composite systems, we must also recall that their governance is neither neutral nor unequivocal. One approach encourages optimal autonomy for sub-systems, each creating service standards and rules using the values and framework of collective action, as well as forms and modes of monitoring customers within its purview. This path limits entry costs for operators and is inexpensive to coordinate. It encourages multiple supply systems endowed with their own mode of governance, and relies on competition to regulate their coexistence. However, autonomous sub-systems pose higher risks for urban integration objectives. Conversely, a second approach favours a polycentric perspective aimed at drawing all channels of water supply into a multilevel architecture. Composite systems take advantage of the diversity of participants and arrangements to stabilize local solutions, framed in “all-encompassing” regulations for water quality, service minimums, and price limits; these solutions guarantee the coordination and mutability of all of the systems, in addition to a shared vision of the service’s social utility (Jaglin 2001).
Both the municipal water company of Lusaka, Zambia (since the 1990s) and GRET, a French non-governmental organization acting with a conventional water utility, Camep in Port-au-Prince, Haiti, have implemented this strategy in very different urban contexts. It also underpins the programme known as the Mirep in Cambodia (see Figure 1), scaled to an ensemble of small towns (Mahé 2006).

**CONCLUSION**

In many cities in developing countries, the business model for integrated utility services has denied the composite character of the real water supply, while maintaining the fiction of service based on national and egalitarian standards. Composite systems provide a promising alternative, but do not yet constitute more than a very incomplete model. They cannot emerge as a sustainable solution until policy-makers impose the coexistence and standardization of various sub-systems from above. That is the full challenge of their regulation and governance. While available technical, managerial and spatial engineering offer diverse management tools, only a political power can impose the regulations that will enhance a composite system’s cohesion, solidarity, inclusion and urban integration.

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2. GRET (*Groupe de recherche et d’échange technologique*) is one of the leading international solidarity non-profits in France.

3. **Centrale autonome métropolitaine d’eau potable.**

4. **Mini-réseaux d’eau potable.**

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**FIGURE FROM INFORMAL SERVICE TO ESSENTIAL SERVICE: MIREP MODEL**

<table>
<thead>
<tr>
<th>Service Components</th>
<th>“Informal” Service</th>
<th>“Essential” Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Quality Demands</td>
<td>Good-tasting water at home</td>
<td>Water of international quality standards</td>
</tr>
<tr>
<td>Coverage</td>
<td>Area in near proximity to supplier</td>
<td>Dense town areas susceptible to water shortages and pollution of traditional sources</td>
</tr>
<tr>
<td>Service Access</td>
<td>Various modalities without guarantee of availability or quality</td>
<td>Maximization of individual connection rates and service reliability</td>
</tr>
<tr>
<td>Price</td>
<td>Based on supply and demand</td>
<td>Regulated rates</td>
</tr>
<tr>
<td>Equity system</td>
<td>None</td>
<td>Choice for poorest people</td>
</tr>
<tr>
<td>Regulation</td>
<td>Almost non-existent</td>
<td>Regulated by local contract with local levels of authority participating in service definition and monitoring</td>
</tr>
</tbody>
</table>

Source: Mahé (2006: 33)
WORKS CITED


A multitude of small, alternative provision systems has recently developed to meet specific needs, alongside large-scale electrical, water and sanitation utilities. This development overturns the dogma that extending ever-larger utility networks will always provide the best or only solution for urban services.

Large utility systems tend to dominate prescriptions for delivering urban water, electricity and sanitation services. Their centrally planned, interconnected fixtures and equipment are managed on local or larger scales, and offer relatively uniform services that help promote social cohesiveness. From the first quarter of the nineteenth century, powerful technical, economic and political factors (Hughes 1983), as well as environmental and social ones (Barles 1999), combined to create utility distribution systems, particularly in Europe, Japan and North America. The lack of such infrastructure, in either quality or quantity, is often perceived as a symptom of uncontrolled, poorly-managed or dysfunctional urbanization.

Utilities are at the heart of the urban transition that took place in the early 1800s in the most industrialized countries (de Swaan 1995; Melosi 2000), the period that shaped what persists as their dominant conception. This conception holds three main tenets: that networks give the best urban services performance in economic, socio-spatial and environmental terms; that a network’s performance increases with its size, i.e. with its spatial extension, and the number and diversity of its connected customers; and that solutions to problems networks create are to be found in the networks themselves – in their further extension, more centralized management and greater technical sophistication.

However, in recent years the centralized, technical network model has come into question. Long-standing, disparate, and sometimes radical criticisms about the functional principles of large utilities crystallized when those services encountered the proclaimed imperative of sustainable (urban) development. Such critiques question the compatibility of large utilities with more “sustainable” organization, management and operation of urban systems. They tend to oppose the “metabolism” of networked systems to the “eco-cyclic” metabolism,” or ecologically-based systems vaunted by the advocates of (strong) sustainability² (see Figure 1).

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1. “Eco-cyclic” describes a system that reduces wasteful dependence on fossil fuels, underground metals, minerals, chemicals, and other encroachments on nature, by reusing or recycling the by-products or waste generated by some activities as inputs for others (e.g. using solid waste as fuel, or recycling grey water).
2. “Strong sustainability” is a term from environmental statistics
In an eco-cyclic perspective, there are obvious reasons for fundamentally questioning the network model for supplying energy, water, waste or storm water treatment, or for recycling and reusing waste. This perspective challenges the postulate that it is always better to extend the network to respond ever more effectively to ever-increasing demand. Rapidly developing data and communication technologies – long-used to enhance real-time management of utilities’ technical networks – now find uses in more distributed services architecture, such as “smart grids”\(^3\) for electricity. In addition, liberalization reforms in utility industries have facilitated market entry by new providers and systems that complement or compete with large utilities. Finally, the earlier system of pre-equipping networks in advance of urbanization, or “catching up” when pre-built spaces connected to the network, has a new overlay of diverse services – services promoted, as were previous systems, by public authorities. Examples include mini-networks – individualized, lot- or building-scale supply systems inserted in eco-districts designed to be “autonomous,” or in sparsely-built spaces.

This questioning does not, however, mean the end of utility networks. In practice, we see various combinations of technology, where existing networks join with new types of provisioning to create composite systems, although such new systems are still evolving and remain outside official channels. Sustainable urban planning projects usually require more developed and sophisticated infrastructure and a tight articulation between decentralized systems and large, pre-existing utilities’ technologies. Such

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### Figure 1: Network and Eco-cyclic Systems

<table>
<thead>
<tr>
<th>Networked System</th>
<th>Sustainable Urban Ecosystem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear metabolism: withdrawal &gt; supply &gt; elimination</td>
<td>Circular metabolism: minimal resource use, minimal waste, recycling and reusing</td>
</tr>
<tr>
<td>Solidarity</td>
<td>Autonomy</td>
</tr>
<tr>
<td>Engineering, mechanics, technical systems, cybernetics</td>
<td>Ecology, organic systems, ecosystems</td>
</tr>
<tr>
<td>Water-tight; flows, discharge, kinetics; flow model (hydraulic)</td>
<td>Porous; stasis, stock, slowness; stock model (non-renewable resources)</td>
</tr>
<tr>
<td>Imbalance between the capacity to provide resources and resource consumption habits</td>
<td>Equilibrium between the capacity to provide resources and resource consumption habits</td>
</tr>
<tr>
<td>Long cycle, un-looped</td>
<td>Short cycle, continuous loop</td>
</tr>
<tr>
<td>Support for demand expansion; demand supply</td>
<td>Demand limitation and management</td>
</tr>
<tr>
<td>Technical-economic model of large systems expansion: economies of scale, scope, variety; club effects; least transaction cost</td>
<td>Ecological model of conservation and preservation of resources and milieu</td>
</tr>
<tr>
<td>Large, centrally-managed fixtures and equipment</td>
<td>Small, dispersed fixtures and equipment, (capable of being) managed in a decentralized way</td>
</tr>
<tr>
<td>Unlimited consumption; perpetual growth of urbanization, material wealth, and use of urban services</td>
<td>Limited consumption, low-use; dissociation between development and growth; “degrowth” (a reversal of growth)</td>
</tr>
<tr>
<td>Irreversibility, momentum, inflexibility</td>
<td>Reversibility, adaptability</td>
</tr>
</tbody>
</table>

Source: Coutard (2010: 115)
infrastructure-intensive projects attest to the transformation of urban services’ internal economy, in which the rising value of flows (water, energy and waste) economically justifies duplicating infrastructure. We see double networks for potable and non-potable water; double or triple networks to collect wastewater, storm water and rainwater; multiple energy networks and systems for electricity, heating and cooling; and differentiated systems for selective garbage collection. Ever more frequently, all of these infrastructure systems co-exist with individualized, lot-scale systems, even in high-density areas – supplying services such as rainwater recovery, heating and cooling produced on-site, and garbage composting. However, from a prescriptive point of view, decentralized systems do not seem to be a practical or even desirable alternative to utility distribution systems scaled for entire agglomerations of whatever size.

The questioning of traditional large utilities thus has its limits. Undoubtedly, the powerful technical and economic factors that underpinned the century-long growth of utilities have progressively diminished. But they remain significant: the cost of duplicating utilities’ infrastructure is prohibitively expensive in most cases, and the quality of service increases with the number and diversity of customers. Furthermore, one should not underestimate utilities’ capacity to satisfy customers’ needs unobtrusively, immediately and efficiently. Even though they may encourage a lack of ecological responsibility, they do provide their customers the great benefit of spending time and energy outside of “coproducing” services, e.g. treating their buildings’ wastewater, securing water and energy, and sorting or even treating their own waste and garbage. Therefore, the definitive question remains open: “to what extent the city of the future will continue to depend on the infrastructure technologies of the nineteenth century, and to what extent they will incorporate new and more flexible technologies” (Tarr and Dupuy 1988: xvi).

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TO WHAT EXTENT WILL THE CITY OF THE FUTURE CONTINUE TO DEPEND ON THE INFRASTRUCTURE TECHNOLOGIES OF THE NINETEENTH CENTURY?

JOEL A. TARR AND GABRIEL DUPUY
South Asia: Managing the Quality of a Limited Resource

Anamika Barua, Ashok Jaitly
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Urban water distribution systems have developed greatly in South Asia, but without service continuity or consistent reliability, leading to high financial and health costs for consumers. Solutions to ineffective water management include improving pipelines, developing alliances between public water authorities and private operators, and using information technology.

Providing adequate safe water to millions of people across an increasing number of cities in South Asian countries1 is a daunting task for urban authorities. The urban water supply in South Asia is plagued with severe deficiencies in terms of availability, accessibility, quality and equity. Water problems in South Asian cities are aggravated by rapid population growth and urbanization. In addition, many water service providers are inefficient and in poor financial condition. Inefficiencies are reflected in high losses during water distribution and are the result of inadequate maintenance of old systems, high overheads and very low user charges in many cities. As a result, most urban water authorities cannot cover their operations and maintenance costs and are heavily dependent on government support. Achieving a sustainable urban water system therefore means improving not only services delivery but also financial viability.

Although a large number of South Asian cities are connected to piped water supply networks, water supply is intermittent with restricted supply hours in different areas. According to official records, while access to clean water is increasing in these cities, reliability, sustainability and affordability of water services remain poor (WSP 2006). Thus, there is a huge demand-supply gap. City residents, even though formally connected to a piped water network, spend large sums of money on expensive and unsafe alternatives to cope with poor service quality. To bridge the demand-supply gap, urban water authorities constantly search for new sources of water, which is extremely costly. Little emphasis has been placed on the efficient use of available water resources. The irony is that in spite of the huge demand-supply gap, not all of the water supplied by water utilities reaches the consumer, as 40%–60% of the water is lost during transmission in many cities. In addition, low pipe pressure and intermittent supply cause back-siphoning, which causes contamination in the distribution network and negatively affects public health.

Interestingly, several large Asian cities have successful 24x7 water supply systems, including Hong Kong, Phnom Penh, Seoul, Shanghai, and Tashkent. However, no South Asian city has achieved a wholly successful 24-hour water supply system. They are plagued not only

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1. In this paper, South Asia includes Afghanistan, Bangladesh, Burma, India, Iran, Nepal, Pakistan, and Sri Lanka.
with intermittent water supply, but also with water loss from the distribution process or through illegal connections that do not earn any revenue. This indicates that the urban water service providers in most South Asian cities will need to take serious steps to achieve performance at international standards.

One way to achieve the goal of urban water sustainability in South Asian cities would be through a 24x7 water supply model. Efficient service delivery should be the key performance indicator. One of the commonly held assumptions regarding 24x7 water supply systems is that water requirements would increase and require massive investments in bulk capacity augmentation. A concomitant assumption is that intermittent water supply lowers residential consumption in comparison with continuous supply. These assumptions are not borne out by several studies or by reality. In fact, consumers tend to waste a considerable amount of water with intermittent supply, since excessive water is stored and stale water is dumped once a fresh supply arrives. On the supply side, intermittent water supply leads to leakages due to burst pipes, because the large volume of water supplied for short periods generates much higher pressure. A continuously pressurized system for 24x7 supply can lead to a longer life for the water distribution network and lower maintenance costs due to a reduction in broken pipes.

It is essential that South Asian cities wishing to improve their water service standards should progressively convert intermittent water supply to 24x7 supply. The pace of conversion may vary from country to country and city to city, but 24x7 is the most comprehensive approach and can lead to urban water sustainability. However, it is important to build in structured approaches and a proper implementation strategy: a number of social, economic, and institutional reforms will have to be introduced in parallel with technical reforms.

To begin with, a well-structured, integrated information system on a geographical information system (GIS) platform needs to be developed. In addition to the need for reliable information, utility performance requires other simultaneous measures: controlling technical and commercial losses, pressure management, metering, equitable rates, efficient revenue collection, cost effectiveness in service delivery, and effective regulation. Public-private partnerships (PPP) may fuse the skills, funds, and expertise from public and private service providers with an ultimate aim of delivering a good standard of service to the consumers. Hence, successful PPP models from other Asian cities that could be replicated in South Asian cities need to be explored.

The relationship between customer and supplier is critical for success. Customers of an intermittent water supply system resist making payment mainly because of sub-standard service levels. Introducing 24x7 water services means management of the service could be radically improved. Under a 24x7 system, the supplier has a responsibility to deliver water of satisfactory quality and quantity on a continuous basis. Hence, this approach has the potential to generate consumer satisfaction and improve willingness to pay for the service, even in slum areas (CAD 2008).

Under a 24x7 water supply system, service providers will have to focus on several measures to improve service delivery, but such efforts will be short-lived if they are not coupled with institutional reform and a strong political will. Hence, political acceptance and reforms, in the form of effective regulatory mechanisms, managerial efficiency, financial stability, monitoring, and evaluation, need to be introduced in parallel to ensure the long-term sustainability of the system. The success of a 24x7 water supply system also depends on increasing public awareness so that people fully understand the health benefits and the necessity of demand management and conservation. Conversion of intermittent water supply in South Asian cities to 24X7 water supply systems is both achievable and affordable if implemented with careful preparation and planning.

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Social cohesion is not a new goal in Africa: many countries that have tried to achieve it with varied success. Standards-based housing market regulations do not guarantee reduced spatial segregation or increased homeownership for the poorest people. To attract more economic activity, local governments may try to prevent poor people from migrating to cities, and relegate them ever further from city centres. Protecting access to housing, improving living conditions and increasing the availability and density of rental housing may be effective means to accommodate two billion new urban inhabitants by 2030.

AFRICA: WHERE AND HOW TO HOUSE URBAN CITIZENS

A rapidly growing portion of the global urban population is impoverished and lives in illegal areas. Construction of adequate housing, and particularly housing the urban poor can afford, largely falls short of need, whether one considers rental, owner-occupied or collectively-owned stock. Access to credit for the legal purchase of urban land, housing or home improvements is often out of reach for the poor. These facts lead to two questions: “How will our cities accommodate the two billion new urban citizens projected to need housing in the next two decades?” and “How can cities take up the challenge of social inclusion through improved access to housing?”

The majority of urban population growth is accommodated by so-called “slums,” i.e. living areas that lack one or more of a range of basic conditions, such as adequate shelter, water, sanitation and protection against eviction. In this chapter, I argue that governments’ approach to slums must be understood in the context of an urban policy that strives for inter-city competitiveness. This discourages an acceptance and legalization of existing settlements and/or slums, and is hostile to the formation of new informal settlements as a response to growth of the urban poor population. However, as I explain in more detail, the granting of “tenure security,” or the decisive prevention of eviction, is an important first step in improving the lives of slum dwellers. Government failure to secure tenure, combined with blatant practices of social exclusion by ethnicity or nationality, can exacerbate stresses among low-income communities that can erupt into violence and further social exclusion.

Urban policies and interventions to accommodate two billion new urban citizens in the next two decades must not only address construction of sustainable urban
housing, but must also halt a massively under-reported phenomenon: the forceful removal of people from city centres to city peripheries. I refer to two cases of large-scale slum clearance, both targeting rental housing, to illustrate this negative trend in urban practice.

While dominant forms of tenure differ significantly from one region to the next, a powerful lobby of development NGOs, government advisers and others has simplistically promoted owner-occupation or homeownership as a solution to tenure security. In this chapter, I use two contrasting examples in Johannesburg, South Africa, and Nairobi, Kenya, to show how the dominant form of tenure – owner-occupation in one case and renting in the other – has shaped the two cities in very different ways, especially when coupled with their differences in planned and largely unplanned development. These two cities provide significantly different access to housing to their growing, impoverished populations. I will show how the contrast between the sprawling and segregated homeownership districts of Johannesburg and the compact rental neighbourhoods of Nairobi produces surprising, perverse and often ignored outcomes in terms of urban sustainability. These cases suggest a need for a more differentiated approach to urban development and housing policy on the part of local and international policy makers. They also suggest the need for a conscious striving toward a dense, convenient, sustainable and inclusive urban form.

Finally, I argue that the kind of urban competitiveness currently promoted worldwide is not compatible with meaningful social inclusion. There is an urgent need to shift from a primary focus on cities’ global competitiveness to one of urban social inclusion, if the growing urban population is to be accommodated adequately.

INTER-CITY COMPETITION AND EXCLUSION OF URBAN POOR

In 2000, when the United Nations launched its Millennium Development Project, the global urban population was estimated at 2.86 billion, with a projected addition of 1.38 billion people by 2020 and more than 2 billion by 2030. In 2001, 31.6% of the urban population was estimated to be living in so-called “slums,” with the highest concentration of this urban slum population in African countries. Slums are expected to absorb the largest percentage of future urban population increases (UN-Habitat 2003b: 246).

Slums are defined as areas that are lacking in one or more of the following conditions: 1. durable, protective housing; 2. sufficient living space; 3. accessible, safe water; 4. adequate sanitation; 5. security of tenure (UN-Habitat 2003b: 12).

Inadequacies in living conditions largely occur in unauthorized and often unplanned settlements. As cities grow, the urban land market expands and competition increases from other land uses, be they commercial, industrial or higher-income residential. In this context, intensified by the “liberalization of land markets,” unauthorized settlements have little protection from future demolition (Durand-Lasserve 2006: 207). Security of tenure, or protection against future
eviction, is therefore the most important and most pressing “challenge of slums,” as has long been recognized (Abrahams 1966; Angel 1983).

Unauthorized or unplanned settlements with insecure tenure are generally referred to as “informal settlements.” They therefore fall under the umbrella term of “slums.” Most informal settlements not only lack security of tenure, but are inadequate with respect to all five slum conditions. Unless tenure is secured or settlements are legalized, governments are usually reluctant to invest resources to improve access to water and sanitation, or to improve the quality of shelter. At the same time, except for progressive governments in Latin America (see Fernandes 2007), governments are notoriously reluctant to secure tenure in existing informal settlements, even though this is primarily a legal intervention that does not require massive public expenditure. Their reluctance to secure tenure hinges on a widespread perception among policy-makers that legalizing unauthorized housing will only encourage more unauthorized development by or for a never-ending tide of poor urban immigrants. Furthermore, any one city that legalizes unauthorized construction of housing will fear attracting migration that might otherwise be directed toward other cities. Many city governments consciously create urban conditions that are unattractive to the urban poor, as Kurtz (1998: 82) argues with respect to Nairobi’s authorities, in order to prevent the perceived burden of unwanted urban growth that results from inward migration of the poor.

Since the 1990s, cities have also been encouraged to develop a policy mindset of active economic competition with other cities as a requirement for growth, or to strive towards being “globally competitive” (Murray 2008:73). “City Development Strategies” promoted by the Cities Alliance, “an international donor coalition, including the World Bank and UNCHS [United Nations Centre for Human Settlements], but also linked to international organizations of local government,” have centred on this objective, though also attempting, with some tension, to address the developmental needs of the growing urban population (Parnell and Robinson 2006: 240). Inevitably, competitiveness includes a city’s attempt to attract not only more national and global investment than its competitors, but also - although this is not always explicit - to avoid attracting more unwanted migrants than other cities. Cross-border migration means that this negative competition between cities spans countries’ borders. As I will show below, in Johannesburg, South Africa, and Nairobi, Kenya, blatant social exclusion by the state has contributed to violent social exclusion among the poor.

In this context of competitive policy-making, few city governments make it their central objective to unlock access to housing for the poor. Instead, the overwhelming housing needs of the urban poor are seen as a burden, an added challenge and a hindrance to economic growth and urban prosperity. Therefore, many municipalities attempt to keep the poor out of the city or to actively remove them. Eradication, eviction, relocation and resettlement go hand-in-hand with modern world-class city
aspirations (Murray 2008), as well as with a perceived mandate from the UN to eradicate slums or informal settlements by 2020. The unfortunate UN slogan “Cities Without Slums,” which accompanies the Millennium Development Goal (MDG) 7 Target 11, to “achieve significant improvement in the lives of at least 100 million slum dwellers by 2020” (UN-Habitat 2003b: 8), has resulted in cities closing their doors to the poor. Huchzermeyer (2008a) demonstrates this for the South African capital city Pretoria, where the municipality’s budget for the policing and control of informal settlements by private security companies is larger than its budget for basic services to these same settlements. The Gauteng provincial government has hailed Pretoria’s informal settlement management approach as a “best practice” for curbing the growth of informal settlements: it is clearly keeping the poor out of the city.

TENURE FOR THE URBAN POOR

In neo-liberal policy orthodoxy, the preferred tenure form to promote for the urban poor is freehold ownership (Andreasen 1996; Durand-Lasserve and Royston 2002). The neo-liberal endorsement of home ownership was preceded by modern urban planning, which idealistically promoted low-density suburbia (see Hall 1990) financed through mortgages. The assumption was that most urban households would derive their income from formal employment and would qualify for a mortgage. This model continues to inspire and shape formal urban expansion, despite having long been blamed for creating segregation and motorcar dependence, for being expensive and accessible only to those deemed credit-worthy, and therefore exclusionary (e.g. Jacobs 1961).

For most of the poor in “peripheral countries” such as South Africa and Kenya, the city is seen as a market in the pre-industrial sense of the term. They seek access to cities not for the urban promise of formal (industrial) employment, mortgage and homeownership, but for their promise of a small stake in the informal retail and services market. Despite their relative disinterest in homeownership, there have been efforts across the globe to house the poor as homeowners. Homeownership is promoted by a powerful development lobby. At the one extreme is the increasingly influential international non-profit organization, Slum Dwellers International, which encourages mobilizing the poor’s meagre resources through savings and credit towards land purchase and self-construction of individually-owned housing, whether in India, South Africa or Kenya (Bolnick and Mitlin 1999; Weru 2004; Mitlin 2008) – that is, irrespective of context. At the other extreme are prominent liberal policy advisors such the Peruvian economist, Hernando de Soto (2000), who simplistically argues that wealth will be unleashed for the urban poor through formalization and titling of their illegal stakes in the city.

Both positions ignore the reality of increasing growth in rental tenure as the sole urban housing option for the poor and the slightly better-off (see Andreasen 1999; Keyder 2005). They are blind not only to the existence of rental housing, as argued by...
Gilbert (2008), but also, and perhaps more importantly, blind to the need to intervene sensibly in the growing rental market (Andreasen 1999) and improve conditions in largely unregulated housing stock, much of which qualifies as “slums.” Rental tenure in the “developing world” is often inaccurately idealized, as by Gilbert (2008: iii), who calls it a market of “a myriad of small-scale landlords.” This position takes as a norm those cities in Latin America, Asia and southern Africa where owner-occupation dominates – a common weakness in the development literature (Andreasen 1999).

In several African cities, the percentage of urban households that rent is much higher than in Asia or Latin America. In any context where three-quarters or more of urban households rent, they cannot possibly all be backyard tenants of small-scale owner-occupying landlords. Where the rental population makes up 70% or more of urban households and the majority of rental stock is private, it is evident that relatively few proprietors own the majority of the rental housing stock (Figure 1). Large-scale absentee landlords often enjoy political patronage and impunity from constructing harmful and exploitative housing that qualifies as “slums.” Yet they produce urban densities and centralities that have relevance to an economically uncertain future in which oil may be more costly than at present. I illustrate this in the case of Nairobi below.

Urban land available for owner-occupied low-income housing is growing scarcer, in particular for self-help “squatting.” This can be linked to globalization and the increasing privatization of public land and its release into a profit-seeking residential market. This trend has been reported for such diverse cities as Istanbul (where even people whose incomes have improved through globalization increasingly tend to rent (Özüekren 1995; Keyder 2005), Kigali, Rwanda and Phnom Penh, Cambodia (where 20-25% of the population rents: (Durand-Lasserve 2006). Shatkin (2004: 2470) describes similar trends elsewhere in Asia: “While incomes are certainly rising in the globalizing cities of Asia, low-income residents are nonetheless experiencing an unprecedented shelter crisis.”

While the liberalized real estate market pushes more and more households into low-quality rentals, often in slums, unauthorized rental housing has been the target of the largest urban eviction drives of this millennium. For instance, the Zimbabwian government sought to “restore order” in its Operation Murambatsvina in June/July 2005. This attack on unauthorized markets, informal/squatter settlements and backyard rental stock deprived an estimated 700,000 people of their homes and 300,000 more of their livelihood in informal commerce (du Plessis 2006; Potts 2006). The operation was condemned internationally. However, it drew sympathy from the Provincial Minister of Housing in Gauteng, South Africa (the province in which Johannesburg is located), who vowed to eradicate unauthorized housing in the

![FIGURE 1 RENTAL: AN ACCESS TO HOUSING](image-url)

**Tenant Households: Selected Cities in Developing Countries (%)**

<table>
<thead>
<tr>
<th>City</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mavoko (Kenya)</td>
<td>91.2</td>
</tr>
<tr>
<td>Port Harcourt (Nigeria)</td>
<td>86</td>
</tr>
<tr>
<td>Kericho (Kenya)</td>
<td>85.3</td>
</tr>
<tr>
<td>Nairobi (Kenya)</td>
<td>84.7</td>
</tr>
<tr>
<td>Kisumu (Kenya)</td>
<td>82</td>
</tr>
<tr>
<td>Moshi (Tanzania)</td>
<td>78</td>
</tr>
<tr>
<td>Quito (Ecuador)</td>
<td>48</td>
</tr>
<tr>
<td>Johannesburg (South Africa)</td>
<td>42</td>
</tr>
<tr>
<td>Bangkok (Thailand)</td>
<td>41</td>
</tr>
</tbody>
</table>

province in a similar fashion (Huchzermeyer 2008b). At a similar scale but hugely underreported, the Nigerian government evicted around one million slum dwellers, mostly tenants, in the capital city Abuja between 2003 and 2007 (COHRE and SERAC 2008; Fouwler 2008).

**ACQUIRING AND LOSING A HOME: TWO CONTRASTING TRAJECTORIES**

In the case of Johannesburg, South Africa, the state subsidizes inconvenience. Where housing for the poor is underwritten by the state, as in South Africa, it is seldom integrated with the city and its economy. Instead, massive schemes are developed on cheap tracts of land on the urban periphery, creating an urban form that itself imposes the extra living costs and the inconvenience of long distances. Ironically, this unsustainable urban form is the result of strict adherence to planning standards and regulations, i.e. what is considered “good governance.”

Johannesburg, with a population of approximately 3.2 million according to the 2001 census, occupies an area of 130km by 33km. Despite a compact central business district, its residential density is extremely low – a concern that the city’s Spatial Development Framework seeks to address (City of Johannesburg 2008). During the late apartheid years, legislation for controlling migrant inflows to the city was repealed and the enforcement of racial segregation began to crumble. A growing number of urban poor found accommodations in overcrowded government or company hostels, in the backyards of formal township houses, or in the mushrooming informal settlements on township fringes and on abandoned farmland on the urban periphery (Beall, Crankshaw and Parnell 2002). Since the 1990s, the urban poor also occupy the inner city either as tenants or “squatters” in abandoned and/or inadequately converted inner-city high-rise buildings; 78,000 low-income people were recorded as living in the inner city in 2001 (du Plessis 2009).

Under the 1986 policy of “orderly urbanization” that promoted homeownership for the urban poor, large tracts of peripheral land were converted into subsidized sites and service schemes. After the democratic elections in 1994, housing policy was substantially refined and consolidated: a constitutional right of access to adequate housing was introduced. However, the programme continued of massive state-subsidized development of land for the poor on the urban periphery, though with the introduction of a “top structure” or minimal house (Huchzermeyer 2003). This delivery of “free-of-charge” homeownership to the urban poor has perpetuated the segregated and fragmented urban form of the apartheid era (Tomlinson, 2003). Large pockets of uniform dormitory-type housing disperse the urban poor far from the economic opportunities and amenities of the city (Figure 2). While strictly following urban planning procedures, regulations and standards, these
policies impose an inconvenient and costly way of life. As a result, poor people who are allocated units are often compelled to return to the better-located informal settlements from which they were relocated.

The simplistic political conception assumes that the allocation of home ownership in marginal locations can achieve social inclusion. This progresses at a slow pace. Nearly 30% of Johannesburg’s households are excluded from formal housing, living instead in the city’s 179 informal settlements, in squatted buildings or informal rentals in the back yards of low-income people (Figure 3). As part of a national campaign to eradicate informal settlements by 2014 (as erroneously justified by the MDG 7 target 11 slogan “Cities Without Slums”), there are plans for in situ upgrading.

In Johannesburg as elsewhere, only half of the city’s informal settlements at most are deemed suitable for upgrading, and the pace of implementation lags far behind its targeted goals. The remaining half are still earmarked for demolition and their residents face relocation to new housing schemes on the periphery; meanwhile, current measures prevent the building of new informal settlements, which leads to overcrowding elsewhere.

Social exclusion in South African cities has taken on another, more sinister dimension. City authorities, from law-enforcement officers to housing officials, have shown blatant discrimination against African foreigners, apparently in order to stem the perceived tide of unwanted poor to the city. Foreigners, including economic and political refugees, are excluded from state-subsidized housing, and therefore compete for scarce space in the increasingly confined informal settlements and the underdeveloped affordable private rental

<table>
<thead>
<tr>
<th>Occupancy type (%)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Formal and private</td>
<td>39.1</td>
</tr>
<tr>
<td>Informal settlement</td>
<td>29.6</td>
</tr>
<tr>
<td>Social housing stock</td>
<td>17.4</td>
</tr>
<tr>
<td>Owned subsidized houses*</td>
<td>13.9</td>
</tr>
</tbody>
</table>

*built since 1994

Source: compiled by M. Huchzermeyer, derived from the City of Johannesburg (2001).
market. Already in the late 1990s, this public discrimination helped foster deep resentment against foreign migrants among low-income South African communities, particularly in informal settlements (McDonald 1998). Compounded by slum eradication campaigns that have actively prevented the formation of new informal settlements (thus increasing competition for marginalized living space), a deeply disturbing poor-on-poor xenophobic violence sparked in Johannesburg’s informal settlements in May 2008, and spread across South Africa (Pithouse 2008). Thus, bottom-up social exclusion in its rawest and most gruesome form emerged in a country where memories of the apartheid state’s racially-based violence still fester.

The situation in Johannesburg contrasts with that of Nairobi, Kenya. In cities where housing subsidies are non-existent, entrepreneurialism is encouraged, and an unregulated urban economy is given free rein to shape the city in a more compact and convenient urban form. Nairobi is my case in point: it has no political pretensions of achieving social inclusion of the urban poor through ownership of a plot of land. Instead, an entrepreneurial rental market provides access to minimal living spaces. While hugely inadequate, often overcrowded, and insecure due to lack of formal authorization, housing opportunities for the poor are well-situated, and may provide access to and reinforce the urban economy through their incorporation of retail opportunities. In the multi-storey rental or tenement market, ground floors are generally dedicated to retail activity. Tellingly, Nairobi’s single-storey rental areas, commonly termed “slums,” are often referred to as open-air markets.

The prevalence of rental tenancy in Nairobi has its roots in the under-provision of housing for the urban poor masses, during colonial rule and up to 1963. Despite much donor support and interest in the early post-independence years, the distortion between formal supply and demand never reversed. Instead, rental “slums” have come to house an ever-increasing percentage of Nairobi’s households, from one-third in 1970 (Nevanlinna 1996: 214) to 55% in 1997 (Nairobi Informal Settlements Coordination Committee 1997), and 60% in more recent estimates (Syagga, Mitullah and Karirah-Gitau 2001).

Nairobi has virtually no owner occupation in self-help “squatter” or informal settlements. Furthermore, according to the Central Bureau of Statistics (2004), only 1.4% of Nairobi’s households are in the tenure category of “no rent, squatting” (Figure 4). Land invasion or squatting by the urban poor often precedes illegal access by the better-off, who buy out the initial squatters and, if necessary, hire gangs to fight out conflicts over urban land (Obala, forthcoming). In Nairobi, gang violence rooted in the political and ethnic exclusion of the Moi era (Anderson 2002) reinforces


<table>
<thead>
<tr>
<th>Occupancy type (%)</th>
<th>Households (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rental</td>
<td>84.7</td>
</tr>
<tr>
<td>Other*</td>
<td>13.9</td>
</tr>
<tr>
<td>Illegal</td>
<td>1.4</td>
</tr>
<tr>
<td>Illegal and Owner-occupied</td>
<td>66.6</td>
</tr>
<tr>
<td>Illegal and Owner-occupied with another household</td>
<td>64.4</td>
</tr>
</tbody>
</table>

social exclusion, often along ethnic lines. This was evident in the post-election violence of early 2008, when a number of factors triggered a “descent into a spiral of killing and destruction along ethnic lines and the consequent fracturing of the fragile idea of nation” (Mueller 2008: 186).

In Nairobi, slums as well as multi-storey tenements form an important part of the indigenous urban economy (Figure 5). While corruption, violence and ethnic tensions pose serious challenges for social inclusion, one should acknowledge that urban density in the un-gated form of tenement development incorporates retail activity and produces streets with public spaces. Nairobi’s combination of good city location, integration of retail activities and presence of public street space provide a convenience and conviviality absent in most parts of Johannesburg. Amin and Graham (1997: 422) point to the important role of “shared public space” in developing “a civic culture that combines self-belief and autonomy rooted in widespread practice of citizenship rights with the potential for tolerance and cultural exchange offered by mingling with strangers.”

These positive dimensions of Nairobi’s unauthorized spatial form are not reflected in urban policy. Nairobi’s latest vision statement (Ministry of Nairobi Metropolitan Development, 2008) seeks competitive advantage, and borrows from South African cities (among others) to brand itself as a “world-class African city.” Like Kenyan housing policy (Ministry of Lands and Housing 2004), the vision statement ignores the prevalence of rental tenancy and instead seeks to expand home ownership, an approach that has served largely to provide opportunities for further unauthorized or corruptly authorized investment in tenements (Huchzermeier 2007).

CONCLUSION

“As a general rule, the primary mechanisms for social inclusion into the mainstream of urban life are regular work and stable income, the availability of authorized residential accommodation, and access to physical infrastructure and basic social services... [anchoring] residents to a rightful place in the city” (Murray 2008: 13).

Social inclusion should be a fundamental principle for housing the urban poor across different contexts. For most cities in “peripheral” developing countries, achieving legal accommodation and access to basic services and infrastructure means authorising and improving an existing residential situation. Ironically, attempts at “getting ahead” of the problem through a focus on planned delivery of home ownership (rather than legalization and upgrading) has reproduced inconvenient, costly and unsustainable urban environments, as in South Africa. If we are to take the spatial dimension seriously in conceptions of social inclusion, then entrepreneurial forms of rental housing must be embraced, realistically guided and regulated to prevent the formation of slums. Cities across the globe, particularly in developing countries, cannot afford not to harness indigenous entrepreneurialism in building urban environments, if they are to house two billion new urban poor by 2030. Governments in many cities have helped foster ethnic, racial or citizenship
barriers within their housing markets. These need to be actively broken down, in order to prevent social exclusion from below from undermining the gains of increased housing construction.

While city development strategies promote the idea of an “inclusive city” (see South African Cities Network 2008), this masks a certain contradiction between goals of social inclusion and those of economic or global competitiveness. Parnell and Robinson (2006: 351) call for research “on the challenges of addressing the growth/poverty-reduction dilemma in cities.” They are optimistic that “development policy” and “growth-based urban strategy” can be fused in urban theory (Parnell and Robinson 2006: 338). I argue instead for an urgent and far more fundamental rethinking of strategies for our urban future. This requires a more rigorous discredit-ing of the “global competitiveness” orthodoxy. What is needed is the development of urban as well as housing policies, based on local circumstances that build on, foster and effectively guide local economic processes into the construction of sufficient, adequate and inclusive housing stock for the future.

![Figure 5: Nairobi: Housing Opens Up the City to the Poor](source: compiled by M. Huchzermeyer.)
WORKS CITED


“HOW CAN CITIES TAKE UP THE CHALLENGE OF SOCIAL INCLUSION THROUGH IMPROVED ACCESS TO HOUSING?”

MARIE HUCHZERMeyer
At the time of Tunisia’s Independence in 1956, the city of Tunis had 560,000 inhabitants and covered an area of less than 10 kilometres. By 2009, Tunis has become an agglomeration of almost 2.5 million inhabitants, spread nearly 60 kilometres wide along its east-west axis. Its spatial evolution or sprawl reflects several processes linked to urban policies, real estate market forces and the decline of agriculture around the urban-rural fringe area. It also demonstrates how the absence of a coherent public housing policy for low-income people has the undesirable consequence of encouraging illegal and unsustainable activities.

The Effects of Urban Policies on Suburbanization

Between 1960 and 1970, the Tunisian state refused to admit the existence of gourbivilles or shantytowns – spontaneous agglomerations of mostly new migrants, who constructed housing for themselves using rural methods and mud. The state launched a program to demolish these illegal settlements and evict their residents, sending them back to their regions of origin. Such operations had little success, because the evicted simply hurried back to settle in Tunis once again. Most returned to the medina or old residential quarter of Tunis, or to shantytowns that were too big and too populated for the state to tear down. This led to even higher population densities.

During the 1970s, a new economic development model based on industrialization and exports was put into place. However, mediocre housing conditions, the lack of transportation for workers and the absence of institutional initiatives to attract foreign capital necessitated measures to support and encourage the development of a middle class; these measures included a housing policy and a scheme to extend access to schooling. The new middle class was intended as the base of support for the ruling party’s regime, which had been in power since Independence. In 1974, an agency for housing and land was created with governmental powers and prerogatives to implement the new policies. Its tasks included developing several housing estates in the northern periphery of Tunis, the intended site of the first middle-class neighbourhoods. Obsessed by the necessity of having a middle-class base, the government did not consider working-class people in its new housing policies. That lack of official attention led to new forms of unauthorized,
illegal housing that developed in rural areas and around the periphery of Greater Tunis.

The 1970s wave of illegal housing, known as “spontaneous suburban housing” and built on the urban-rural fringes of the city, was the second generation of illegal housing after the shantytowns. Several factors differentiated it from the first wave: the urban origin of its residents, 72% of whom came from Tunis; the use of brick and mortar rather than mud for building materials; and the residents’ income levels, which while modest were higher than in the shantytowns. This new type of housing on the city’s periphery resulted in residential migration within Greater Tunis. Between 1975 and 1980, the state tolerated the spontaneous suburban housing settlements, but did nothing to improve or renovate them. These illegal settlements arose because of the lack of any low-income public housing policy for people of modest means – those who could not afford the public housing being built exclusively for the middle-class. These spontaneous suburban housing settlements also illustrate how low-income households sought out affordable real estate. The development of these second-generation settlements took place in rural agricultural areas, unlike the shantytowns that came before them, which were built on unsanitary inner-city lands. Year after year, agricultural land receded as urban wastelands were created. This process had its biggest impact in the western part of Greater Tunis, well-known for its agricultural activities. The changes in land use led to an increase in real estate speculation and broke up farms and agricultural areas. Furthermore, the increased distances between home and workplace, along with the new pools of residents, attracted small- and medium-sized manufacturers, those who could not afford the rents and who did not need the large-sized plots of planned industrial zones. The processes that took place between 1970 and 1980 amplified urban sprawl, as more people from inner-city Tunis migrated to rural villages 20 kilometres outside the city, in order to live closer to their workplaces.

Between 1994 and 2004, the greater peripheral area outside of Greater Tunis (particularly to the west and the northwest) grew in population at a rate of 4% to 5% per year while the growth rate of Greater Tunis did not exceed 2%. Furthermore, the population of the medina in Tunis fell by half, from 160,000 in 1960 to only 85,000 by 2009, while the European centre in town lost about 50,000 of its habitants. After 1984, the heavy residential migration from Tunis to the greater periphery contributed largely to suburbanization or turning rural land into a mix of urban and rural uses. It should be noted that this process is the opposite of what occurs in European cities, in that the people who move to the peripheral areas of Greater Tunis.

RENOVATION OF ILLEGAL NEIGHBOURHoods AND ITS IMPACT ON URBAN SPRAWL

At the end of the 1970s, the illegal settlement neighbourhoods began to receive funds from the World Bank; this formed a partial response to the general strike of January 1978, where police confronted massive demonstrations and killed or wounded several dozen protesters. The protesters included residents of the shantytowns who continued to live in unsanitary, crowded conditions while the well-heeled middle-class neighbourhoods developed. Following these events, the government paid greater attention to the poorer neighbourhoods and started projects to renovate the shantytowns. In 1981, the Urban Renovation Agency was created to renovate and equip the illegal settlements. The Agency renovated nearly 35 neighbourhoods in large and small Tunisian cities up until 1988. After the World Bank abandoned its urban project funding, the Tunisian government came up with a new programme, the National Programme to Renovate Popular Neighbourhoods. The first programme was entirely financed by the Tunisian state, whilst the second through fourth programmes were 70% financed by AFD, the French development finance institution. The four programmes together
affected more than 650 areas in different neighbourhoods throughout Tunisia. The special feature of the renovation projects was that beneficiaries did not have to contribute anything to their financing, which was assumed by the government for the most part (70%), and by the local commune to a lesser degree (30%).

However, these no-cost remedial renovations of illegal neighbourhoods unintentionally encouraged their increase, and became a selling point for “pirate” developers of illegal plots. In effect, there are two motivations behind the spread of housing to the periphery of Greater Tunis. One is the search for relatively low-cost real estate, which is behind the concentration of spontaneous suburban housing in parts of Greater Tunis. The other motive relates directly to the multiplication of renovation and legalization projects in illegal neighbourhoods. In effect, and somewhat counter-intuitively, the reduction in neighbourhood renovation projects throughout Tunisia provides a guarantee of sorts for residents: it ensures that, in spite of waiting and delays, infrastructure installations and renovations will eventually occur. Residents perceive the state’s policy as a proof that however long it takes, they will benefit from a state-supported project. This conviction is also affirmed by several other factors, such as the creation of transportation zones with suburban bus lines, the development of new real estate markets, the decline of agricultural activity, and more globally, the process of building up areas that were agricultural just a few years earlier. Beyond these physical factors, the state presents the renovation projects as its only option for supporting low-income people. Under these conditions, it is not surprising to find that urban sprawl continues and that the Greater Tunis agglomeration stretches out for nearly 50 or 60 kilometres.

In addition, the new illegal settlement areas with a little manufacturing activity cannot fully employ the area’s nearly 150,000 inhabitants. This increases pressure on the transportation system. The suburban bus lines make infrequent round trips of nearly 100 kilometres throughout the day: they are incapable of satisfying the large transportation demand that arises from concentrating illegal housing around the periphery of Greater Tunis.

CONCLUSION
The urban sprawl of Greater Tunis results from several factors, and given landowners’ role in creating specific markets, real estate occupies a strategic place. In effect, small plots without infrastructure are an affordable real estate product for low-income households, one that can only be sold illegally and only in urban wastelands. In terms of housing policy, since the state is unable to provide land tenure appropriate for low-income people, it tolerates the development of housing and jobs on the periphery. The cost of this type of urbanization becomes prohibitive when one factors in the cost of lost agricultural land, not to mention the cost of retrofitting infrastructure and transportation systems during renovation. Pollution from industry and other activities near these settlements adds additional costs. In the end, the state’s reduction of official renovations gives credence to the production of spontaneous housing. A more sensible solution would define a true social housing policy for both middle-class and poorer households, by providing plots of land improved with infrastructure and equipment and thus rendering the illegal plot seller altogether useless.
One-third to half of city dwellers in Asia and Africa live in slums or shacks deprived of basic services such as electricity, water and sanitation. They are also deprived of basic human rights such as health, education and citizenship. Hope for improvement lies with national and international federations of slum and shack dwellers that propose real alternatives where public policies and external aid groups are failing.

Half of the world’s population lives in urban areas, mostly in low- and middle-income countries where at least 900 million people live in slums and shantytowns. In most cities in Africa and Asia, one-third to one-half of the entire population lives in such settlements. Living in a slum or shantytown means overcrowding (often three or more persons to each room) and inadequate water, sanitation, schools and health care. It usually means facing constant discrimination because of where you live – being looked down upon, ignored, exploited. It also means your home will be bulldozed when some government agency wants the land on which you live, or the land has become sufficiently valuable for real estate interests to press for its “redevelopment.” It usually means no electricity – or electricity supplies that are illegal and often unsafe. Most such settlements are on dangerous or inconvenient sites, more at risk for accidental fires and floods. There are no emergency services in the event of such disasters, or with acute illness or injury, and no insurance for homes and possessions lost or damaged. The lack of a legal address may also mean no access to government schools and health care centres, and no possibility of a bank account. In some places, no address means no way to get onto the voters’ register.

The last forty years have brought little success in reducing such urban poverty, which most international aid agencies have shown little or no interest in addressing. One of the most significant changes in urban poverty reduction has been the emergence of grassroots organizations among “slum” or shack dwellers who form their own national federations. They are developing real alternatives to slums and shantytowns. Where governments and international agencies support these federations, the scale and scope of what they can achieve increases greatly.

THE FEDERATIONS
Savings and credit groups formed by slum or shack dwellers are the foundation for all these federations. All of the federations address their members’ needs for better-quality, more secure housing and good water, sanitation and drainage. Women make up the majority in all the federations and have key roles within them. On their own, these savings and credit groups can achieve a lot, but having a voice in the decision-making of the federation is essential. A federation can and should be the lead actor in calling for fair policies and better housing and infrastructure, and in creating the political space in which such a shift can occur. The federation is the key local body, the interface between government and the slum-dwelling community.
leadership roles. Their strength and tenacity, and their active role in finding land and building housing, allows them to negotiate roles that approach equality with men, whilst ensuring that women’s needs and priorities are addressed. The savings groups form city-wide and then nation-wide federations to learn from each other, to pool some of their savings, and to develop their capacities to address housing issues and negotiate with government agencies. There are currently seventeen nations with such federations (see Table 1) and many other nations where federations are emerging as savings groups expand. Many of these federations have set up their own Urban Poor Fund to help manage their savings and fund their initiatives. For instance, the Mcchega Fund in Malawi has supported a range of initiatives related to land acquisition, house building and livelihoods, with over 3,000 households securing land in the last five years (Manda 2007). The Gungano Fund in Zimbabwe, despite political and economic difficulties, has carried on lending for land development and infrastructure, and has recently secured 4,800 plots. In the Philippines, the regionalization of the Fund has enabled thousands of members to negotiate for land in the fourteen cities where the Homeless People’s Federation Philippines is active. In Cambodia, the Homeless People’s Federation was awarded the prestigious International Year of Shelter for the Homeless Memorial Prize 2009 by the Japan Housing Association (Phonphakdee et al. 2009).

In many nations, savings groups have designed and built hundreds of new housing units; in some nations, they have managed the construction of tens of thousands of new units. In Thailand, local savings groups-led initiatives have built or upgraded homes and neighbourhoods for over 400,000 low-income people since 2003 (Boonyabancha 2005 and 2009). The South African Federation of the Urban Poor has built over 20,000 homes and is developing new ways to upgrade existing shantytowns. Many other federations in Africa also have large new house building programmes, including the federations in Kenya, Malawi and Namibia (Mitlin 2008; Mitlin and Muller 2004; Manda 2007). In India, the National

| Table 1: Examples of the Savings and Work Programmes of the Federations |
|----------------|----------------|----------------|----------------|----------------|
| Date(a)  | Number of settlements | Active savers | Savings (estimated value in US dollars) | Houses built (number of families) |
| INDIA 1986 | 5,000 | 100,000 | 1.2 million | 6,000(b) 80,000 |
| SOUTH AFRICA 1991 | 750 | 30,000 | 1.2 million | 15,800 23,000 |
| THAILAND 1992 | 42,700 | 5 million | 206 million | 40,000 45,000 |
| NAMIBIA 1992 | 60 | 15,000 | 0.6 million | 1,500 3,700 |
| CAMBODIA 1993 | 288 | 11,300 | 145,000 | 2,798 5,000 |
| PHILIPPINES 1994 | 148 | 42,727 | 631,830 | 547 26,166 |
| ZIMBABWE 1995 | 62 | 45,000 | n.a. | 1,100 4,035 |
| NEPAL 1998 | 396 | 3,147 | 173,402 | 50 85 |
| SRI LANKA 1998 | 130 | 21,506 | 29,469 | 50 120 |
| COLOMBIA 1999 | 1 | 60 | 10,000 | – 60 |
| KENYA 2000 | 50 | 20,000 | 50,000 | 110 5,600 |
| ZAMBIA 2002 | 45 | 14,000 | 18,000 | 66 1,048 |
| GHANA 2003 | 15 | 12,000 | – | – 120 |
| UGANDA 2003 | 4 | 500 | 2,000 | – 300 |
| MALAWI 2004 | 50 | 20,000 | 50,000 | 750 3,050 |
| BRAZIL 2005 | 5 | 100 | 4,000 | – 7,000 |
| TANZANIA 2004 | 16 | 1,000 | 2,000 | – 500 |

a. The year in which significant savings schemes began; in some cases this precedes the year when the federation was established.
b. A further 30,000 households in India have secured new housing not constructed by the federations, but as a result of their activities.

Source: www.sdinet.org
Slum Dwellers Federation and Mahila Milan (the federation of women slum- and pavement-dwellers’ savings groups) have built thousands of homes, along with building and managing community toilets and washing facilities that serve hundreds of thousands of slum dwellers (Burra et al. 2003).

**MASS MOVEMENTS THAT WANT TO WORK WITH GOVERNMENTS**

The grassroots federations are unusual because while they are mass movements, they do not form simply to protest and to make demands, but rather to offer governments their knowledge, skills and capacities in partnership. They also demonstrate to governments what the latter could achieve, since the federations build better quality housing more cheaply and quickly than government agencies or contractors. They also show how much the scale and effectiveness of their work increases if governments work with them. This helps change politicians’ and civil servants’ views of the urban poor, and their organizations and informal settlements, as those who create solutions, not as “the problem.”

Nations where federation-government partnerships operate include South Africa, Namibia, Malawi and Kenya; they are also developing in Zambia and Tanzania. Such partnerships are also active in India, Thailand, Philippines, Cambodia, and many other Asian nations. A strong federation has developed in Sao Paulo, Brazil, and is generating interest among the urban poor in other South American cities and nations.

**SLUM/SHACK DWELLERS INTERNATIONAL (SDI)**

The federations and the local NGOs that work with them have set up their own umbrella organization, Slum/Shack Dwellers International (SDI). SDI negotiates with international funding agencies on behalf of the federations, helps manage external funding and supports knowledge-sharing between the different federations. It also sets up visits from the federations in nations where urban poor groups want to learn how to achieve similar successes.¹

Most of what the federations do is generated by their own energy, capacities and savings, and by the support they can negotiate locally, such as land where they can build or guarantees that their homes will not be bulldozed. Additional external funding has proved useful in many instances, as long as it supports the federations’ priorities and the federation can manage its use and disbursements. The Urban Poor Fund International is an important external source of support. The federations manage it through the SDI membership and regular meetings of federations where they present their plans and decide what funding allocations should be made. The Fund was initiated in 2001 with a grant from the Sigrid Rausing Trust, which provides ongoing support and invests about US$5 million a year. It received additional funds from the UK Big Lottery Fund and the Allachy Trust, and attracted substantial support from the Bill and Melinda Gates Foundation in 2007. More recently, it has received support from the Norwegian Ministry of Foreign Affairs.

¹ For more details of the work of the Federations and of SDI, see www.sdinet.org

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**WORKS CITED**


Security discourses taking place in contemporary cities – in both developing and developed countries – feed defiance and legitimize an “urbanism of fear” based on controls that increase social and spatial segregation. Inversely, a sustainable city is an inclusive one capable of making a place for all kinds of people in a shared world. This is a plea for ambitious urban planning policies.

INSECURITY AND SEGREGATION: REJECTING AN URBANISM OF FEAR

A sustainable city is an inclusive city that accommodates all kinds and classes of people in a common world. By contrast, the current-day “security discourse” – the scaremongering language of politicians and the media – institutionalizes the way we think about public safety and legitimizes an “urbanism of fear” in most contemporary cities. In both developing and developed countries, a growing feeling of insecurity leads to increasing social and spatial segregation. The means of combating fears and insecurity force the separation – and even the destruction – of classic forms of urban cohesion, rendering the city both unbearable and unsustainable.

In developed as well as developing countries, this ever more clamorous “security discourse” has two major consequences on the growth of cities, even as it obscures safety’s link to real delinquency: (1) certain fringes of the population, especially poor people and youths, are perceived as vectors of insecurity; and (2) planned urban redevelopment feeds an incontestable market of security systems and services. These two phenomena induce what we propose calling an “urbanism of fear,” where a series of socio-technical systems (or material devices, juridical norms, political institutions and social behaviour) splits the city apart socially and physically. These fear-based material and institutional settings produce a new physical arrangement and social ordering of the city. A new urban order – an “archipelago of fear” – emerges, displacing

1. Our inspirations here come partly from the work of Michel Foucault and his concept of “dispositive” as an heterogeneous set of narratives, institutions, architectural settings, laws, administrative decisions, moral principles and so forth (Foucault 1994).
the ideal of a modern city in which strangers can peacefully coexist in common public spaces. We will hypothesize that part of the violence in contemporary cities derives from the disdain and contempt inherent in these fear-based socio-technical systems, due to the humiliation they engender on a daily basis. The city of fear thus appears profoundly intolerant and intolerable.

**DIVERSITY CHALLENGES CITIES’ SUSTAINABILITY**

In light of the increased mobility and heterogeneity that comes with globalization, urban social and territorial sustainability increasingly appears as a desideratum rather than a concrete project or cornerstone for organizing everyday systems and operations. Sustainability runs up against several complex realities, especially those improperly grouped together under the rubric “urban violence.” Delinquency, criminality, corruption and riots: these notions forge an idea of the city as a dangerous place, one that is soon “verified” by experience.

We are thus witnessing an urbanism of fear\(^2\) emerge in cities of both developed and developing countries – a concept that owes as much (or more) to the police officer’s vision of the city as the architect’s. Reactivating inclusive urban projects takes on new urgency: measures to ensure safety and reduce city-dwellers’ fears translate into urban planning and architectural operations “securing” increasing areas of city terrain, to the point that the market for security systems and services has become one of the most profitable ever. The fundamentally political task of making the city a safe place should not carry the price of segregating or disdaining part of the population, or sacrificing the vision of an inclusive city. Indeed, historically this tension between order and segregation is central to policy and urban planning work (Pattaroni 2007).

**URBAN ORDER: SOCIO-TECHNICAL SYSTEMS OPEN AND CLOSE THE CITY**

The development of cities can be read as an evolution in the way various socio-technical systems place city dwellers in urban and social space, e.g. where they live, work, shop, play, meet and so forth. Over time, these material systems and the societal models they imply have changed in important ways. The ordering or placement of

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\(^2\) An analogy to Mike Davis’ (1997) concept of “the ecology of fear.” See also Nan Ellin’s (1997) work on “the architecture of fear.”
urban dwellers based on their social status gave way to ordering them based on the position of places themselves, and on the boundary between public and private spaces (Lofland 1973). The modern ideal of liberty and equality encouraged pacified public spaces open to all, even in cities highly segregated spatially (Box 1). The

**BOX 1  SEGREGATION AND URBAN VIOLENCE**

Urban segregation is not a new phenomenon; it is central to the modern Western city. Whereas rich and poor lived side-by-side in pre-industrial cities, an increasingly marked spatial segregation between classes accompanied the expansion of industrial cities. The pioneers of urban sociology in the first half of the twentieth century showed how competition between classes for the best usable locations drove the industrial city's expansion. The result was a highly segregated city where different activities and classes occupied distinct areas. The “concentric” city described by the American sociologist Earnest Burgess is an exemplary illustration (Figure 1). Neo-classical economics spread this approach by explaining segregation as the result of an arbitrage between housing size and the cost of travel (GRHS 2003: 20).

**CLASSIC MECHANISMS AND FORMS OF SEGREGATION**

Nonetheless, mechanisms for adapting to market constraints alone have not accounted for segregation (GRHS 2003: 21). Another explanatory factor is the unequal distribution of territorial amenities, such as views, air quality and services. In general, poor people are relegated to particularly disadvantageous areas, while investment focuses on sites that offer the best characteristics. Exclusionary zoning mechanisms linked to regulations and urban policies also play a role. Urban segregation can also be the result of willed processes or institutionalized discrimination, as with apartheid or the Jewish ghettos. “Zoned urbanism,” aimed at separating various everyday activities spatially, developed in the United States at the beginning of the twentieth century and then spread to Europe. It too was a powerful tool for separating the rich from the poor.

However, there are many other global models for cities besides concentric circles. Some examples include the colonial city surrounded by walls, the “hollowed” city of Eastern Europe where raised buildings surrounded a lower city centre, or the “polycentric” automobile city of Southeast Asia. Each presents specific forms of segregation.

**MOVING TOWARD A NEW FORM OF SEGREGATION?**

A relatively original and common model of segregation has recently appeared internationally (GRHS, 2001, 2003, 2007; SWC, 2006/7). It usually takes the form of a fortified citadel and ties into the evolution of classic forms of segregation: zoning tends to disappear, and the spatial distance separating rich and poor dwindles. The gentrification process, characterized by the return of some higher-class people to poor areas in the city centre, illustrates this new mix. The large increase in gated communities could thus be “an indication that poor people and rich people are being brought closer to one another spatially” (GRHS 2003: 20). Spatial enclosures have the effect of keeping nearby people at a distance. This phenomenon is not uniform everywhere. Even though they appear almost everywhere in the world, gated communities are far more developed in the United States and Latin America than in Europe. One explanation for this is Europe’s tradition of strong public planning; by contrast, Latin American cities are characterized by neo-liberal policies that allow private investors much more leeway (SWC 2006/7: 149-150).

The contemporary city increasingly appears as a mosaic of different cities - cobbled together - each made up of distinct networks of places, and frequented by specific populations who may co-exist without ever crossing paths. Thus, we see the luxury city, the gentrified city, the suburban city, the tenement city, and the abandoned city (GRHS 2001: 34). The model of “archipelagos of fear” described in this article seeks to comprehend this fragmentation. The main problem is not the existence of spatial segregation, but rather the gradual abandonment of spaces where milieus and classes can mingle. With this abandonment, a public space that symbolizes and facilitates a right to the city for each of its inhabitants also disappears.

1 The American “Chicago School” of sociologists: Burgess, MacKenzie, Wirth, and so on.

2 As of 2000, 32 million people lived in 150,000 gated communities in the United States. In Guadalajara, Mexico, gated communities take up 10% of the land for 2% of the population (SWC 2006/07).
modern city’s founding ideal was to create a space where each person could be safe (among other things) independently of his or her status or income. This ideal rested on a number of political principles as well as congruent socio-technical systems: a state monopoly on violence (national police force), suppression of discriminatory regulations, and systems to facilitate “vulnerable” people’s mobility (children, the handicapped and old people). A culture of urban civility complemented the separation between public and private spaces; taking one’s place in the city depended upon a proven ability to respect others.

Conversely, the gradual rise of the “magma of safety concerns” (Garcia-Sanchez 2006) stifles the goal of teaching civility to all citizens. Mechanical systems replace mutually civil conduct, through barriers, automatic security systems and other means of physical repression. In the bigger picture, this swing towards physical control matches the abandonment of the modern ideal of a city accessible to all. The authorities lost their monopoly on the legitimate use of violence to a very diverse array of private agents and security systems, all of which tend to fragment public spaces. These material controls diminish mobility and deprive large segments of the population of access to certain areas of the city. Potentially, this physical rather than civil control involves exposing people to danger: money – and sometimes status or membership in some community (ethnic, cultural, sexual) – becomes a requirement for safety. These transformations take place slowly but surely. In the space of a few years, security discourses have generally given way to instituting this new urban order – territorial constellations whose appearance gives us the term “archipelagos of fear.”

FROM DELINQUENCY TO SECURITY DISCOURSE
Today, security policies feed a culture of mistrust and insecurity. This comes largely from the degree of uncertainty that separates real crimes – the ones that become news items in the daily papers – from the feeling of insecurity. In reality, a progression in such feeling rarely correlates with actual increases in delinquency: the feeling depends not only on “objective” facts, but also on the way a society thinks about the feelings’ progression and that of “delinquency” (Widner et al. 2004). It is obvious that many media outlets and political speeches play a significant role in developing a climate of insecurity, given that they usually focus on delinquency in an alarmist way, describing the perpetrators as unmanageable and incorrigible. In developed countries as much as developing ones, security discourses emerge that profoundly change social relationships within cities and their built environments.

We are not trying to deny the reality of delinquency and urban violence here: “The probability of falling victim to an act of delinquency or violence is substantially higher in an urban area than a rural one” (SWC 2006-7: 45). That said, the same study also notes that communities with a large excluded population “suffer a higher level of crime and violence than communities that are well connected to
main roads and power structures” (SWC 2006-7: 45). Responding to urban insecurity is not sufficient; rather, it is also necessary to think about the links between insecurity and segregation.

Pedro Garcia-Sanchez shows how an “atmosphere of insecurity” has been created in Caracas (Garcia-Sanchez 2006: 128) since the late 1980s. Despite sometimes radical breaks in policy, both the media and public rumours have created and maintained this climate of fear – “bring[ing] up facts, scenarios, unfortunate incidents or advice on how to protect yourself from danger every day” by focusing discussion on major figures of small-time urban crime, bandits from poor neighbourhoods (Pedrazzini and Sanchez 1998). Next come multiple “civic security” associations that give shape to the security discourses and gradually include them in everyday life. From then on, these converging narratives, scattered events, fears and fantasies establish confusion and anxiety in “the heart of public space” (Garcia-Sanchez 2006). The average citizen feeds off a feeling of insecurity that transforms his view of fellow citizens. Instead of maintaining a “civil indifference” for a passing stranger, keeping him at a distance while giving him a modicum of trust, he becomes suspicious. A real transformation of social ties within the city takes the form of “surveillance sociability.” The ties grow closer at the level of immediate neighbours – the people whom one “knows well” – while mistrust governs relations with the “stranger,” always seen, in an almost paranoid way, as a potential aggressor (Garcia-Sanchez 2006).

**FROM SECURITY DISCOURSE TO AN URBANISM OF FEAR**

The Caracas example shows how an increase in security discourses causes fear to spread and leads to a defensive reconfiguration of urban space. In particular, hundreds of barred control points with sentries (*alcabalas residenciales urbanas*) have sprung up in the city within ten or fifteen years, generally due to private initiatives, which restricted the physical mobility of residents. All kinds of gated residential communities have also appeared, from the simplest to the most sophisticated, as they have in many cities in developed and developing countries (see Caldeira 2000).

The barriers clearly draw an interior and an exterior space. There is no grey area between inhabitant and passer-by, but rather a relatively clear division between the inhabitant who is identified and therefore authorized, and the stranger who seems suspicious and must be kept at distance, barred from entry. The areas subject to these controls suffer from these practices despite their status as normally accessible public places: their inhabitants explain that even if they lack the right to prevent access by “strangers,” they try to make it “difficult to get through” (Garcia-Sanchez and Villa 2002: 235). There is a negative appropriation⁴ or colonization of these spaces that

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⁴ We use the word “negative” here because, while one often “appropriates” the spaces one regularly frequents, the question here is how far this “taking” is exclusive and inhospitable to other uses and people.
defines the main outlines of a “private urbanism” (Garcia-Sanchez and Villa 2002). This new arrangement of cities, driven by security discourses, results in the transformation of daily practices and judgments. It feeds feelings of insecurity on one side, and increases feelings of social contempt and disrespect on the other.

We are clearly witnessing the emergence of a market for security services in Venezuela; it started in the 1980s, especially during the terrible urban riots of 1989. The number of security companies exploded after that, going from 72 in 1987 to 509 in 1997, a 700% increase in ten years. This market's most ostentatious effects are the proliferation of private police and security guards, and an exponential increase in the more or less professional installations of barriers, alarms and defences – cutting through urban and domestic space in every sense.

The growth in the market for security services affects not only cities in developing countries. Indeed, it is even larger in developed-country cities: a 2000 evaluation revealed a 30% increase in the market for security, compared to an 8% increase in developing-country cities (GRHS 2007). In the United States, for example, the number of private “police” has exceeded the number of public police by three to one since the 1990s. In developed as well as developing countries, security is an enormous market: according to a 2006 survey, security providers’ sales reached €350 billion, a 9% increase over 2005 (Manach 2007).

**URBANISM’S HORIZON OF VIOLENCE**

While some city-dwellers understandably need to address their feelings of insecurity and the existence of genuine delinquency, many of the so-called solutions lead in one way or another toward a new “horizon of violence.” The German philosopher and sociologist Axel Honneth links contemporary ills to the denial of recognition, to “social contempt” (Honneth 2000). The denial can take three forms: the absence of love, of legal recognition, or of social esteem. In the absence of love and affection, a person loses self-confidence; in the absence of legal recognition, the basis of self-respect; and in the absence of political recognition, self-esteem. We thus depend on other people and institutions to fully exist and to lead satisfying lives. Institutions can therefore humiliate and deny recognition even when they are trying to be just (Margalit 1996). That denial underpins the reluctance of some people to claim their welfare benefits, or their humiliation at being treated “like a number” – like a thing – by the bureaucracy (Margalit 1996).

The “horizon of violence” of these institutional and material settings leads us to question not only the fairness of solutions, but also their decency, their avoidance of humiliation. (Margalit 1999). Contemporary urban policies sin against residents through a double denial of recognition, refusing the most elementary rights and social esteem in some cases. In France, this appears in the mistrust of immigrant Arab youth and the stigma attached to unemployed or illegal alien status. One response to humiliation is anger. When anger can be channelled into a critical voice, the response is sometimes denunciation. When anger cannot be channelled, it leads to violence.
THE SEMANTICS OF FEAR

The “semantics of fear” not only creates feelings of insecurity everywhere; it also leads to “demonizing” suspects and guilty parties (Garcia-Sanchez 2006). This changing view of delinquency figures prominently in most security discourses worldwide. It is especially prevalent in the United States, where the delinquent currently tends to be perceived as a fundamentally bad person – rather than as the product of a bad environment, formerly the prevalent view – who requires severe punishment because he or she is incorrigible. This is not a uniquely American discourse: research in Switzerland shows that the people who feel the least safe also have the most negative views of delinquents. Delinquency is perceived to be the result of an individual’s deviance – delinquents are “bad” or “disturbed” – rather than a result of a social process (Widmer et al. 2004).

The growing climate of insecurity seems to close the door on more measured analysis of delinquency and preventative policies. Fearful visions of reality appear suddenly and open the way for repression. In France, this fear emerges in popular views on what should be done about the poor suburbs (les banlieues) where many first- and second-generation immigrants live in social housing. According to Emanuel Renault (2002: 1), “analyses are performed through the prism of insecurity, so poor neighbourhoods are no longer seen as places of suffering so much as sanctuaries for illegal activities requiring a penal response.”

The prism of insecurity erases social circumstances and denies the suffering of the people committing violent acts. The works cited here on humiliation and recognition prompt another reading of urban violence as well. If one listens to young people in French banlieues, one hears a recurring request for respect. These youths speak of a powerful feeling of social contempt that parallels the fear they themselves instil (Renault 2002). This sense of contempt arises from their experience of constant suspicion, and from the loss of the social and professional ties that are traditional sources of recognition. The precariousness or instability taking hold in French banlieues, and more generally in all large cities in developed countries, is that of “disaffiliation.” People become vulnerable when they lose their jobs and social networks, and can no longer draw on these sources of recognition to counter the disdain of the dominant classes (Renault 2002: 2).

The establishment of a “watchful sociability” results in a powerful exclusion of the poorest and the stigmatized, who are denied recognition even by people from their own milieu. As they feel more useless, violence becomes more likely. The violence is not directed at living standards, but rather “against the vectors of social contempt, against the environment inasmuch as it imposes a degraded self-image” (Renault 2002: 3). The resulting frustration erupts into the delinquency, petty crime and urban violence that appear on the evening news programmes.

There is no direct link between poverty and violence. A whole set of intermediary
mechanisms come into play, especially those linked to the experience of social and spatial inequality. More than the lack of money, the experience of “relative poverty” and frustrations associated with the loss of self-esteem appear to be the main drivers of urban violence. Thus, “inequality and exclusion exacerbate insecurity, which in return perpetuates a vicious cycle of poverty and violence” (SWC 2006-7: 145).

Consequently, the current fight against urban fear means that real criminal events and those that merely increase feelings of insecurity receive the same treatment. In this light, even if there are currently “some reassuring signs of a decrease in levels of criminality in big cities” across the world (SWC 2006/7: 150), there is no parallel reduction of security discourses. Nor has the trend towards an urbanism of fear abated, an urbanism allowing ample space to socio-technical systems that segregate and materially exclude certain fringes of the population. Indeed, security policies seem like ineffective half measures, inflating the problem more than they reduce it.

ARE ARCHIPELAGOS OF FEAR THE NEW SHAPE OF URBAN ORDER?

Given the foregoing, are we witnessing a new urban order that will replace the modern city constructed around an ideal of universally accessible public space? Architectural ramparts and boundaries permanently affect the built environment of the “defensive city.” The price of defensible landscapes and parcels explodes, even in times of crisis. The landscapes and material settings born of security urbanism emerge in very different social and territorial conditions and, while there is not yet a generic defensive city, the same models of security spaces take diverse forms the world over, e.g. gated communities, protected towers and guarded residences. This “globalized” model induces a fragmentation of urban space aimed at facilitating control. Once its public spaces have split into paradoxically private spaces, the city increasingly takes on the shape of an archipelago – one where each island is equipped with security systems according to its owner’s or renter’s affluence, and each island is also more easily policed from the exterior. That leads to a new socially and spatially polarized morphology of contemporary cities, dismembered into secure enclaves and poor ghettos (Davis 1977).

In modern and postcolonial urban societies, this fortification of social classes is not always perceived as a planned catastrophe, one that will eventually render any city – or any place – impossible and unsustainable. On the contrary, many leaders and urban residents seem convinced of its relevance or even its necessity. This principle of safety depends on a progressively defensive autonomy for some parts of the city, along with the inexorable abandonment of other increasingly vulnerable, but always more violent, parts of the city – more violent because lost in urgency and hopelessness. On one side, we have Disneyland transformed into Fort Apache.
On the other side, the campfires of homeless people flicker throughout ruined city centres. Between them circulate police patrols, night watchmen and secured roadways. Little remains in the middle anymore. Public spaces, streets, squares and markets that functioned as intermediate spaces disappear. These spaces are privatized “for reasons of safety,” or turned into wastelands reclaimed by the underclass. The progressive loss of “the street” – a public space gradually grown so deserted that walking one at night is suspect – arises from a planned strategy of privatization. It is a very serious loss indeed, for this was the space where the “classically” segregated city allowed rich and poor to cross paths and coexist. By contrast, in the manifold city now emerging, different classes can practically circulate “in parallel” within their reserved areas, moving in their own networks without being aware of adjacent ones (GRHS 2003: 22).

Even the disdained participate in the spatial prohibitions, and reinforce the boundaries of their ghettos by tinkering with them. They too seek to experiment with the privatization of space for safety reasons. Entire blocks of social housing in the centre of Mexico City thus take on the look of veritable fortresses forbidden to strangers. That said, it is on the elites’ side of the city, known as “Luxury City” (Box 1), that this trend appears most clearly. The “city under surveillance” typified in such sites features three categories of space: one is residential, the second reserved for prisons and other detention centres, and the third used to construct secure commercial enclaves, managed and defended like autonomous territories. The quasi-military withdrawal of public spaces into shopping malls and athletic clubs, with their architectural and technological fortifications, is not solely a triumph of consumerism. Shopping centres reinvent the city by calming its fears, air-conditioning it, and populating it with polite salespeople and innocent buyers.

SAFETY AS A LUXURY PRODUCT
In a context of growing urban segregation, property privileges gradually give way to access privileges. Safety becomes a service and provides admittance to society; it is sold like a luxury product. The most striking recent buildings contribute to this urbanism of security. Examples run the gambit from the Torre Agbar by the French architect Jean Nouvel in Barcelona (2005), or the Archivo Distrital by the Columbian architect Rogelio Salmona in Bogotà (1990), to the Walt Disney Concert Hall (called “Death Wish” by Mike Davis) by the American architect Frank Gehry (2003), and the renovated and secured Bunker Hill neighbourhood, both in Los Angeles (Davis 1977).

To some degree, real estate developers also contribute to the materialization of fearful societies. It is not a given that their contribution means they subscribe to this ideology of security; it is more likely they simply respond to demand and make a good living doing so. Nonetheless, their technical talents have pushed the urbanism of fear towards a dramatic radicalization of the process of spatial segregation. To
classic urban fragmentation, they now add planned fragmentation of territory divided according to degrees of safety or danger. It is striking to see how nearly all of the residential buildings in the city centre of Geneva, Switzerland, have closed-off their central entryways with numeric keypads. The paradox remains that all these systems to render the city more secure never really make it truly safer. The feeling of insecurity even seems to increase as the obsession with safety grows: as Mike Davis suggests, “The social perception of threat becomes a function of the security mobilization itself, not crime rates” (Davis 1997: 205). Furthermore, for the people excluded from secured spaces, the fragmentation of the urban environment may also entail an increase in fear (SWC 2006/7: 147).

CONCLUSION
Thus, this urbanism of fear is also a frightening urbanism. By surfing the wave of insecurity, it produces an imaginary global geography: cities are generally perceived as barbaric in developing countries, but henceforth in large numbers of developed countries as well. People in cities are violent. Disorder reigns supreme. As the sociologist Zygmunt Baumann emphasizes, “Paradoxically, the cities originally constructed to provide safety for all their inhabitants are these days associated more often with danger than security” (Baumann 2003: 29). The image as well as the practical form of the contemporary city induces a segregated universe where civil indifference – the minimal condition for peaceful urbanity – gives way to generalized mistrust.

The current urban condition therefore appears unsustainable because it signals the failure of the inclusive ideal of sustainable development. It is an economic failure because segregation and fear reduce the “competitiveness of cities” (SWC 2006/7: 147). It is a social failure because socio-spatial inequalities and barriers to mobility increase mistrust of other people, along with delinquency and violence. Furthermore, it is an environmental failure because an increase in slums makes it difficult to enforce ecological management (Berque et al. 2006). Conversely, an inclusive city should be able to calm security discourses and reintroduce the delinquent into the human community. It should promote an urbanism of recognition, capable of giving everyone a place in the city and the means to live the life to which he or she aspires. Such are the conditions for urban society’s future existence, in developed as well as developing countries.


The 2008 financial and economic crises that began in the United States ultimately reached urban governments around the world, affecting their investment financing systems. Credit systems have been devastated. Policies must be restructured; financing tools and mechanisms reinvented. The extent of damage varies from region to region, but it is clear that post-crisis recovery will take time, especially in the least developed countries. Consequently, rethinking urban financing systems, as well as urban planning and housing policies, takes on new urgency.

Local governments – municipalities, regions and others – affected by the crises face various constraints whose effects are cumulative, rendering recovery impossible in some cases. Broadly speaking, localities suffer the crises’ consequences at four levels: (1) receipts (income) can be drastically reduced, whether these are state transfers or a local government’s own taxes and fees; (2) expenses increase because of a decline in economic activity and corresponding rise in unemployment and social benefits; (3) ability to finance is reduced because borrowing becomes more difficult, and interest costs rise; (4) external investments are reduced, current operations often halted, and projects cancelled or delayed.

Local governments’ two main financing systems – municipal bond issues and commercial banks or specialty municipal lenders – have been hit hard by the financial crisis. Central governments have taken steps to address the crisis, which vary according to political and institutional circumstances. Nevertheless, the steps taken – rescuing financial institutions, stimulus and recovery plans – share a common trait: they target the national level more than that of local governments. Their concrete effects on cities are likely to be limited or delayed, as in the case of investment programmes that require time for implementation. In any case, beyond short-term actions, local governments require fundamental reforms to reverse their plight. In many countries, the relationship between local governments and the state is at issue, whilst the architecture of credit and financing systems has weakened everywhere. The crisis did have the effect of finally calling into question a paradigm that has ruled the financial sector for decades: the modernization of credit systems could
be achieved only through structured finance, the bond market and public-private partnerships. This discourse is no longer credible. But it would be wrong to conclude that these techniques and tools are outmoded. In this chapter, we will see that they remain at the heart of solutions designed here and there to revive the production mechanisms of sustainable cities.

**WESTERN HOUSING AND URBAN DEVELOPMENT POLICIES ARE IN CRISIS**

The mechanisms – in particular, securitization – through which the housing sector in the United States damaged the global financial system are well documented. However, the role of public housing policy appears relatively underestimated – a vital point in understanding the process and its origins. Historically, the US Department of Housing and Urban Development (HUD) – charged with promoting middle-class homeownership, supporting community development and increasing access to affordable housing – relies on two giant mortgage lenders: the Federal National Mortgage Association, nicknamed Fannie Mae, and the Federal Home Mortgage Corporation or Freddie Mac, both government-sponsored enterprises (GSE). The Federal Housing Authority (FHA) provides mortgage insurance for poorer people, requiring very small or no cash down payments to close a loan. In the mid-1990s, as government policy favoured housing construction and access to homeownership for low-income people, HUD directed Fannie Mae and Freddie Mac to grant mortgages to low-income people without going through the FHA, and gradually increased their loan disbursement objectives. To achieve these government-mandated objectives, Fannie and Freddie put ambitious and evocatively named programmes in place – “American Dream Commitment” and “Catch the Dream” respectively – conceived to help the poorest households acquire a home. Eventually, private banks entered the market and subcontracted mortgage sales to independent agents, some of whom were unscrupulous (Kelly 2009). New mortgage products provided the basis for the GSE programmes: low- or no-down payment loans, thirty-year mortgages, low initial interest rates (known as 2/28, 3/27, etc.) or even interest-only “negative amortization” loans, with monthly payments of less than the full interest due – deferred interest being added to principal at the end of the loan’s term.

The mortgage credit system’s architecture rested on a borrower’s ability to refinance his or her mortgage. One method entailed “cashing out” an existing mortgage with a higher-value loan after a few years. Another relied on home equity lines of credit, where an increase in home value (over the value of the initial loan) served as collateral for another loan to pay off interest due on the first. These two mechanisms acted as rechargeable mortgages that worked well as long as home prices increased, even as they helped feed rising prices and a housing bubble. Tax-deductible mortgage interest and other advantages for cash-out loans spurred borrowers to refinance systematically and on a grand scale. It became prevalent for borrowers to buy larger houses than needed, and to use interest-tax-deductible home equity lines of credit to pay for consumer goods and everyday needs (Wallison 2009). When the real estate
market bubble burst and prices began to decline, it took down solvent or qualified borrowers – who appeared to be the primary victims in the end – along with poorer households, artificially solvent borrowers and speculators riding the bull market. Even after having made regular initial payments and taking out mortgages suited to their financial situation, solvent borrowers could find themselves in a negative equity situation: just as with the other borrowers, the value of their mortgage exceeded the value of their house. In September 2009, nearly 12 million households were thus “underwater” on their loans, owing more than their houses were worth. In most states, tax and other laws mean that owners in a negative equity situation can best retrench by ceasing mortgage payments (Wallison 2009). The bank forecloses and takes over the house, feeding the snowball of ever-lower house prices. Some owners not in a negative equity situation choose to keep their houses whilst waiting for a hypothetical or progressive price increase. During this time they lose their ability to move – apparently worsening the employment situation in some parts of the country where there is a correlation between homeownership and unemployment rates.

Spain is currently experiencing one of the deepest recessions in Europe. Its economic expansion of 1997-2006 ended abruptly with the bursting of the housing bubble that fed it and raised all indexes. The mechanisms behind Spain’s bubble depended, in part, on those operating in the United States, and on the specifics of Spain’s socio-economic and institutional circumstances, as well as its housing policy. The expansionary period started with strong demand for housing because of population growth and decreasing average household sizes. At the time, the demand was directed solely toward home purchases because of historical arrangements that penalized renting. Tax policy strictly favoured homeownership whilst the legal framework discouraged construction of private rental properties. This obligated young households and the poorest people to purchase housing at all costs. In ten years, the number of dwellings per person doubled in Spain: with 568 dwellings per thousand inhabitants, it now has the highest rate in Europe (Vorms 2009). Banks met this growth with increasingly attractive financial products for homebuyers exposed to ever-increasing prices. Forty- or fifty-year mortgage loans with low or even optional down payments also encouraged the construction of second homes, as well as speculative investments in general. At the end of the expansionary cycle, real estate prices increased more than 17% per year (Vorms 2009).

The bursting of the housing bubble precipitated bankruptcies for many real estate developers and builders, which aggravated the effects of the worldwide recession in Spain. It also plunged local governments into serious difficulty, given their dependence on receipts from construction activities, permits and increases in land values. These knock-on effects, coupled with a near-absence of rules and urban planning regulations in the autonomous regions charged with managing development, precipitated the final bursting of Spain’s bubble. The counties had been pushed to create
construction works to increase current revenues. The movement strengthened because each private development had to give part of the built land to the municipality for public purposes. In practice, it appears that many local governments resold these properties and used the revenue for current expenses (Vorms 2009). These elements contributed to the housing bubble by accelerating the production of buildings and property. They brought about a predatory urbanization, a chaotic process that consumed much open land.

These examples from the United States and Spain demonstrate certain fundamental principles. One is that financial engineering has no miracle recipe for overcoming a borrower’s insolvency. A policy of homeownership for all cannot sustainably function without individualized social assistance to insure and assist homebuyers. In addition, requiring private-sector or quasi-public financial institutions carry the costs of financing such programmes, without cost to the government, is not viable in the long term. Moreover, a housing policy based exclusively on homeownership for all seems based more on cultural schemes than rational economics. There is no correlation between a high percentage of homeowners and the wealth of a country or its people. This is demonstrated by several European countries with low homeownership rates, such as Sweden, Germany, Switzerland, the Netherlands, which figure amongst the richest in the world while having some of the lowest levels of poverty and exclusion.

THE CRISIS’ EFFECTS ON LOCAL GOVERNMENTS

The impacts of the financial and then the economic crises varied greatly from country to country. Institutional circumstances sheltered some local governments, relatively speaking, compared to others that were fully exposed. Local governments able to invest in the markets faced direct capital losses. In the United States, cities that made the most prudent investments lost 20%-25% of their money, while others that had invested in hedge funds lost much more. In the United Kingdom, local governments lost a billion Euros in the Icelandic banking crisis, not counting the value of lost future earnings. Elsewhere, debt denominated in foreign currencies or with variable interest rates ravaged municipal budgets, notably in several Eastern European countries.

Local governments everywhere have suffered from a decrease in tax revenues related to real estate, construction and development. In the United States, property taxes provide urban municipalities their primary source of revenue; some have registered a drop in receipts of more than 45% compared to previous years. Cities are not the only governments affected: the states also have massive budget problems. The majority of states’ budgets will be out of balance for the next two years, leading to a deficit of more than $350 million (McNichols and Lav 2009). In general, the decline in global economic activity equally affects local budgets in developing as well as developed countries, particularly in devastated regions such as Detroit area, the heart of the American automobile industry. Finally, many local budgets suffer from a reduction or delay in transfers from national governments, who also have constrained budgets. Such is the case in some Eastern European countries and some
less-developed ones, whose revenues drop with declining commodity exports and lower remittances from expatriates, and where local governments dispose of fewer of their own resources.

In some cases, increased expenses arise from smaller state subsidies for public services, pushing irreducible costs onto local budgets. In the most developed countries and those hit hardest by the crises, local governments experience increased social welfare expenditures due to increases in unemployment, in the number of families losing their homes, and in the homeless population. Even in countries with less-generous social services, such as emerging ones, local governments see their expenses mount. Pinched by decreasing receipts and increasing expenses – particularly for social benefits – local governments must drastically reduce their operating expenses. Under legal obligation to balance their budgets, many American cities have had to close their most expensive services for several days each month by putting staff on furlough. In many cases, particularly in developing countries, reduced operating budgets affect public services such as sanitation, garbage collection and waste treatment.

The degradation of municipal accounts is often one factor limiting their access to loans. The lack of liquidity in the financial system, the precarious situation of many banks and financial services institutions, the general lack of appetite for investment and the increase in interest rates are other parameters of a phenomenon that unequally affects local governments, depending on their credit culture and local financial system’s structure. Obviously, in some emerging countries, such as China or Vietnam where local governments cannot borrow money directly, or in the least developed countries that have never had access to loans (still the case in the majority of sub-Saharan African countries), the crisis has caused less disruption. Countries with specialized para-public financial institutions might limit or simply not impose credit restrictions in some cases, e.g. if the national government has used such institutions to revive the local economy. Nonetheless, in the majority of developed countries, difficulty in obtaining loans constitutes a supplementary or even determinant element in local governments’ financial problems. In a few countries such as Hungary, where local governments may borrow to cover current expenses, increased borrowing costs burden already-strained budgets. For the great majority of local governments, borrowing may be done only for investment purposes, and such restrictions lead to the reduction, delay or cancelling of transactions, which depresses the local economy and employment still further. An increase in borrowing costs also means the municipality will have supplemental expenses in the future.

Direct capital investments in urban development, office buildings and other facilities have been withdrawn everywhere. Public-private partnership activities have fallen off considerably. Many projects have been delayed or suspended, if not cancelled outright. Certain sectors are less affected, such as energy and telecommunications
where demand remains strong. The sectors most affected are those most commonly related to local governments, such as water, sanitation and transportation, which have fallen 40%-50% in terms of project value (Leigland and Russell 2009). Developing countries are proportionally more affected by this decrease in activity.

BADLY DAMAGED CREDIT SYSTEMS AND INSTRUMENTS
The usually thriving tax-advantaged municipal bond market – representing $2.5 trillion in outstanding issues and new annual issues of nearly $200 billion – has severely contracted in the United States. Since bonds furnish almost their only means of financing, local governments now find it very difficult to raise money. They must cut back investment programmes to make up for higher bond interest rates. They must abandon projects usually easy to finance via revenue bonds because they generate their own income. The increase in financing costs strikes even harder as it follows prosperous times when local governments could easily raise money from bonds with historically low yields. Today, local governments with poor or average credit ratings are excluded de facto from borrowing. They no longer benefit from credit enhancement services that guarantee their debt, because credit enhancement companies (also called bond insurers or “monolines”) are also failing. The bond insurers’ role is to reassure the lender or investor that it will be compensated if the borrower defaults. These bond insurers, along with the credit rating agencies, appear responsible for a great deal of the credit crisis debacle.

In countries where local governments borrow more from commercial banks or specialty municipal lenders than from bond markets, the credit contraction proved sharper, primarily because of the poor condition of the largest banks. Interest rates increased for this reason. Consequently, in Europe, very old and established specialty lenders such as Kommunkreditt in Norway or Kommunalkredit in Austria found it difficult to obtain finance capital. The state took over Kommunalkredit in the end. The French-Belgian Dexia, a world-leader municipal finance bank, went into technical bankruptcy and survived only through a rescue plan jointly proffered by France and Belgium. They had to recapitalize Dexia and guarantee its own borrowings, given the value of its outstanding loans to French and Belgian municipalities. In emerging countries, municipal specialty lenders appear affected in various ways. Some, such as CPSCI\(^1\) in Tunisia, traditionally turn to international donors and should not have much difficulty refinancing. Other institutions that look to the market for at least part of their financing, such as the Development Bank of Southern-Africa and the Tamil Nadu Development Fund in India, may also have to turn to international donors, preferably for subsidized loan products if such loans can be made in their local currency.

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\(^1\) *Caisse de Prêts et de Soutien aux Collectivités Locales*
HOW TO EXIT FROM THE CRISIS?

More than a year after the financial crisis, the American government has not shown any intention of carrying out significant structural reform. So far, treatments of the crisis have centred on the financial system (where a cure remains far off); policy issues regarding other sectors of activity have not yet been raised. The two mortgage finance GSEs continue losing a colossal amount of money – Fannie Mae alone lost $37 billion the first quarter of 2009 – due to provisions for delinquent loans: they will need more backing from the US Treasury. The central government plans to divide Fannie and Freddie into “good banks” with valuable assets and “bad banks,” which would carry delinquent loans and unsalable securities on their books (Zandi, Chen, de Ritis and Carbacho-Burgos 2009). The mortgage and bond insurers are studying a similar scheme. Some are attempting to isolate their “toxic” or bad assets in ad hoc entities, to facilitate a return to the municipal bond market with a double or triple-A credit rating. There is disagreement about the future of credit enhancement and its long-term viability, especially since confidence in the credit rating agencies has been seriously shaken. The three largest rating agencies, Moody’s, Standard & Poor’s and Fitch, form a de facto oligopoly. Their methodologies for analysing structured products proved to be riddled with error; they face accusations of conflict of interest (White 2009).

Associations of local governments put forward proposals to revive the municipal bond market through guarantee schemes. The first, classic-style proposition would require the US Treasury to guarantee municipal bond issues temporarily through the stimulus framework, the Emergency Economic Stabilization Act of 2008. The second proposition, which has the virtue of a permanent plan, would create a mutual guarantee fund. The fund would insure new, general fixed-interest-rate bonds and revenue bonds. It would be a non-profit national-level guarantee instrument managed by municipalities. However, it would necessitate government funding for its initial capital. In the current political climate, the necessary support for such a plan appears far from certain. Another proposal would create a public-private infrastructure bank at the federal level (Rohatyn 2009). The market and its participants await clarity on these and other issues. Many investors, politicians and other parties seem to think that once the low point of the economic crisis has passed and toxic products have been isolated – aside from reining in securitization somewhat – activity will take off again from its former, unchanged basis.

Europe’s financial system also saw massive state intervention. As stated above, the re-nationalization of Dexia and Kommunalkredit demonstrates that states consider local economies and municipalities critical. National governments’ aid to their localities shows common elements: tax abatements, such as reimbursing value-added taxes, special transfers, and stimulus plans for local economies. States with access to public or para-public financing instruments have applied them to restructuring certain loans or reviving suspended projects. In France, the CDC, a public financial

2. Caisse des dépots et consignations
institution, took an equity position in Dexia. In Germany, KfW, a bi-lateral development bank, was asked to rescue approximately one hundred municipalities holding leasing contracts with American banks, whose terms required review because of credit insurers’ downgrades. Spain plans to create a fund for local investments. The Spanish government took initial legislative action on a series of structural reforms in the urban planning and housing sectors, notably through a new property rights law designed to curb the ill-effects of urbanization and to outline the framework of a social housing policy. It also launched a plan to support rental properties with a series of tax and legislative measures. These initiatives complemented a massive debt restructuring plan for real estate developers that offered a three billion Euro line of credit to underwrite leases on unsold units, as well as a programme to buy reserved property.

Such measures comprise part of a wider-reaching plan that the Spanish government will undertake for the entire urban sector. It will address the local governments’ credit system, whose obsolescence and negative externalities became obvious once the real estate bubble burst. Spain provides one example of a general trend in Europe, where a movement to revisit clearly dysfunctional laws and arrangements has emerged following the economic and financial crises. In particular, local tax structures and relationships between central and local governments have come under review.

However, it is more difficult to obtain information about measures taken to support local governments in emerging countries. Government planners have apparently preferred local stimulus plans as the best general way to support employment. They face a two-fold difficulty implementing such plans: funds must be transferred quickly, which implies reliable and experienced administrative circuits, and the local level must have sufficient capacity to absorb the funds and execute the plans with due speed and urgency. These two conditions seldom occur in one place. Consequently, countries armed with instruments such as municipal development funds or urban development banks do better than those without.

CONCLUSION
Responses to the current crises may spark the creation of new financial instruments and new forms of credit, and find support in convergent policies. One example: the prospect of climate change elicited several new financing mechanisms, such as carbon credits for mitigation and some funds and initiatives for adapting to the effects of global warming. However, local governments, particularly those in developing countries, still face a considerable gap between needs and available financing. Credit instruments have proven insufficient, fractured and relatively ill-suited: they are complex and costly to use, and most are designed for sovereign or national borrowers rather than local governments (Paulais and Pigey 2009). Local governments mostly need advice and support to master the technical aspects of a credit

3. Kreditanstalt für Wiederaufbau
file and grasp financing opportunities from different sources. They need assistance to enable the simultaneous exploitation of several credit sources, made difficult by administrative constraints, financial characteristics, competing schedules, legal backlogs, and so forth. Recently, the concept of a revolving or renewable fund has revived in policy circles, an option that could address many of these concerns.

Such a model worked in the United States in the 1980s, for grants emanating from the Environmental Protection Agency. Each state created a revolving fund where grants were combined with money from the market to create highly-subsidized loans for investments in environmental protection. The European Community, targeting urban renewal projects, recently created the Joint European Support for Sustainable Investment in City Areas (Jessica) Fund. It combines grants from the European Economic Community, state transfers and aid, local governments’ own monies, private-sector investments and loans or guarantees from the European Investment Bank and other financial institutions. The Jessica Fund uses local support teams in cities for its implementation. A number of financial instruments and recently proposed initiatives in different parts of the world emulate this model, as if the confrontation with global crisis causes policies to converge. The strength of the recovery at the local level will depend on the measures and reforms promoted by central governments. The solutions seen in this chapter show pragmatism, notably in their recourse to the concept of a semi-public economy, and rethink policies in light of knowledge gained in recent decades. Given the stagnation or even the relative decrease in international aid and the parallel increase in need, such an approach appears even more necessary for the least developed countries. After the crisis, financing sustainable urban investments will depend more than ever on mobilizing local savings, promoting housing and construction investments in particular, and in developing land and second-generation public-private partnerships.

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DEVELOPMENT AID: A COMPREHENSIVE CITY-SCALE APPROACH

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Developing countries face major urban challenges, requiring tailored answers from development donors and funders. Rather than merely addressing emergencies in various urban sectors, international aid should help build a comprehensive approach to town planning, especially since decentralization enlarges the scope of possible interventions.

Increasing global urbanization and its effect on climate change put sustainable cities at the heart of twenty-first century priorities. Well-conceived urban planning contributes much overall to development. However, when insufficiently mastered it can – and often does – carry unfortunate consequences. Each city presents a particular case, but one outcome is obvious: cities have generated negative effects, such as poverty, crime and pollution at the local scale, or greenhouse gas emissions and cultural destruction at the global scale. These are the challenges that local governments must address with “integral” urban plans and management. The 2007 Leipzig Charter on Sustainable European Cities defined this “integral” approach as “taking into account simultaneously and equitably all urban development imperatives and essential interests.” This does not mean addressing all issues at the same time, but taking each intervention as integral to a pre-existing, comprehensive consideration of the issues confronting local governments. An urban planning project’s financial viability should be reviewed together with its economic, social, cultural, environmental and spatial needs. Increasingly, donors and funders are promoting this “integral approach” to cities’ development.

Since half of the urban areas that will exist in 2030 in developing countries are not yet built, it is especially important that donors and funders watch over the path of urban growth – or better still carefully prepare for it. Most often, this means providing financial support to local governments. Even if national policies remain important, notably in supervising local governments’ budget balances and supporting balanced regional development, progressive decentralization puts local governments at the centre of development issues. Once local democracy has emerged, and local governments have acquired sufficient autonomy and necessary technical capacities, they will have both the legal responsibility and the legitimacy to implement and manage suitable public policies.

Decentralization is a complex process that implies coordination of different levels of government, consistent technical capacities, and sufficient financial resources to achieve sustainable development.
Development aid: a comprehensive city-scale approach

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Aims efficiently. It therefore calls for measures that reinforce capacities while ensuring their complementarity, and sufficient resources to carry them out. Donors and funders need to establish close dialogue with local governments, focusing on the adequacy of their development policies’ financial strategies. Such an approach is particularly meaningful because it matches implementation to each local government’s financial viability.

At the same time, far from concerning itself only with financing, this support rests increasingly on an integrated approach to urban growth, as defined in the Leipzig Charter. Constrained by emergencies, traditional cities’ approaches have often focused on specific sectors and have blurred the organic interaction between various social, economic and environmental factors. For instance, improving sanitation in a non-hygienic district is certainly essential, but in the absence of complementary actions, such as investing in affordable transportation, creating new jobs and designing good quality public spaces, the local community will not benefit fully from these improvements. Only an integral approach makes it possible to solve all issues entailed in improving given urban areas, whether one addresses housing, zoning activities, urban mobility, public works, or environmental protection.

Consequently, AFD promotes renewed support to municipalities and a new approach to urban development. It considers the municipality critical for guaranteeing the development of sustainable urban planning policies. Even as AFD provides funding for a certain number of sectors under municipal responsibility, it always tries to link a project to an integrated vision of the urban area and to base its work on a consolidated financial forecast. In this connection, it reviews different sources of financing with the municipality, including tax revenues, rates and license fees; relevant asset management, particularly for land and property; grants and subsidies; and loans and public-private partnerships. This overall diagnosis allows a constructive dialogue to take place, and highlights consequences of political decisions and project implementation for elected officials. These analyses also identify relevant supporting measures, ensuring the financial and technical viability of an urban development strategy.

AFD plans to give financial and technical support to local efforts in designing and implementing integral urban projects. The Kisumu Urban Project in Kenya exemplifies AFD’s approach to such projects. AFD will provide a 40 million Euro loan to the Kenyan government, which will reassign it in the form of a grant to the Municipal Council of Kisumu. Within a traditionally centralized country, the Kisumu Urban Project is the first of its type; the central government coalition considers it a pilot project for sustainable urban development. Kisumu is the third largest city in Kenya, with significant yet under-exploited economic and environmental potential. It is chronically underfinanced, crushed by debt, and geographically and socially fragmented. Kenyan cities traditionally revolve around independent neighbourhoods, organized around individual communities. The project aims to help the municipality develop a global strategy for its territory, so that these diverse and separate communities can participate in a common urban project and share a sense of belonging to the city. By designing an integral urban development strategy, the municipality will launch a process of urban redevelopment that should prove acceptable to its residents. Its ultimate goal is to reinforce local governance and local public institutions’ legitimacy, and to enhance overall living conditions in the city. To maximize its social impact, the project will finance investments in those sectors that the Municipal Council of Kisumu considers top priorities. The municipality and AFD favour this pragmatic approach because it allows for Kenyan land regulations and encourages strategic spatial planning. Contracts signed between Kenya’s central government and the Municipal Council of Kisumu could help clarify each party’s responsibilities and increase the transparency of financial transfers.

Ho Chi Minh City in Vietnam provides another
example of AFD’s urban strategy in a different geographic context. AFD is currently helping the city implement an integral urban development project to address its many growth and environmental challenges. Ho Chi Minh City is an economic and financial powerhouse, and a growth engine for Vietnam. It has more than seven million residents, attracting people in search of a better life. Its increasing population and urbanization are major challenges for its government, along with its vulnerability to the consequences of climate change, flooding in particular. Sixty-one percent of the city is located within the Mekong Delta and the Red River area, and will be at risk of frequent flooding by 2050. Ho Chi Minh City’s 2025 comprehensive urban plan anticipates rising water levels and foresees specific building criteria for floodplains and other exposed areas. AFD will finance infrastructure projects (such as waste treatment plants and universities) through the municipality’s Ho Chi Minh City Investment Fund For Urban Development, while encouraging measures that help priority sectors – health, education, environment, social housing – mitigate and adapt to climate change. As the city grows, AFD will help build social infrastructure and limit urbanization’s environmental and social effects, while strengthening local financing tools.

An integrated programme for transportation and the urban environment in Curitiba, Brazil further demonstrates AFD’s urban intervention strategy. AFD provides funding to the municipality through a direct loan to promote consistency and financial viability in public urban development policies and projects. The project will fight global warming and will be one of AFD’s first operations to preserve urban biodiversity. Finally, AFD is providing a direct loan, without a sovereign guarantee, to the Metropolitan Municipality of Kayseri in Turkey, to support an investment programme launched in 2005. This is a budgetary approach, whereby AFD partially funds the municipality’s 2007-2009 project plan. AFD intends to prove that Turkish municipalities are viable loan candidates for external investment capital. More generally, AFD supports the decentralization and democratization process that Turkey launched in 2004.
“SINCE HALF OF THE URBAN AREAS THAT WILL EXIST IN 2030 IN DEVELOPING COUNTRIES ARE NOT YET BUILT, IT IS ESPECIALLY IMPORTANT THAT DONORS AND FUNDERS WATCH OVER THE PATH OF URBAN GROWTH”

NATHALIE LE DENMAT
Cities consume many natural resources and emit increasing amounts of pollution. It does not have to be this way: it is the result of urban planning that pays no heed to ecological constraints. It is urgent to understand the ecology of cities as we do nature’s ecologies, so cities can be transformed and provide a needed, positive response to the global environmental crisis. It requires a political agenda.

BRIDGING THE ECOLOGIES OF CITIES AND OF NATURE

Cities are a type of socio-ecological system that has an expanding range of articulations or interactions with nature’s environment and ecologies. Today, most of these articulations are negative and produce environmental damage. This chapter examines how we can begin to use these articulations to produce positive outcomes – outcomes that allow cities to contribute to environmental sustainability. The complex internal systems of cities and their multi-scalar character – in terms of geography, policy, society, economy, space and time – have massive potential to effect a broad range of positive articulations with nature’s ecologies.

The massive processes of urbanization underway today are inevitably at the centre of our environmental future. It is in cities and vast urban agglomerations that humankind is increasingly present on the planet, and largely through cities that people use various stocks and flows of environmental capital. The hinterlands supplying urban areas, once mostly-confined geographic zones, are global hinterlands today. With the expansion of the global economy, we have raised our capacity to annex larger portions of the planet to support a limited number of industries and places (Girardet 2008). In this chapter, I address the multi-scalar character of cities: the diverse terrains and domains, many non-urban, onto which they project their effects and from which they meet their needs. I address cities’ ecological features: the multiple mechanisms and feedback loops that articulate urban processes and their consequences. Furthermore, I examine the emergent articulations or interactions between these urban ecologies and nature’s ecologies. The multi-scalar and ecological features of key city processes need to become part of urban governance, so that
the process of governing cities becomes part of the process for developing a more environmentally sustainable and ecologically efficient society.

THE NEED TO DISTINGUISH FORMAT FROM CONTENT

Urbanization and industrialization have made humankind the biggest consumer of all significant ecosystems. Urbanization is an enormously distinctive presence that contributes both directly and indirectly to changing a growing range of nature’s ecologies, from the climate to species diversity and ocean purity. It also leads to the formation of new, negative environmental conditions, such as heat islands, ozone holes, desertification and water pollution –resulting in a set of global ecological conditions never seen before.

Major cities have become distinct socio-ecological systems with planetary reach (Sassen 2006). The needs of cities and their increasing populations, and the profit motives of agribusiness, have altered traditional rural economies and their long-standing cultural adaptation to biological diversity. Increasingly, rural populations have become consumers of goods, including even food, produced in the industrial economy, which is much less sensitive to biological diversity. The rural condition – the physical as well as cultural and mental aspects of rural life – has evolved into this new system of social relations, one that does not support biodiversity. These developments all signal that the urban condition – the built environment along with urban cultures and lifestyles – is a major factor in any environmental future, and amounts to a radical transformation in the relationship between humankind and the rest of the planet.

But is it urbanization per se that creates environmental problems, or is it the particular urban systems and industrial processes we have implemented? Are negative global ecological conditions the result of urban agglomeration and density, i.e. the urban format? Or are they the result of the specific types of urban systems we have developed, i.e. the urban content – meaning the transportation, waste disposal, building, heating and cooling, food provision and industrial processes through which we extract, grow, make, package, distribute, and dispose of all the foods, services and materials we use? It is, doubtless, the latter – the specific urban systems we have made: systems and processes we have created collectively and historically, partly through path-dependence dynamics that kept eliminating options as we proceeded, and partly because of corporate profit motives.

When we examine a range of major cities today, one outstanding feature is the sharp differences in their environmental sustainability. These differences result from diverse government and industrial policies, economic bases, cultures, community norms and lifestyles.¹ Government and corporate policies are mutable – as seen in

¹. For a particularly strategic angle that cuts across all these factors, see Box 1, Ecological Economics. For the impact of environmental destruction on generating refugee flows, often directed to cities, see e.g. Warner et al. (2009) and Reuveny (2008). For the differences in impacts on the rich and poor in cities, see e.g. Morello-Frosch et al. (2009); Environment and Urbanization (2007). For the development of urban agriculture as a major response see e.g. Van Veenhuizen and Danso (2007).
the two following examples from the 2007 U.S. Conference of Mayors. They demonstrate that good urban leadership by elected officials and informed individuals can make an enormous difference in a country often thought to be deeply anti-regulation and generally opposed to government-run programs.

The first case concerns energy systems and a city in Texas, a state best known for its devotion to oil, and shows how the determination to “green” a city can be developed and implemented even when the larger political landscape is not supportive. In 2000, Austin began to implement a “Green Buildings Program” that has been recognized internationally as a model. It is transforming the local construction market by providing education, marketing and monetary incentives to develop both the demand side (the buying public) as well as the supply side (building professionals). The program is primarily funded and managed by the city’s community-owned utility, Austin Energy. This municipal utility also develops renewable energy sources for the city, including 59 local wind-turbines, four landfill methane gas recovery projects and three solar energy sites, providing over 153 kilowatts of energy. Austin happens to be the only city in Texas run by a Democratic mayor; Texas is often thought to be one of the most Republican, free-market, anti-government, anti-regulation states in the U.S. It shows how a well-designed effort and determination can succeed even in apparently inhospitable situations.

The second case concerns Chicago, which has an economic history of heavy manufacturing, steel mills, agribusiness and the most important heavy-haul transportation centre in the country. Today, Chicago is determined to establish itself as a premier environmental city, with the goal of obtaining 20 percent of its energy from renewable sources within the next five years. This includes solar, wind, biomass, small hydropower and tapped landfill gas. Chicago has planted thousands of trees over the last five years, created more than 100 miles of bike paths in the city, installed solar panels on city museums and built a rooftop garden on City Hall. The city government has also passed legislation to reduce urban “heat island” effects by allowing only reflective roofs or living roofs covered with vegetation.

These examples demonstrate that policy and proactive engagement are critical dimensions for environmental sustainability, whether they involve asking people to change their energy consumption habits, or insisting governments pass sustainability-oriented legislation, or demanding accountability from local and global corporations known to have environmentally damaging production processes.

A few foundational elements that dominate our way of doing things, and that are at the heart of what we need to address, recur across different cities. One is the fact that the energy and material that flows through our human economy returns in altered form as pollution and waste to the ecosphere. The crux of the matter is that this set of flows is made and can be unmade, as is signalled by the two prior examples from a country that has lagged in environmental standards compared to
other highly developed countries. This rupture is present in just about all economic sectors, from urban to rural. However, it takes on its most complex interactions and cumulative effects in cities. Cities are the source of most environmental damage, and some of the most intractable conditions feeding the damage.

**PARALLEL TENSIONS AMONG SCALES IN CITIES AND IN NATURE**

The diverse issues affecting the environment can be conceived analytically as questions of scale. Importantly, cities incorporate a range of scales at which a given ecological condition functions, and in that sense cities make legible the notion of scaling. For instance, one asphalted street in a village and a few buildings with air conditioners produce some heat emissions; thousands of such streets and buildings in a city produce a new socio-ecological condition – heat islands. This in turn implies that cities make the multi-scalar aspect of ecological systems legible to residents of cities. The urban environment’s capacity to make legible should be developed and strengthened, because such legibility will become increasingly critical for policy matters concerning cities, as well as regions beyond urban areas.

Scaling is one way of handling what are now often seen as either/or conditions: local vs. global, markets vs. non-market mechanisms, green vs. brown environmentalism. Some of the analytic work on scaling being done among ecologists has proven very illuminating in my efforts to conceptualize the city in this context (e.g. Dietz et al. 2009). Of particular relevance is the notion that complex systems are multi-scalar systems as opposed to multilevel systems, and that the complexity resides precisely in the relations across scales. An important issue raised by scaling in ecological research is the frequent confusion between levels and scales: what is sometimes presented as a change of scales is actually a translation between levels. A change of scale results in new interactions and relationships, and often a different organization. Level, on the other hand, is a relative position in a hierarchically-organized system. Thus, a change in levels entails a change in a quantity or size rather than the forming of a different entity. That said, in some cases an expanded quantity or size can indeed become a different scale, as in the case cited below of an illness that becomes an epidemic by spreading to vast numbers of people.

The ecological literature finds that tension among scales is a feature of complex ecological systems, a condition that would certainly seem to hold for cities. Let me illustrate with an example whereby providing an air-conditioned hospital is likely to be experienced as a positive element in any neighbourhood of a large city or small town: it would be difficult to see the negatives for the average resident. But at the scale of the city, the air-conditioned hospital contributes to heat islands, which produces a tension between the advantage for that neighbourhood and the damage to the larger environment, where it accentuates growing ozone holes. This tension among the different scales forces the issue of environmental damage and the need to find
and develop solutions at all levels. In brief, understanding how tensions among the multiple scales that might be operating in the context of the city enhances the analysis of environmental damages associated with urbanization. And it enhances our understanding of the ways in which cities are the source for solutions to such damages.

A crucial analytic operation here involves giving spatio-temporal scaling to the object of study (Sassen 2005; for a theoretical treatment about how to construct the object of study, see Sassen 2008; for an application see e.g. Porter et al. 2009). This also entails distinguishing the object of study from contextual variables, which in the case of cities might be population, economic base, etc. Executing such analytic operations would help us avoid the fallacy of holding “the city” guilty of environmental damage. Eliminating cities would not necessarily solve the environmental crisis. We need to understand the functioning of and the possibilities for changing specific city-related systems: energy systems, economic systems, transportation systems, et cetera, which entail environmentally unsound modes of resource use. The fact that these various systems are amalgamated in urban formations is a condition analytically distinct from the systems involved. The distinction between specific systems and background or contextual variables also helps us avoid the fallacy of seeing “the city” as a container, a boundaried, closed unit. In my research on cities and globalization, I instead conceptualize the city as a multi-scalar system through which multiple, highly specialized cross-border economic circuits circulate. This idea can be applied to cities and the environmental dynamic by conceptualizing the city as a multi-scalar system through which multiple specific socio-ecological circuits traverse. Rather than a closed system, cities are amalgamations of multiple “damage” circuits, “restoration” circuits and policy circuits.

Specific issues raised by research on ecological systems point to possibly fruitful analytic strategies for understanding cities and urbanization processes, both in terms of environmental conditions and in terms of policy. One of the reasons this may be helpful is that we are still struggling to understand and situate various types of environmental dynamics in the context of cities, and wondering how to engage policy. When it comes to remedial policy and cleaning up environmental damage, there is greater clarity in understanding what needs to be done. But understanding the city as a broader system poses enormous difficulties precisely because of the multiple scales that constitute it, both as a system of distributed capabilities and as a political-economic and judicial-administrative system. That is to say, the individual household or firm or government office can recycle waste, but cannot effectively address the broader issue of the excess consumption of scarce resources; the international agreement can call for global measures to reduce greenhouse emission levels, but depends on individual countries, cities, households and firms to implement many of the necessary steps; and the national government can mandate environmental standards, but it depends on systems of economic power and those of wealth production.2

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2. Some kinds of international agreements are crucial, for instance, when they set enforceable limits on each national society’s consumption of scarce resources and their use of the rest of the world as a global sink for their
A key analytic step is to decide which of the many scaled ecological, social, economic and policy processes are needed to explain a specific environmental condition (whether negative or positive) and design a specific action or response. Another analytic step is to factor in the temporal scales or frames of various urban conditions and dynamics: cycles of the built environment, of the economy, the life of infrastructures and of certain types of investment instruments. The damage produced by a car’s unclean motor spewing fumes is immediate, and promptly visible; but when the car is not running, it is not, strictly speaking, producing damage. The damage produced by a building’s outside walls does not stop; it is constant and relentless, and it is not as legible as a car’s fuming motor. The combination of these two steps helps us deconstruct a given situation and to locate its constitutive conditions in a broader grid of spatial, temporal, and administrative scales.

In the case of cities, the connection between spatial and temporal scales evident in ecological processes may prove analytically useful for approaching some of these questions. What may be found as negative at a small spatial scale, or a short time-frame, may emerge as positive at a larger scale or longer time-frame. For a given set of disturbances, different spatio-temporal scales may elicit different responses from ecosystems. Using an illustration from ecology, we can say that individual forest plots might come and go, but the forest cover of a region overall can remain relatively constant. This raises a question as to whether a city needs a larger system in place that can neutralize the impact on the overall system of major disturbances inside the city. One outcome of the research by ecologists in this domain is that movement across scales brings about change, which is the key process in multi-scalar systems: it is not only a question of bigger or smaller, but rather that the phenomenon itself changes. Biological processes are good examples: the pest that is experienced as pure damage at one scale becomes the food for another species and is experienced as benevolent at that scale. In the case of cities, we can return to the previous example of buildings and heat islands as one illustration. This multi-scalar dynamic also allows us to recognize that an unstable system at a given scale can be a condition for stability at a lower or higher scale. We can extend this process of changing valence, or the capacity of one thing to react with or affect another, to other features of systems: bottom-up control turns into top-down control; competition becomes less important. This also is suggestive for thinking about cities as the solution to many types of environmental damage: what are the scales at which we can understand the city as contributing solutions to the environmental crisis?

Relating some of these analytic distinctions to cities suggests that one way of thinking of the city as multi-scalar is to note that some of its features, notably density, alter the nature of an event. The individual occurrence, e.g. a high-rise wastes, with protection against biopiracy one of the most extreme cases (Mgbeogi 2006; Gupta 2004). I find other such agreements problematic, notably the one for carbon trading, which has mostly negative incentives for firms in the highly developed countries: firms need not change their practices insofar as they can pay others to take on their pollution, which could mean no absolute reduction in pollution.
building, is distinct from the aggregate outcome, e.g. density. It is not merely a sum of the individual occurrences, i.e. a greater quantity of occurrences. It is a different event. The city contains both occurrences and aggregate outcomes, and in that regard can be described as instantiating a broad range of environmental damage that may involve very different scales and origins, yet still become manifest in urban terms. For instance, CO₂ emissions, produced on the micro-scale of vehicles and coal burning by individual households, become extensive air pollution that covers the whole city, with effects that go beyond CO₂ emissions *per se*. Air and water-borne microbes materialize as diseases at the scale of the household and the individual body, and become epidemics thriving on the multiplier effects of urban density – capable of destabilizing firms whose machines have no intrinsic susceptibility to the disease, but which are dependent on humans who might be infected.

A second way in which the city is multi-scalar is in the geography of the environmental damages it produces (Girardet 2009; Rees 2006). Some of it is atmospheric; some of it internal to the built environment of the city, as might be the case with much sewage or disease; and some of it is in distant locations around the globe, as with deforestation. The case of ozone holes is one of the most serious instances of scale-up: the damage is produced at the micro-scale of cars, households, factories, and buildings, but its full impact becomes visible and measurable over the poles, where there are no cars and buildings.

A third way in which the city can be seen as multi-scalar is that its demand for resources can entail a geography of extraction and processing that spans the globe – though it does so in the form of a collection of confined individual sites, albeit sites distributed worldwide. (Girardet 2009; Rees 2006). This worldwide geography of extraction instantiates in particular and specific forms, such as furniture, jewellery, machinery and fuel inside the city. The city is one moment—the strategic moment—in this global geography of extraction, and it is different from that geography itself.

A fourth way in which the city is multi-scalar is that it instantiates a variety of policy levels. It is one of the key sites where a very broad range of policies – supranational, national, regional and local – materialize in specific procedures, regulations, penalties, forms of compliance and types of violations (Satterthwaite et al. 2007; Low and Gleeson 2001; Etsy and Ivanova 2006). These specific outcomes are different from the actual policies, since they are designed and implemented at other levels of government.

It is also important to factor in the possibility of conflicts in and between spatial scales. Environmentalists can operate at broad spatial and temporal scales, observing the effects of local activities on macro-level conditions such as global warming, acid rain formation and global despoliation of the resource base. Environmentalists with a managerial approach often have to operate in very short time-frames and confined levels of operation, pursuing clean-ups and remedial measures for
a particular locality – remedial measures that may do little to affect the broader condition involved. Indeed, they may diminish the sense of urgency about larger issues of resource consumption and thereby delay much-needed responses. On the other hand, economists or companies will tend to emphasize maximizing returns on a particular site over a specific period of time.

**THE COMPLEXITY AND GLOBAL PROJECTION OF CITIES**

As I stated previously, it is not urbanization *per se* that is damaging, but rather the mode of urbanization, which extends to the adoption of environmentally harmful production processes in rural economies, such as the overuse of chemicals and deforestation, or air-conditioned buildings that worsen ozone holes, and other such interactions. Yet it is the complexity of cities that is also part of the solution.

The complexity and diversity of cities can help us engage the legal systems and profit motives that underlie and enable many of the environmentally damaging aspects of our societies. The question of urban sustainability cannot be reduced to modest interventions that leave major urban systems untouched; further, the actual features of urban systems vary across countries, and across cities within countries. While for some environmental issues, such as protecting the habitat of an endangered species, we can make considerable advances simply by acting on scientific knowledge, such is not the case when dealing with cities, or with society at large. Non-scientific elements are a crucial part of the picture: questions of power, poverty and inequality, ideology and cultural preferences, are all part of the question and the answer.

The spaces where environmental damage takes place often differ from the sites where responsibility for the damage lies – such as the headquarters of mining corporations – and where accountability should be demanded. A crucial issue is the massive worldwide investment promoting large projects that damage the environment. Deforestation, mining, and construction of large dams are perhaps among the best-known cases. The scale and the increasingly global and private rather than public-sector character of these investments suggest that citizens, governments and non-governmental organizations all lack the power to alter these investment patterns or influence their implementation.

However, particular kinds of cities that I call “global cities” should actually be seen as structural platforms for acting on and contesting irresponsible and powerful corporate actors (Sassen 2005; 2001). This is because the geography of economic globalization is strategic, especially when it comes to managing, coordinating, servicing and financing global economic operations. According to two major studies (MasterCard 2008; AT Kearny 2008), about 75 cities worldwide contain almost all of the headquarters of globally operating firms. There are sites – the network of global cities – in this strategic geography where the density of economic transactions and top-level management functions come together and constitute a concentrated
geography of global decision-making. We can also see it as a strategic geography for demanding accountability from major corporate headquarters about environmental damage. For instance, a firm may have hundreds of mines across the world, but its headquarters might be in one, or perhaps a few, global cities.

The global economic system is characterized by enormous concentration of power in a limited number of large multinational corporations and global financial markets; for precisely this reason, it also concentrates rather than disperses sites where accountability and the changing of investment criteria can be demanded. Engaging a company’s headquarters is actually easier than engaging the thousands of mines and factories in often remote and militarized sites, or the millions of service outlets of such global firms. Direct engagement with the headquarters of global firms is facilitated by the recognition among consumers, politicians and the media of an environmental crisis. Certainly, dealing with the headquarters of large firms leaves out millions of independent small local firms responsible for much environmental damage, but these are more likely to be controllable through national regulations and local activism.

CONCLUSION: URBAN ECO-GOVERNANCE

Today the city is a strategic space for the direct and often brutal encounter between forces that are enormously destructive of the environment and of increasingly acute needs for environmental viability. This points to two critical dimensions. One is that urban governance must correspond with the development of environmentally sustainable urbanization. Secondly, this correspondence should maximize recognition of the multiple ecologies in cities and nature, respectively. Each point in these ecologies should be a bridge articulating the city and the environment.

Diverse empirical conditions both push towards and enable this complex articulation between cities’ and nature’s ecologies. For instance, most international and national environmental standards will also have to be implemented and enforced in cities, in addition to being enforced at national and international levels. This is partly because cities incorporate a large share of all environmentally destructive processes, including many that are not exclusively urban, and partly because the multi-scalar character of cities entails incorporation of national and global processes. The obverse of this specificity is that each city’s mix of elements has a certain particularity – as does its mode of insertion within local and regional ecosystems. Out of this particularity comes place-based knowledge, which can then be scaled up and contribute to the understanding of national and global conditions.

All of this matters because it is now urgent to make cities and urbanization part of the solution: we need to use and build upon those features of cities that can re-orient the material and organizational ecologies of cities towards positive interactions with nature’s ecologies. These interactions, and the diversity of domains...
they cover, are themselves an emergent socio-ecological system that bridges the city’s and nature’s ecologies. Part of the effort is to maximize the chances of positive environmental outcomes. Specific features of cities that may help include economies of scale, density and the associated potential for more efficient resource use, and, important but often neglected, dense networks of communication that can facilitate environmentally sound practices in cities. More analytically, insofar as cities are constituted through various processes that produce space, time, place and nature, cities also contain the transformative possibilities embedded in these same processes. For example, the temporal dimension becomes critical in environmentally sound initiatives: thus, ecological economics helps us recognize the efficient and value-adding character of the longer temporal frames of environmentally sound criteria. Conventional market criteria, with their ever-shorter temporal evaluation frames, might characterize much of this as inefficient or value destroying.

A city is a microcosm of the complex mix of variables we need to factor into our programs of change. Urban systems entail systems of social relations that support the current politico-economic organization, systems which we will have to dismantle

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**BOX 1 ECOLOGICAL ECONOMICS**

- Many of the biophysical stocks, flows and functions that we use are difficult to quantify and price through conventional understandings of markets, and others are simply invisible to conventional analysis: these are the issues taken up by ecological economists, beginning with the work of Rees (1992; 2006), Schulze (1994), Daly (1977), Daly and Farley (2003), among others. In contrast with neoclassical economics, ecological economics seeks to move away from models of infinite economic growth that separate the economy from the environment and move towards a model of sustainable growth that integrates social, built, natural and human capital components (Gund Institute 2009). Ecological economics rejects the belief that economic growth alone can lead to development. It seeks to incorporate measures of quality of life and environmental sustainability alongside GDP in assessing how development contributes to human well-being; it rejects the idea that new technologies can overcome all limits to growth, instead suggesting that there are real, insurmountable environmental limits to growth; and it emphasizes allocative efficiency over market efficiency (see Gund Institute 2009).

One of the key propositions of ecological economics is that humans derive benefits from the ecosystem and from ecological processes. The value of these benefits – referred to as ecological or ecosystem services (ES) – is recognized and factored into ecological economic models as a non-marketed wealth underpinning marketed economic wealth (Porter et al. 2009). Ecological services include food (including agriculture), water, flood and disease control, recreational and spiritual benefits, and the cycling of nutrients that maintains conditions for life on earth. To measure economic development in terms of “real, sustainable well-being” instead of market growth alone (GDP), one needs to measure nonmarketable contributions to human well-being, such as those from nature, social relationships, health and education (Beddoe et al. 2009). In order to account for non-marketable contributions to human well-being, ecological economists have suggested alternative measures of development.

Another key proposition of ecological economics is that there are limits to infinite growth. Whereas neoclassical economics assumes technological solutions to environmental limits, ecological economics sees these limits as real and ultimately insurmountable. Rather than increasing quantities of growth, then, ecological economists have suggested increasing qualitative improvements to generate greater economic welfare from fewer resource inputs -- in other words, increasing efficiency (Beddoe et al. 2009).
partially or wholly in some cases. Cities are complex systems in their geographies of consumption and of waste-production: this complexity also makes them crucial for producing solutions. Some of the geographies for sound environmental action in cities will also operate worldwide. The network of global cities described earlier becomes a space at the global scale, not only for managing current investments, but also potentially for re-engineering environmentally destructive global capital investments into more responsible ones. It contains the sites of power of some of the most destructive actors, but potentially also the sites for demanding accountability of these actors. The scale of the network is different from the scale of the individual cities constituting this network. The circular logic that environmentalists want to introduce in the functioning of cities, i.e. maximum re-use of outputs to minimize waste, will entail spatial circuits that operate at different scales. Some will be internal to households, others will be citywide, and yet others will go beyond the city and run through sites around the globe.
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“A CITY IS A MICROCOSM OF THE COMPLEX MIX OF VARIABLES WE NEED TO FACTOR INTO OUR PROGRAMS OF CHANGE”

SASKIA SASSEN
Southeast Asian countries approach urban sustainability in very different ways. Actions vary according to levels of economic resources, organization of local governments, and awareness of what is at stake. However, joint actions are the most effective way to address the region’s most critical pollution problems, including air pollution.

The ten countries that make up Southeast Asia1 vary widely in their pursuit of sustainable urban development because of differences in their development stages and economic growth. They differ substantially in terms of the technical, administrative and financial resources they commit to constructing sustainable cities. Thus, efforts directed at the three components of urban sustainability – social, economic and environmental – depend upon this triangular relationship to set priorities in resource allocation. The globalization forces that strongly influence these countries’ receptivity to environmental protection appear closely linked to their ability and commitment to meet globally recognized standards. This paper will investigate three groups of Southeast Asian countries that differ in their inclination and capacity to construct sustainable cities. It will focus on countries with more open market economies and those vulnerable to the hazards of urban pollution.

In Southeast Asia, one may divide the ten nations into three broadly defined groups. Singapore stands alone in its own group, as a city-state with a strong and pro-business government. With its globally integrated networks, acquired technology and financial wherewithal, Singapore is highly committed in its own way to protecting its intensively built environment.

The second group consists of countries with pro-capitalist national governments. Though facing more difficulties than Singapore in pursuing global integration because of domestic, political and other constraints, Malaysia, Thailand, Indonesia, Brunei and the Philippines have closely followed Western-based environmental norms in formulating their urban policies.

The third group comprises countries whose economies are in transition from central planning towards greater acceptance of free market practices: Myanmar, Vietnam, Cambodia and Laos. In comparison with the more urbanized and industrialized second group, environmental degradation and pollution problems are generally less severe in this group; however, there are also fewer resources and less technological expertise for environmental control and conservation. Apparently, all three groups reflect a general

pattern: their implicit allegiance to sustainable urban development corresponds somewhat with their level of urbanization (see Table 1).

**SINGAPORE: A GLOBALLY INTEGRATED CITY-STATE**

Since 1965, Singapore has sought global integration by promoting free trade and attracting international and domestic investments; this has also entailed upgrading its own educational, infrastructural and industrial-cum-technological development. Within this economic-priority framework, environmental protection and aesthetic enhancement of the fast-urbanizing landscape are perceived as necessities – both to woo world-class multinational corporations, and to ensure a good quality of life to its citizens under a “developmentalist” mandate (Wong and Yap 2004). Such a mandate reflects the quest to build a modern nation, with continued political support ensured by the electorates’ rising material standards.

Singapore’s Ministry of the Environment and Water Resources is supported by a cash-rich government, strongly committed to achieving a clean, green environment and long-term environmental sustainability. With qualified personnel and instruments, and ample financial means from budget surpluses, the Ministry implements environmental programmes with rigorous enforcement measures. Organizationally, environmental preservation and protection operate through a three-pillar “private, public, people” partnership based on business functionality, public sector efficiency and citizen involvement (MEWR 2008).

For instance, new environmental initiatives are encouraged in business contracts, in procurement of materials, and in operations that not only use modernization and the transfer of technology.

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2. Developmentalism is an economic theory that states that the best way for the least developed countries to develop is by fostering a strong and varied internal market. In Singapore’s case, this includes imposing free trade with minimal tariffs and strong links with the developed capitalist world, to facilitate modernization and the transfer of technology.

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### TABLE 1 URBAN POPULATION IN SOUTHEAST ASIA 1990-2007

<table>
<thead>
<tr>
<th>Country</th>
<th>Urban Population as % of Total Population</th>
<th>Total Population ('000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Singapore</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Philippines</td>
<td>48.8</td>
<td>58.6</td>
</tr>
<tr>
<td>Indonesia</td>
<td>30.6</td>
<td>40.2</td>
</tr>
<tr>
<td>Malaysia</td>
<td>50.7</td>
<td>62.0</td>
</tr>
<tr>
<td>Thailand</td>
<td>18.7</td>
<td>21.6</td>
</tr>
<tr>
<td>Brunei</td>
<td>-</td>
<td>72.0</td>
</tr>
<tr>
<td>Myanmar</td>
<td>24.6</td>
<td>27.7</td>
</tr>
<tr>
<td>Vietnam</td>
<td>19.7</td>
<td>24.2</td>
</tr>
<tr>
<td>Laos</td>
<td>18.1</td>
<td>23.5</td>
</tr>
<tr>
<td>Cambodia</td>
<td>12.6</td>
<td>23.5</td>
</tr>
<tr>
<td>Total</td>
<td>30.1</td>
<td>37.1</td>
</tr>
</tbody>
</table>

best environmental practices but also provide good economic returns as incentives for reinvestment. Again, this exemplary emphasis on the interdependence of environment and economy has been supplemented by a rather comprehensive legal and regulatory system that implements monitoring, evaluation, auditing and enforcement.

**MALAYSIA, THAILAND, INDONESIA, PHILIPPINES, BRUNEI**

Except for Brunei, which remains vulnerable to the adverse effects of Western-induced recessions, countries in this group have a close integration with globalization forces. These forces have bolstered a fast pace of urbanization as well as imports and local reproduction of consumer goods. After four decades of foreign investment in manufacturing and services, technology transfers and local innovations have positioned this group of countries in world trade. At the same time, symptomatic urban malaise in the form of traffic congestion, pollution and loss of amenities has increased.

Concomitantly, the growth of an affluent middle class, characterized by a sharp increase in automobile ownership and use, has led to changing consumption patterns and urban sprawl, promoted by haphazard suburbanization. Earlier studies, such as that of Sham Sani (1993), have shown that the capital cities of Jakarta, Bangkok, Kuala Lumpur and Manila have high concentrations of suspended particulates, arising mainly from increasing use of automobiles and industrialization, as well as less effective pollution prevention measures.

Bangkok, Thailand, a prime or leading city in the region, has absorbed close to a quarter of the Thai kingdom’s 21 million vehicles in its congested greater metropolitan region. Air pollutants containing suspended particulates, carbon monoxide and sulphur dioxide are unacceptably high. With fuel consumption expected to more than double from 1995 to 2015, remedial measures to date have been more technology-led, e.g. using emissions controls, traffic management and penalties, rather than limiting the number of vehicle licenses.

In Indonesia, Jakarta’s level of polluting emissions closely matches that of Bangkok. A recent World Bank report indicated that serious effects of air particulate pollution in Jakarta would cause 1,200-2,300 deaths annually and 184,000-541,000 asthma attacks. As one of the world’s largest contributors of greenhouse gas emissions, Indonesia has undertaken a series of measures to mitigate environmental degradation. However, given its widespread rural poverty and the international pressure to protect its vast tropical rainforest, it has prioritized sustainable development more in rural than urban areas. Difficulties in financial, technical and environmental law enforcement support have meant little urban progress either in curbing polluters’ behaviour or in environmental quality control. For example, until 2005, Indonesia’s national environmental impact management agency (BAPEDAL) had no legal status to enforce emissions standards and enjoyed no power to prosecute industrial polluters (Rock 2005).

Generally speaking, Group II countries have failed either to improve urban environmental performance or to establish credible regulatory agencies supported by necessary resources, particularly political and technical expertise in enforcement of environmental laws (Rock 2005). Malaysia’s largest metropolitan region, the Kelang Valley (in which the capital city of Kuala Lumpur is located), is known to be a highly automobile-dependent city, lacking an efficient public transportation system to serve its widely scattered suburbanized zones. Metropolitan Manila in the Philippines is another regional primate city whose air pollution levels far exceed the World Health Organization index of safety. The cost of atmospheric pollution management is prohibitively high – well beyond the financial capacity of the nation to handle it (World Bank 2009).

**MYANMAR, VIETNAM, CAMBODIA AND LAOS**

Urbanization has advanced more slowly in the Group III countries than in their Southeast Asian neighbours. Most of these countries’ territories remain rural. Given their relatively closed economic systems, where fewer direct foreign investments have produced less significant industrialization, public discussion of environmentally sustainable urban development has been more about rhetoric than practice. Limited material resources and lack of available expertise at the national level have further tempered any urgency in approaching sustainable urban development. Hence, three countries in
this grouping, Myanmar, Laos and Cambodia, are excluded from discussion.

Vietnam is the most populous country in the group with a population of 85 million, of which nearly 30% lives in urban areas. By 2020, the urban population is projected to reach 46 percent of the total (Dang 2005). Given the scale of urbanization and higher level of industrialization, sustainable urban development and environmental protection have received greater attention. Since 1988, many Vietnamese cities have deployed the “Ecocity” concept, targeted at building a “Green – Clean and Beautiful City.” Municipal efforts have produced some positive results in dealing with rising urban air pollution. Ho Chi Minh City, with a population of 5 million, has more than 20,000 small family-based factories operating with outdated equipment and technology, creating health hazards. The City has phased out a few thousand polluting factories or workshops located in residential areas and the city’s periphery. The City’s master plan has also begun to tackle air pollution hazards caused by over 1.5 million motorcycles, most using leaded petrol. More public transportation is being promoted. However, the long-term prospects for controlling pollution in fast-urbanizing Vietnam have yet to be assessed.

CONCLUSION

With the exception of Singapore, Southeast Asian countries have until now paid only lip service to sustainable urban development, rather than taking action with genuine and substantial financial and technical support. Institutional and enforcement weaknesses have hampered progress in building a more consolidated and sustainable environment. Singapore stands out in protecting its small physical enclave, but atmospheric pollution recognizes no frontiers. Through movement of air masses, Singapore’s air quality could be affected from nearby polluted sources. The lessons here may be summed up in two ways. First, unless improved financial and technical resources for pollution management support urbanization and industrialization, environmental degradation could be the costly outcome, requiring equally expensive remedial measures. Second, national governments in Southeast Asia need to intensify their regional cooperation, given the cross-border character of pollution sources. As Western- and perhaps China-led globalization further exerts its impact on the region, and as urbanization accelerates, urban sustainability concerns and action programmes will inevitably speed up as well.

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Emerging cities are finding new ways to deliver basic services, inventing fresh techniques and institutional arrangements. Before long, their wide variety of experiences may generate new service and financing standards, determining how public and private actors divide responsibilities and tasks, particularly for water supply, sanitation and solid waste management. This possibility inspires a review of government’s role in supplying such services, and of ways to adapt urban development policy makers’ analytical tools.

Analysts often describe urban services infrastructure in developing countries in crisis terms: the lack of resources and public funding drives management crises and foils the paradigm of general service access. Everyone comes to the same conclusion: service levels are inadequate, service extensions lag behind urbanization, and financing is impossible. Meanwhile, innovative service delivery arrangements emerge throughout developing countries. Countless services operators – working in neighbourhoods, cities or even at the national level – propose pragmatic, ready solutions for the varied strata of urban society. Differentiated services arise according to customers’ ability to pay: these are local and limited, but often fill lucrative service gaps. Harnessing this dispersed purchasing power allows systems to develop at the same rate as the city grows. Urban services management has long belonged to the public sphere in emerging countries (understood here as economies modernized enough to boast technical and managerial expertise, well-distributed beyond government organizations). This previously exclusive domain has now opened to a coalition of private actors. Compared to developing economies, emerging countries have a special ability to industrialize new systems rapidly and independently of the government – and to reproduce them on a large scale, thus lowering production and operating costs.

These differentiated services distinguish themselves from classic, centralized public management more by their nature than by their quantitative service standards. Basic services’ technical systems diversify as the minimum size required for their financial viability is reduced (Ruet et al. 2009). Once the pilot phase is over, the levels of coordination with more centralized public systems multiply. Given their
operational (but not necessarily enduring) character, the evolution of such systems prompts a rethinking of the government’s role: less central to service supply, more responsible for regulation. The proliferation of new systems brings new challenges: technical integration between permanent centralized systems; new, decentralized systems with a potentially large scope of service; and social inclusion of all urban residents. But to think of these dispersed changes merely as answers to a (so-called) “crisis” only obscures their potential for urban planning and development.

What if the crisis actually lies in analysis of the problems? Emerging societies invent solutions incessantly. The very definition of emergence rests on these models’ ability to “create a system” in tandem with opportunities for development aid. To bypass one paradox of classic urban services management, we propose that development professionals use the concept of “club goods” – i.e. economic goods that are “non-rivalrous” e.g. whose users do not compete with each other because several individuals can use them without diminishing their value; yet exclusive or “excludable” because certain individuals or groups can be prevented from using them (Buchanan 1965). Development theory primarily rests on the idea of economic public goods, or goods that are non-rivalrous and non-excludable. In practice, however, such goods are often managed through organized shortages and exclusionary discrimination. The effectiveness of club goods-based systems could help create real public goods without the pitfalls of deficient public services – if regulation could compensate for their exclusive aspect. Understanding the logic of club goods could thus reformulate crucial questions about urban social and spatial cohesion in developing and emerging countries.

**EMERGING COUNTRIES HAVE MANY INNOVATIVE SOLUTIONS**

In 2005, the growing urban population of China, India and Brazil – the main emerging countries – was equivalent to that of Europe and North America combined (UN Habitat 2007). Their share of urban citizens continues to increase. The urban issues they face are quite new to us; understanding them requires attention to two major characteristics – powerful, structural social inequality, and the preponderance of “informal” or unofficial settlements, services and activities. Urbanization tends to accentuate already-large income disparities, because certain sectors of activity develop with different levels of profitability, as large agglomerations in developing countries attract greater numbers of disadvantaged migrants. Once integrated into the urban economy, these new residents earn higher incomes than the rural average, but remain relatively poor. The spread of a massive, urban middle-class is a fiction in the medium-term: the masses in question are too large, and the integration of emerging economies into the world market depends on a differential in internal salaries. Differences in living standards become visible in the urban landscape, where
highly differentiated urban areas are often spatially – and always economically – embedded within one another.

The term “informality” itself evidences a blinkered vision of emerging countries. Rather, one should speak of forms of housing and economies developing outside the state’s purview. The urban fabric of emerging cities consists mostly of working-class neighbourhoods, an enduring feature: by 2025, the number of people living in these districts will be double that of 2005 (Giraud et al. 2006). In terms of economic activity, “formal” or official activity is only the tip of the iceberg: in India, only 9% of workers hold official jobs (Kundu et al. 2009). The economic emergence of countries with hundreds of millions of urban residents rests on innovation and technology, but also on poor urban workers. Furnishing them with essential services will require development tools and systems adapted to their ability to pay and to each city’s governance structure.

The socio-economic development model in which the state played the dominant role has exhausted itself, after producing many results and showing no fewer limitations. Emerging countries’ long-term modernization now accommodates a variety of private actors. Several major agents intervene in basic urban services supply: public or para-public enterprises that de facto no longer have a de facto monopoly on supply and infrastructure; real estate developers and large international or transnational services firms, trying to replicate uniform interventions; small firms that grow out of the working economy, their status characterized by a large variety of official and unofficial titles; civil society, which includes some non-governmental organizations concerned with global issues and many local community not-for-profit associations (Ruet et al. 2004); international financing agencies (multi- and bi-lateral development banks) now diversifying their beneficiaries, as seen in the rise of “non-sovereign” loans made without backing by the host government. With the diversification of stakeholders in urban management, new models of services provision proliferate.

Supply systems adapted to these new urban challenges, characterized by smaller, more elementary techniques and arrangements, have emerged in different forms almost everywhere. Operators of neighbourhood water mini-networks (now gaining recognition) contribute at three levels. First, they sometimes give an alternative or complementary means of increasing home water access, without extending the official network; they are especially efficient where water is recycled locally. Second, they supply water to many low-income households, particularly in urban areas that conventional networks find hard to serve, thus improving living conditions for underprivileged districts. Finally, their services manage to rival those offered (or not offered) by the principal operator, in terms of pressure, continuity and cost. For waste management services, small private operators have a wider range of interventions – collecting, sorting, recovering, re-using, reselling, recycling, and so on – and represent an equally large sector of activity, in terms of the number of people
involved and tonnes of material. Here again, informal and local operators make collection routes and waste treatment more economically efficient by recycling and sorting waste at its source.

Community-based, decentralized systems for water, sanitation and waste management are appearing simultaneously. These supply and recovery systems function on the “short-loop” principle: instead of going through slow and extensive systems, they focus on providing services more or less autonomously in their communities, as seen in Box 1. Can these community-sized systems become a model? Yes, if seen through another prism. Urban development agencies tend to favour implementing only those systems they can control entirely (see Maria 2006). The alternative systems now developing are far more complex than conventional systems. Urban entrepreneurs, are no longer content to simply purchase: they join with technology providers for innovations and investments, defining specifications for modular systems. This makes it imperative that governments recognize these entrepreneurs and new systems before attempting large-scale changes. In emerging countries, intervention models have yet to stabilize unit development costs, management, technical terms, and so forth, but their abundance makes comparisons possible and increases potential market size. Thus their initiatives help structure and consolidate the operating methods of urban operators-in-training, allowing comparisons amongst themselves.

EMERGING COUNTRIES MAY SET FUTURE STANDARDS

In our view, emerging economies differ from developing ones in three ways (Ruet 2009). First, they exceed certain human, institutional and technical resource thresholds. Second, they have a diversity of actors who have acquired and can distribute

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**BOX 1 DECENTRALIZED WATER MANAGEMENT SYSTEMS IN DWARKA, INDIA**

Dwarka is a residential area under development outside New Delhi, India, expected to accommodate more than a million middle- and upper-middle-class residents. Two agents of urban entrepreneurship have buildings constructed there: the Delhi Development Authority (DDA) and the Cooperative Group-Housing Societies (CGHS). In both cases, a co-operative company comprising ninety to 200 members allocates land to build co-op residences. Even though Dwarka is an official urban development project for well-off people, its public service infrastructure is deficient and does not provide sufficient water. Few solutions have been found for the DDA buildings that have individual water network connections. Although the Resident Welfare Associations may lobby for assistance, they lack the clout and developed base of the wealthier co-operative societies created a dozen years before building even began. Consequently, the CGHS uses a collective water network connection, and collective strategies have emerged responding to the municipality’s insufficient supply: simultaneous use of network water and underground water, as well as rainwater recovery; using collective storage capacity to variably manage flows according to use (potable or non-potable) through a double piping system; installing small water treatment units for the residential complex’s grey water; and using wastewater to recharge groundwater, after treatment.

Source: Authors (See Maria 2006: 216-250)
technical and institutional know-how. Third, they possess a national reach large enough to permit economies of scale, allowing them to replicate their best business and technical models. The first and third characteristics are classic dynamics in development. The combination of institutional resilience with a diversity of urban operators creates a “development laboratory” effect, which is the true indicator of emergence. The characteristic low production costs of emerging economies also hold true for concepts and innovation: emerging countries are their own economic laboratories for adaptations to even the most specific markets. The agglomeration economies found in metropolitan areas provide another crucial dimension, stimulating actors’ innovation potential with ideas, tools, networks, working environments and so forth. Agglomeration economies function with density: the simultaneous presence of diverse and complementary actors in the same territory has a catalysing effect on information sharing, system interconnections and expertise. Normally unconnected operators, designers, artisans and other professionals can develop their ability to work together and optimize their aptitude for inventing new, ready-to-use solutions. Above all, these conditions encourage the articulation of new technical solutions with organizational arrangements, making it possible to answer real needs and desires. Once innovations have been sufficiently aggregated, tested, and have proven useful and realistic, anyone can appropriate them.

In the examples presented in Box 1, the adoption of new technology by stakeholders at various institutional levels allowed residents to address insufficient public water supply. In Dwarka, the availability of new technological solutions allowed the CGHS to include technical systems that could compensate for the problem in the building-design phase. Many inexpensive technologies, such as reverse osmosis to reduce water salinity, have grown popular in India. Technical systems come from private initiatives. Various residents’ associations turn to different types of urban entrepreneurs, for relatively large technical and/or management modifications, as well as for pure sub-contracting. The technical and economic profitability of such solutions, as well as their relative dependence on a centralized system, results in a wide range of water costs. The water sector’s consolidation is underway, but remains incomplete.

Eventually, the technical, social and economic systems springing up in emerging countries could replicate and spread according to their relative efficiency. Three criteria determine the social and technical efficiency of a system: (1) technical, i.e. does the system satisfy a need, and at what cost?; (2) professionals’ perceptions, i.e. does the system seem possible?; (3) the pilot project’s degree of aggregation, i.e. did it sufficiently test the concept with a wide enough audience (professionals, consumers and administrators) to guarantee interest in its adoption? The Dwarka case suggests that many small technical businesses may grow very quickly once pilot projects have multiplied: prospective buyers will be able to compare offers and developers to systematize implementations, creating “off-the-shelf” technology.
Services and assembly companies will become marketers and services solutions designers, eventually creating a brand-new sector of activity. A normative dimension arises when this type of innovative social and technical system spreads within an emerging country, or in other countries. When the well-off can afford new, decentralized technologies, new standards emerge. Size matters: such social groups – representing hundreds of millions of Indians – remain a minority and more of an elite than a middle class. However, collectively they have considerable purchasing power, enough to allow new systems to spread and make possible a rapid “industrialization” of today’s embryonic models. Replication becomes even more systematic when based on an automatic and substantial cost reduction.

Without treating a fluid typology as a settled matter, we can discern several promising patterns in what might be called new systems “experiments:” services founded on communities and financed by multilateral development agencies are essentially well-controlled, whether implemented by sector-driven associations or municipalities; the development of collective resource capture (water, electricity) leads to public-private arrangements as long as there are participating governance structures (for instance, Bhagidari program for residents’ associations in Delhi); the most advanced experiments also promote progress in urban governance of infrastructure. The challenge is for an accumulation of micro-projects to become truly macro-economic and systematic. We must first look for the most effective sustainable and environmental urban investments where opportunities are strongest, and where new infrastructures will serve the most people: over the long term, these infrastructures will determine demand and thus humanity’s ecological footprint. In coming decades, most growth and physical capital accumulation will occur in emerging countries.

Such systems possess strong potential to become standards in well-to-do neighbourhoods with working residents, but replicating them in less opulent districts appears more problematic. Consequently, the question arises: how can infrastructure in emerging countries (themselves a product and a limit of development: Maria 2006; Ruet 2008; Ruet and Zérah 2004) continue its contribution to emergence, as defined above? Does the proliferation of decentralized services technologies lead to spatial fragmentation, on the scale of the entire agglomeration? One answer may lie in co-ordination concerns, between club goods developed privately and the necessary recognition of common resources, such as groundwater, municipal-scale solid waste flows, and so forth.

**A WINDOW OF OPPORTUNITY FOR CO-OPERATION?**

The evolution of supply modes for essential urban services raises thorny questions. The notion of club goods may prove useful heuristically and prescriptively; the notion calls for careful framing, but denying its real-world impact would be counterproductive. It is a classic idea drawn from economic theory, the same as public good, private good or common good, the characteristics of which are summarized in Figure 1.

The economic character of a good largely depends on its production mode and on
broader social and institutional choices. For the past two centuries and until recently, bridges and roads were canonical examples of public goods: this is no longer the case, as production means and socio-political agreements have changed. While club goods appear more rarely, especially in urban services, their analytical and operational relevance may see a revival. An increasing number of services are managed as club goods, due to new, flexible, modular technologies with lower critical-mass thresholds; certain social classes may deploy them, excluding other potential users. In most cities across the world, interventions to distribute public goods are no longer effective; they tend to create shortages rather than equality. A public good is defined as a good or service whose consumers are “non-rivalrous”, e.g. in how a well-run network benefits from extension because of reduced shared costs. A public good is also “non-excludable:” there is no way to exclude anybody from consuming them. In practice, public services in developing countries turn this theory on its head. Official, centralized services in developing countries tolerate, or even de facto promote, recourse to club-good arrangements. As Erik Swyngedouw (2004: 126) explains, “the highly unequal access to water provides a strong argument to those commanding water production and supply to perpetuate and strengthen a system that is fraught with actually producing the very exclusionary practices it set itself to solve in the first place.” In other words, the insistence on only one technical solution authorizes, de facto, the proliferation of unregulated, alternative solutions where price does not guarantee quality. In emerging economies, “semi-decentralized” systems’ financing and implementing capacity transforms this potential proliferation of club services into a reality.

The race between public sector reform and private developments in urban residential areas favours the latter. In a public system founded on geographical infrastructure sharing, even rich people – long term “captives” of their poorer neighbours – have an interest in extending the network to everyone, because that will lower all unit costs, including their own. On the other hand, for new technical and organizational systems, cost reductions entail series effects external to a given geographic area. The model’s development starts by serving rich people in other cities, rather than other districts in the same city. The objective interest in mutualizing services at the city scale appears lost. The authorities’ persistence (and patent failure) in striving for a public good bolsters these exclusionary management arrangements.

**FIGURE 1** WHAT IS A CLUB GOOD?

<table>
<thead>
<tr>
<th>Type of Good or service</th>
<th>Excludable</th>
<th>Non-excludable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rivalrous</td>
<td>Private Good</td>
<td>Common Good (or Impure Public Good)</td>
</tr>
<tr>
<td></td>
<td><em>Examples: car, house</em></td>
<td><em>Examples: groundwater, oil fields, hunting game</em></td>
</tr>
<tr>
<td>Non-rivalrous</td>
<td>Club Good</td>
<td>Public Good</td>
</tr>
<tr>
<td></td>
<td><em>Example: toll-road, cable TV</em></td>
<td><em>Example: air, national defence</em></td>
</tr>
</tbody>
</table>
Geographically, the emerging city tends to devolve into gated communities: in technical and economic terms, they are “clubs.”

The technical disaggregation potential of these arrangements could strike at social cohesiveness. Entire sections of society already have no access to these services. Furthermore, the proliferation of club arrangements may cut off local governments from part of the revenues they use to subsidize service for all. If the higher-income classes gain autonomy through such systems, they may stop paying for the municipal service. There is a real risk that the rich in emerging societies will opt for a sort of “urban secession,” limiting the municipality’s ability to subsidize services for the poor. That said, are “clubs” intrinsically harmful? Since they help improve services to parts of the city where the government is financially and operationally absent, could they support a complementary relationship between private and public systems? Can local governments capitalize on this situation for social purposes, building on these structures to strengthen social ties? Even if the development of club services has arrived via the back door, so to speak, it is foolish to fight or ignore it. One cannot build dams against the Pacific Ocean. We should see the risks and sketch out regulatory solutions: if club goods create real economic value, this can supplement resources for other users, either directly (by taking less from centralized networks) or indirectly (through taxes and fees, or by refining systems scaled to “industrial” sales).

A closer reading of these systems, and their social cost savings, may provide answers. These community-based systems are not self-sufficient: they need efficient circulation loops into resources, ensuring the quality and quantity of their supply. For instance, a decentralized water distribution system can establish a club good logic and exclude serving citizens living outside the district. But for the system to endure, its groundwater must not be polluted upstream. And yet groundwater is not a club good but a limited renewable resource, a common good. Its management for the good of the group requires collective regulation. Thus water could become an effective public good because it brings forth social inclusion. At the scale of a city, reconstructing public goods in this way is critical for local governments, but for club systems as well. The new challenge for governments and for public development aid is to better draw the limits between club goods and public good – possibly re-allocating the property rights to common goods – and helping both centralized and decentralized operators create taxes or fees, but with differentiated tools.

INNOVATIONS FOR SOCIAL AND SPATIAL COHESIVENESS
The many questions these developments raise also serve as pretexts for action. If we put to one side the aim of filling gaps - accepting that powerful social inequalities and low incomes will endure for most people in emerging countries – new room for action opens up. Emerging societies face two particular challenges: first, they must promote technical decentralization through the effective technical and economic integration of urban services. Viewed through this prism, governments in emerging countries will likely finance fewer facilities programmes and see their role in co-ordinating
governance increase. The other challenge lies in modernizing public authority and regulations, to make the general interest prevail and not leave behind entire sections of urban society.

In other words, it might not be necessary to intervene in club goods management on the pretext that they promote inequality; is there no worth in their functioning, their very existence? Is not the pure centralized system also inegalitarian? Current “reforms” only replace obvious club goods with insidious ones. What matters most is avoiding the proliferation of “dead zones.” In the long term, the public sector must ensure consideration for poor people, while proving its ability to integrate these new islands of technical organization. This calls for restructuring collective action, opening club goods systems to resolve the weaknesses of conventional public management, and reconstructing effective public goods in the process. Nations and cities have seen developments along these lines, but the dominant public and private actors slow down the process. Public development aid could play a complementary role, by monitoring and incentivizing the process.

With their diverse agents and the spread of expertise, emerging countries could invent a regulated combination of centralized and decentralized systems, moving toward a “semi-decentralized” model. This would require renewing the debate on service standards and financing modes, thus raising strong challenges for social cohesion; how, for example, can solidarity be organized in fragmented cities? Public development aid could help renew the models, because appropriation is not synonymous with collective authority. In sum, it begins with individual or collective entrepreneurs who appropriate technical and economic systems – a central step for systems to evolve past pilot projects. The logic here is strictly that of private goods. At this point, the service is not yet standardized: informed consumers and interested social groups must test it. These users will move the system towards the field of either club or common goods. Finally, appropriation by the government becomes necessary, introducing regulatory policy and reconstructing a public good at (probably) a different scale. Regulations are not simple and thinking about them has only just begun. However, new assumptions and progress towards a new system – looking beyond the former system’s failures – should identify and guide the financial and human engines of change.

CONCLUSION: LABORATORIES OF CONTEMPORARY URBAN LIFE
Emerging cities restructure themselves as decentralized – or semi-decentralized – technologies become available. They could surpass the urban systems of Western capitals developed in the nineteenth century. The growth to come, and with it the power of standards, rests with developing nations. In emerging countries, basic services systems will inevitably change. So will their effect on social cohesion and spatial fragmentation, along with the need for collective action. The concept of
public development aid must be rethought with a more collaborative, more symmetrical meaning. The increasing challenge is to *co-produce* truly sustainable development.

Developing countries have a window of opportunity to emerge and set new standards. Rather than importing models, they can use “home-grown” innovations to give value to and catalyze their development. However, these emerging solutions often prove incomplete: focused on the most well-off club targets, they risk abandoning a large share of urban citizens. This is where public aid can play a role. Acknowledging the “club good” nature of real urban services in emerging economies would remove the implicit hypocrisy: these new services are not the only ones that are intrinsically exclusionary. It would also recognize that these new techniques and entrepreneurs – many of whom structure and “industrialize” their offers – offer many ways to capture financing needed for basic urban services. Controlling such systems calls for regulations geared to diminishing the rivalry of goods. Recognizing the club good nature of real services could rework the balance between rich and poor at the municipal level, and promote solidarity on the regional or national level, by drawing on the value received from ambitious regulation. These issues carry even greater weight in light of sustainability criteria: when the time comes for rich countries to renew all their networks, they too may turn to these types of system – centralized or decentralized.
WHENEmergingCitiesCreateTheirOwnStandards

WORKSCITED


Cities are on the front lines of environmental protection, economic development and social services. National decentralization policies recognize the essential role local governments play in these matters. However, vital human and material means are sometimes lacking, so an international network of cities, mayors and local governments has been created to address these needs. The United Cities and Local Governments organization (CGLU) helps cities build capacities and expertise, and participate in designing urban policies at national and international levels. What follows is an interview with Elisabeth Gateau of CGLU, and the editors of “A planet for life.”

CITY NETWORKS: EXPRESSING THEIR NEEDS, BUILDING EXPERTISE

Seventeen years after the Earth Summit in Rio de Janeiro, what is the definition of a “sustainable urban development policy?” Following the Rio Framework Convention on Climate Change and the 1994 Aalborg Charter of European Cities and Towns Towards Sustainability, we [United Cities and Local Governments] expressed the following goals at the 2002 World Summit on Sustainable Development in Johannesburg:

To develop a new, deeper culture of sustainability in our cities and our municipalities that encompasses: a commitment to socially and environmentally sound purchasing policies and ways of consuming goods and services; sustainable planning; investments in resource management; promotion of public health and new sources of clean energy.

To simplify, I would say this means having a broad policy that is both organized and planned, and that affects all levers of action: economic development, social constructs and cohesion, and culture, as well as a will to take care of the environment. It is a policy that is founded first and foremost on solidarity: solidarity between different neighbourhoods, different territories, between “the North” [the most developed countries] and “the South” [developing and emerging countries].

What is at stake for cities in developed countries? What is at stake for emerging cities and cities in the least developed countries?

If we do not all do something, it will be as if no one has done anything. We are currently experiencing, and will continue to experience, immense and unprecedented urban growth. Today more than half of the world’s people live in cities, and
by 2030 – that is to say, tomorrow – the urban population will include two billion more. That will require cities and regions, as well as nations and the international community, to adopt policies for sustainable urbanisation. Without such policies, how many slums will there be tomorrow? How many uneducated children? How many neighbourhoods without water or sanitation? How many people living in exclusion and violence? Without such policies, it is obvious that it will be impossible to achieve our collective Millennium Development Goals, as defined by the United Nations.

**What sustainability objectives can cities set for the future?**

Cities have already set very ambitious objectives with regard to sustainability. Take the City of Paris for example: its Municipal Council adopted a Climate Plan in 2007 whose objective is to reduce greenhouse gas emissions by 25% between now and 2020, and to increase the share of renewable energy it consumes by 25% over the same period. Naturally, cities from the most developed countries (and doubtless, those in emerging market countries) are often better equipped institutionally and financially than developing countries to take effective long-term action in domains as varied as planning, education, water, waste management, energy production, transportation and mobility, and so forth.

**What leads cities to implement sustainable urban development policies?**

We are no longer at the stage of thinking about the pertinence of such policies: the stakes are known and the facts are agreed upon. The city of tomorrow will be neither prosperous nor stable unless it constructs an urban environment that is sustainable and socially cohesive.

**Changes made in OECD cities over the last two decades seem rather modest. Isn’t there a gap between talk and reality?**

On the contrary, it seems to me that a number of cities have put sustainable urban development plans in place. Since the Rio Summit, thousands of cities worldwide have adopted Agenda 21, i.e. local action plans for sustainable development. I can cite several concrete examples just from OECD cities. In addition to Paris, which I mentioned earlier, there is Istanbul in Turkey, which has implemented a high-performance mass transit system: the “Metrobus” reduced travel times by 75% and thereby inspired several hundred thousand people to use it daily. Since 2004, Stuttgart in Germany has developed the concept of a green and compact city, and in 2006 implemented a powerful and ambitious “Integrated Transportation Management Centre.” Tübingen, also in Germany, is one of the first cities to halt its spatial expansion. It has also added sustainability criteria in all its contracts with private sector companies. The Spanish cities of Bilbao and Barcelona have renovated their
old city centres in order to attract new residents. To protect its water quality, since 1997 New York City in the United States has purchased undeveloped lands around its water sources, instead of investing in expensive filters. The Swedish city of Växjö decided in 1996 to become a fossil fuel-free city: ten years later, more than half of its energy demand is supplied by renewable energy.

Outside of OECD countries, there are many other examples. The city of Canton in China has a goal of becoming a “garden-city” by 2015. It has a multi-faceted action plan that ranges from managing water and waste to developing eco-industries. Since 2001, Johannesburg in South Africa has made significant investments in water and the renovation of its water distribution infrastructure. In March 2009, Johannesburg launched a communications campaign featuring “water warriors,” who raise awareness about the importance of conserving water. Rosario, Argentina, has developed large-scale urban agriculture by using land along its roads and rivers. Nelson Mandela Bay in South Africa, and the city of Goteborg, Sweden, started working together in 2000 on a decentralized waste recycling aid project. In the urban residential district of Villa el Salvador on the outskirts of Lima, Peru, wastewater is recycled to clean public spaces. I could continue this litany of examples indefinitely.

What are citizens expected or allowed to do? Do politicians ensure that their citizens participate in determining the direction of urban development?
The policies adopted at the local level by local governments often reflect their nearness to the people affected: they show an understanding of people’s real needs. Often, policies are created through citizen consultation and participation. Of course, it is hard to generalize because there are many different legal frameworks in effect. However, the debates I have attended within United Cities and Local Governments have shown great sensitivity on the part of our members (mayors and other local politicians) to citizen participation and the realities of implementing participatory processes.

Twenty years after the widespread use of decentralization policies, do cities really have the means they need to take action?
The Global Report on Local Democracy and Decentralization, or the GOLD report published by UCLG, is the first worldwide report on decentralisation and local autonomy. It shows that, overall, decentralization has made significant progress throughout the world in the last few decades. However, it also highlights how much remains yet to do, particularly in developing countries where resources are inadequate. With regard to the means for both political and financial action in particular, it is no longer possible to think simply in terms of rich or poor cities, even if these are obviously pertinent criteria. There are cities in both the most developed

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1. For more information on the GOLD report, see www.cities-localgovernments.org/gold/gold_report.asp
countries and the least developed and emerging ones that lack such capacity, both legal and institutional.

Certain troubling trends have arisen in our present period: in some cases, long-established local governments in developed countries are seeing their responsibilities increase while their means do not, as occurs in France, for example. In developing countries, one can cite newer cities, or those that have undergone profound reforms over the last twenty years, where the balance between finances and competencies remains precarious or sometimes blocked: several such instances have arisen in South America. Furthermore, there are countries where local governments are still under construction: they often have ill-defined responsibilities and their means are insufficient or even totally lacking, as is the case in many African countries. Finally, there are cases, as in many countries in the Middle East, or in other fragile nations mired in armed conflicts, where local democracies still need to be created. These trends do not lead to sustainable development.

Power in the urban arena seems to be moving toward private companies, such as businesses, real estate developers, banks and others. Isn’t there a contradiction between capacity-building in cities and the decline of the local governments’ power over the local economy?

This is, without doubt, a pertinent debate, especially when heads of state create private sector agreements without prior consultation with local governments, or where local governments do not have sufficient capacity to supervise the quality and sustainability of investments. Nevertheless, I believe in the progressive spread of a model currently winning over more of our members: public-private partnerships (PPPs). Without taking sides, I believe PPPs are a pragmatic approach for effective public action, as long as the public interest can be preserved – and local democratic governments can and must serve as guarantors in this area.

What difficulties are cities going to have to face? What do cities not yet committed to sustainable development policies most need?

I believe that local politicians have woken up and that their commitment to sustainable development grows stronger daily, even though much remains to do. I also believe that awareness is growing among city dwellers. National governments and international institutions have left no room for doubt about their convictions, even if they sometimes hesitate to set firm objectives and targets for fear of curbing development. Solidarity between cities cannot take care of everything: there must be more vigorous action at both the national and international level.

Does implementing sustainable development mean a return to planning?

Yes, I believe it does. This is what the UCLG’s Committee on Urban Planning is working to achieve, through its actions and its forthcoming definition of a policy position.
What kind of coordination needs to occur between governments, private parties, civil society, and so forth, for a sustainable development policy?
If local governments show leadership when it comes to taking action on a local scale, and if truly inclusive schemes are in place—in particular regarding low-income people, women and marginal groups—we can imagine a multitude of configurations: partnerships, consultations, referendums, etc. Doubtless, the chief need is to remain pragmatic and to ground actions in a number of shared values, especially transparency.

Cities are trying to make their presence felt at the international level, in worldwide urban forums and climate change negotiations. What is their goal? What role can they play next to that of nation-states?
Local and regional governments see themselves being left out of major international agreements on essential subjects, such as finance, climate change, the wars on poverty and pandemics—agreements that affect the daily lives and future of their citizens, and which define policies that the cities themselves will have to implement. Local governments' first goal is to make their voices heard. Their second is to make sure the essential values of their daily work—for peaceful social solidarity and cultural diversity—are integrated at the international level.

What is the role of city-networks?
Their role is to make the voice of local governments more coherent and stronger. When they are extensive and representative enough, such networks can, at a minimum, take their place at the policy definition table. This is the case for UCLG with regard to UN-Habitat, OECD's development aid effectiveness, and the UN's Development Cooperation Forum. When city-networks unite their forces, they can obtain small victories and take small steps forward. This is how UCLG and its partner networks were able to insert more than one hundred mentions of local governance into the text now under negotiation for the December 2009 Copenhagen Climate Change conference. This presence does not guarantee anything, but it does demonstrate that we are being heard more and more. ■
FOCUS
In 2050, the world’s population should peak at around 9 billion people, which is 2.4 billion more than in 2009. Most of this growth will take place in the developing countries, whose population should rise from 5.6 to 7.9 billion inhabitants. Within that group, the least developed countries will maintain the highest rate of growth, at 2.3% a year.

In spite of the expected overall decrease in fertility rates, United Nations projections show a further doubling of the population in 31 countries between now and 2050, reaching 1.7 billion. Afghanistan, Burkina Faso, Somalia, Timor and Uganda should experience a growth in their population of more than 150% between now and 2050. Just nine countries are likely to account for half of the world’s population growth during this period: India, Pakistan, Nigeria, Ethiopia, the USA, the Democratic Republic of the Congo, Tanzania, China and Bangladesh.

On the other hand, 45 countries should record a net reduction of their population between now and 2050. Thus Belarus, Bosnia-Herzegovina, Bulgaria, Croatia, Cuba, Georgia, Germany, Hungary, Japan, Latvia, Moldova, Poland, the Republic of Korea, Romania, the Russian Federation and Ukraine should see a decrease in their population of at least 10%, above all as a result of declining birth rates. The majority of this group are industrialized countries. In fact, a quasi-stagnation of population in the more developed regions is expected between now and 2050, rising from 1.23 to 1.28 billion. This slight growth will only be possible with the arrival of 2.4 million migrants each year until 2050. Without this influx, the population of the developed countries will decrease to around 1.15 billion inhabitants. According to the United Nations.
Population Division, Europe alone should receive 150 million migrants between now and 2050, or risk seeing its population decline irreversibly.

**THE CONTRIBUTION OF MIGRATION**
Already in nine industrialized countries—Belgium, Macao, Luxembourg, Malta, Qatar, Singapore, Slovakia, Slovenia and Spain—, net in-migration is double the figure for natural population growth (births minus deaths). In eleven countries, it counterbalances the excess of deaths compared to births: Austria, the Channel Islands, Croatia, the Czech Republic, Germany, Greece, Hungary, Italy, Japan, Portugal and the Russian Federation. According to the projections of the United Nations, the flows between the zones of high and low birth rates should continue during the 2010-2050 period.

Over recent years, the drivers and modalities of migration have diversified considerably. Thus migration for work, which is regulated by bilateral agreements, has been followed by family reunification, economic migration, seasonal and circular migration. Migrants do not move from point A to point B for just one reason; the itineraries are complex, propelled by multiple and interdependent motives. Any migration policy must thus take this complexity on board and find relevant responses.
According to United Nations projections, the world’s population should cross a new demographic milestone between now and 2050, as a result of the increasing share and size of the populations in the developing countries. This trend will inevitably exert more pressure on the most fragile populations and raise new questions about food supply, access to health care and other services. Nevertheless, this is not the foremost qualitative change projected by various studies published since 2005: a truly new factor for the 2050 horizon is that the overall world population will never have been so old. The proportion of people in the world aged 60 or more will have tripled, rising from 10% in 2000 to 32% in 2100.

The countries the furthest along this transition path are Japan and Italy, with 20% of their population aged over 60 since 2005. Given its low birth rate, Japan should have almost 8.5 million fewer working age people in 2015 than in 2002. Even now, the proportion of Japanese under 15 is not more than 13.6%, which is slightly less than in Italy (14%) and Germany (14.3%). While the majority of more developed countries—North America, Europe, China, the ex-Soviet Union—have not yet reached this stage, they should arrive at a similar demographic structure between 2020 and 2030.

What is even more unprecedented is that the populations of developing countries are also entering an ageing phase. Between now and 2050, the rise in the number of people aged 15 or above in developing countries is likely to equal total population growth, with 1.2 billion persons aged 15-59 and 1.1 billion aged more than 60. According to the United Nations’ projections, South Asia will reach rates close on those of more developed countries towards 2030; the Middle East towards 2040 and sub-Saharan Africa by the middle of the 21st century. The first expected consequence of this far-reaching evolution is a global shortage of labour.

**MANPOWER IN THE DEVELOPING COUNTRIES**

In 2050, the world’s working-age population (15-64 years) will probably be 5.9 billion people, compared to 4.2 billion today. Asia should continue to be the world’s main reservoir of labour, supplying nearly 50% of the world’s workers from 2005 (61.7%) to 2050 (57.8%). The region’s share is due to shrink slightly because of evolutions in China, whose working-age population will fall as from 2020, descending from 22.2% of the world’s working population in 2005 to only 14.6% in 2050. On the other hand, India’s share should increase,
rising from 16.8% to 19% over the same period.

Europe's share of the working population should decrease steadily over this period, dropping from 11.9% in 2005, 8.2% in 2030, to reach only 6.5% in 2050. In North America, the reduction should be less substantial, doubtless because of the major migration flows that are expected: from 5.3% today to a constant share of 4.7% from 2030 on. The Latin American share of the world’s labour force should change only marginally: from 8.5% in 2005, to 8.7% in 2070, before dropping back to 8.3% in 2050. The only working population that should increase is that of the African continent. According to UN forecasts, it should grow from 12.1% in 2005 to 17% in 2030, to reach 22.1% in 2050.

This oncoming demographic upheaval is bound to pose a challenge to the political and economic relationships between different regions of the globe. The impact of population ageing in the more developed countries and anticipated lack of labour means that migration policies will play a decisive role in helping these countries to maintain their economic activity and meet the needs of their populations. This demographic trend will also have consequences for a whole series of national policies: in addition to retirement policies, climate and agricultural policies, for example, will also need adjusting to this new demographic reality. An ageing population is also one that uses transport services less, that heats its accommodation more, and eats less meat…

Ageing in the less developed countries added to ageing in the more developed countries means that the world must anticipate a qualitative change of global needs, in terms of food, health, housing and mobility.
Although the fact is subject to debate, it would seem that the majority of the world’s population has, since 2007, been living in cities rather than the countryside (see Focus 4) and urban zones worldwide are expanding rapidly. This trend can be explained by both a high rate of population growth and an exodus from rural areas that has been accelerating in recent years.

The main part of this urban growth is taking place in the developing countries. Only two of the fifty cities with the highest population density are located in the industrialized countries. Today Tokyo remains the largest city in the world, with more than 33 million inhabitants, but 36 of the 50 most populated cities are to be found in developing or emerging countries, particularly in South-East Asia. Mexico City, with a little more than 17 million inhabitants, is the most populated city in the developing world.

This trend will intensify in the future: among the 100 cities with the highest growth rates, only five are located in industrialized countries: Austin, Atlanta, Las Vegas (United States), Suwon (South Korea) and Bursa (Turkey). The cities that will experience the highest levels of growth are Beihai (China), Ghaziabad (India), Sana’a (Yemen), Surat (India) and Kabul (Afghanistan). Major African cities are also expected to undergo unprecedented expansion: the growth rates of Bamako (Mali), Lagos (Nigeria), Dar es Salaam (Tanzania), Lubumbashi (Democratic Republic of the Congo) and Kampala (Uganda) will surpass 4% per year (see Focus 5).
HIGH STAKES
Major governance challenges stem from this high level of growth. First of all, in terms of housing: the new populations arriving in the cities of the emerging and developing countries are often reduced to living in shantytowns on the city outskirts. The growing demographic pressure on resources will also raise problems of food security (see Focus 10) and access to drinking water. Cities’ water and food resources are increasingly limited, yet must be shared among a growing number of inhabitants.

The urban challenge is also linked to climate issues, as most greenhouse gases are emitted in cities that already come under particular threat when located in coastal zones (see Focus 14).

A DEMOCRATIC CHALLENGE
Despite signs of international recognition and the increasing influence of urban networks (see Focuses 11 and 12), local authorities remain largely absent from international governance mechanisms, particularly those relating to climate issues. They will, however, have a major role to play in the fight against global warming, not only in helping to reduce it but also by implementing the measures required to adapt to new conditions. On the initiative of the Mayor of Seattle, Greg Nickels, nearly 1,000 American urban agglomerations have undertaken to reduce their greenhouse gas emissions to below their 1990 levels. Today, cities are claiming a seat at the table of the climate negotiations.

In a broader sense, the governance of cities and their representation at the international level is also a democratic challenge: the biggest cities have larger populations than many States, and the scope of responsibility of certain mayors is often very broad. As a result, cities, and especially those located in developing countries, constitute one of the major challenges for world governance, even though they do not at present have an adequate level of representation.

In 2025, the largest cities will be in the emerging and developing countries. Only Tokyo and New York will keep abreast with them. The emergence of large cities in Africa indicates how important it is to provide these regions, as of now, with governance tools that can match up to future challenges.
In 2009, no political or economic initiative, no conference, research programme or media report dealing with the urbanization of the planet seemed able to avoid a brief substantiating sentence that captures the imagination: “Today, the majority of people in the world live in cities”. Some claim that this has been the case “since 2007”. Others are more prudent and recognize that we are in fact uncertain as to the exact date and figure of 50%. Yet there seems to be a broad consensus on the matter as a postscript is invariably added pointing out that the proportion of the planet’s urban population will inevitably increase—which is also no more than a hypothesis.

The oft-cited rate of world urbanization is singularly lacking in substance. In fact, no expert is in a position to solve the issue of the heterogeneity of data produced by national statistics institutes. Each country uses its own definition of what is urban, and many countries even propose several conflicting definitions and thus several different figures.

**The definition makes the city**

The example of Paris illustrates this problem perfectly. According to the French National Institute of Statistics, INSEE, and the results of the 1999 population census, Paris counts either 2.1 million, 9.7 million or 11.2 million inhabitants depending on whether one chooses to consider the city’s administrative unit per se (105 km²), the urban unit covering the built-up agglomeration around the inner city (2,723 km²), or the urban zone that includes the area in which people commute on a daily basis (14,518 km²). Depending on the definition, the results obtained are very different. All the resulting indicators and discourses that rely on these figures are thus affected: population density, number of jobs, land and property prices… For nearly half a century, the population of the city proper has been decreasing, while that of the urban agglomeration has been constantly on the rise. The boundaries of the city of Paris have not changed since 1860, whereas those of the agglomeration and of the urban zone have continued to expand.

In three-quarters of the countries, the notion of agglomeration (urban unit) does not exist officially. And even when this definition is identical in two countries, the minimum population threshold defining the “urban” category varies considerably: 10,000 inhabitants in Greece, 2,000 in France, 200 inhabitants in Sweden… Nor is the criterion of the administrative city unit viable for making international comparisons. Applied to Paris, it only describes one fifth of the Parisian agglomeration, whereas Chongqing becomes the largest city in the world, with more than 30 million inhabitants in an area of 82,000 km²—which in size is the equivalent of Austria. The central agglomeration of Chongqing brings together fewer than 4 million inhab-

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### Counting Cities

**Rate of urbanization and number of official “cities” compared to the harmonized urbanization rate as defined by e-Geopolis (of over 10,000 inhabitants)**

<table>
<thead>
<tr>
<th>Country</th>
<th>Official urbanization rate (%)</th>
<th>Official number of “cities”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denmark</td>
<td></td>
<td></td>
</tr>
<tr>
<td>France</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Egypt</td>
<td></td>
<td></td>
</tr>
<tr>
<td>India</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


Years of data: 2003 (Denmark), 2001 (India), 1999 (France) and 1996 (Egypt)
The 1991 population census reported Abonnema, in the Niger delta (Nigeria), as having 41,972 inhabitants. In reality, its built-up area covers only 1.5 km² and accommodates barely 12,000 inhabitants. The rest of its population lives in the surrounding mangrove forests.

How can one talk about “cities” or “urbanization” in Africa? Official statistics provided by individual countries are so heterogeneous that it is hardly meaningful to aggregate them at continental level (see Focus 4). In light of this, the global research programme e-Geopolis is now seeking to exploit the available statistical data on all of the planet’s urban agglomerations that have reached a population of 10,000 inhabitants since the first censuses taken in the early 19th century. The first results published on West Africa point up the limits of official classifications. They reveal urban agglomerations that had previously gone unrecognized, Touba, for example, with 500,000 inhabitants in an area of 103 km², is the second largest city in Senegal after Dakar and the religious capital of the Mourides, yet it is still classified by the Senegalese State as a collection of villages. In Nigeria, on the other hand, dozens of localities deemed to be cities turn out to be no more than rural districts lacking any real built-up urban core. But apart from individual cases, quantifying populations, agglomeration by agglomeration, on the basis of harmonized definitions and the detailed
mapping systems now available for each agglomeration, raises new issues that are undetectable using national urban statistics.

AN AFRICA OF SMALL CITIES AND TOWNS

Although the growth of large urban agglomerations in Africa is currently sustained, it has started to drop off very sharply. Thus, the annual rate of population growth in Abidjan (Côte d’Ivoire) has fallen from 8% in the 1960s to 3.7% today; that in Cotonou (Benin) from 8.1% to 4.4%, etc. However, while the problem of the urban explosion in Africa is now being brought under control, another no less formidable problem is emerging: the dispersion and proliferation of new small and medium-sized urban agglomerations. For example, the number of agglomerations in West Africa with 10,000 to 20,000 inhabitants doubled between 1980 and 2000. Often excluded from the “city” category in official statistics, they are also absent from international data bases, which focus solely on the largest cities.

The causes of this proliferation are both demographic and geographical. Birth rates, which are falling less quickly in Africa than in the rest of the world, still remain very high in rural areas. As the population is young and the birth rate high, the slowdown of the rural exodus is producing a retention effect, which in some cases is compounded by return migration. In the most densely populated regions and/or in those with concentrated settlements, an annual population growth of 2.5% to 3% thus means that small towns are rapidly transformed into real “urban” agglomerations. In other words, no rural exodus results in an urbanization “in situ”. These new agglomerations are only rarely recognized as “urban” by the authorities. Most of them have neither the official status of a “city” or “town”, nor the adequate facilities and services, nor the appropriate forms of governance and functioning.

The dispersion and proliferation of these urban agglomerations increase traffic density, prolong the time spent in transport and extend the space occupied by roads. They raise development problems that are radically different from those of large urban agglomerations. The key issue for these cities is the access to major amenities, such as hospitals, universities and airports. On the continental scale, they exacerbate the disparities between the over-equipped large cities and the urban agglomerations lacking essential services and whose inhabitants feel that their rights as urban residents are being denied.

This phenomenon is largely hidden by the current practice of representing agglomerations by “size groups”: when the thresholds of these groups are fixed (10,000, 20,000, etc.), larger-sized groups, which are open to an infinity of higher order, fill up automatically and reinforce the impression of urban “explosion”. The cartographic approach used by the e-Geopoli programme reminds us that, on the contrary, physical space is not infinite: the increasing number of agglomerations is accompanied by their increasingly dense scattering across the territory. In other words: this proliferation is bringing agglomerations closer to Africa’s populations, wherever these are located. Thus, in 1960 there was not a single urban agglomeration of more than 10,000 inhabitants in the whole of Mauritania, but by 2000 there were already 10. Yet, if urbanization is to draw truly closer to Africans, the public authorities will need to monitor the figures and make efforts to match them with the realities on the ground.

> GRASSROOTS URBANIZATION

**Size of Agglomerations in West Africa 1950-2010**

<table>
<thead>
<tr>
<th>Number of agglomerations by size</th>
<th>Size of agglomerations (number of inhabitants)</th>
<th>Total number of inhabitants residing in these agglomerations (in millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>in 1950</td>
<td>in 2010</td>
<td></td>
</tr>
<tr>
<td>1,193</td>
<td>1,096</td>
<td>701</td>
</tr>
<tr>
<td>313</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


*Most urban populations in West Africa today live in agglomerations of between 10,000 and 9 million inhabitants. The vast majority of these towns and cities did not exist in 1950. It is mostly small cities and towns with between 10,000 and 100,000 inhabitants that have sprung up, which evidences not only demographic growth in their regions but also the declining rural exodus towards large cities with more than 10 million inhabitants.*
One of the main greenhouse gases driving climate change is carbon dioxide (CO₂), which is produced when fossil fuels (oil, gas and coal) burn. An ambitious climate policy therefore necessarily requires that energy needs be reduced and the use of non-renewable resources be gradually phased out. But is this a realistic outlook? How can we foresee the economic consequences of this policy approach? How can we predict fossil-fuel consumption or price trends? How can we forecast GDP growth, technical progress or individual preferences on a 2050-2100 timescale, particularly for high-growth developing countries like China, India and Brazil? Finding answers to these questions is the purpose of models that develop different scenarios based on alternative consumption patterns, technologies and lifestyles.

A MODEL FOR CHANGE
A first possible so-called “baseline” scenario, with no climate policy, envisages a growing convergence in lifestyles between developed and developing countries. Economic growth will enable the latter to catch up on household consumption in terms of living space, the level of household equipment, the number of cars and mobility per inhabitant. Urban sprawl and a greater need for mobility will speed up the massive development of road transport, with the result that in 2050 the number of vehicles will have tripled compared to today. This scenario nonetheless increases dependence on economies that are based on fossil energies, making them more vulnerable in the event of conflict within production zones. It also precludes the introduction of more carbon-light technologies such as electric vehicles and thus heightens the risks of a technological impasse at a time when oil resources will be scarce. In addition, the unlimited explosion of household and company energy bills will have social consequences that governments will find tricky to manage. For example, in 2050, an Indian will spend 20% of his income on energy costs. Finally, there is a risk that the damage resulting from increasingly frequent extreme weather conditions will grow due to a doubling of the present level of CO₂ emissions between now and 2050.

AND WHAT EMISSIONS ARE LIMITED
A second scenario envisages the objective of stabilizing the world’s emissions so as to limit climate change to an increase in world average temperature of less than 2°C between now and 2100. In 2050, activities that emit carbon are taxed at around €100 per tonne of CO₂ emitted, thus producing a progressive disconnect between economic growth and energy.
consumption. The tax promotes the rapid uptake of “very low consumption” equipment and new technologies (renewable energies, carbon sequestration in industry, etc.). It produces energy efficiency gains, especially in transport and construction. However, the economies of developing countries, which are heavy consumers of energy, experience a difficult transition period during which they will have to take on board the constraints imposed on greenhouse gas emissions.

A MODEL FOR CHANGE
The third so-called “non-mimetic” scenario envisages, in addition to a carbon constraint, an alternative development style that addresses the causes of emissions upstream. This involves rethinking policies concerning mobility and the location of activities in order to limit energy costs according to local specificities. In order to respond to the urban sprawl now typical of a great number of cities in the North and South, policy-makers encourage gradual decentralization of the production and distribution of energy flows. The introduction of multimodal transport networks, powered by decentralized systems of energy production (batteries recharged at home, for example), also means that the high demand for mobility due to urban sprawl can be met. In the cities where economic activities are concentrated, mainly located in Asia, efforts are made to reduce the needs of people mobility and the use of private vehicles. The number of vehicles in India could thus be reduced by half compared to the baseline scenario. Finally, reducing the energy burden of households and enterprises limits the impact of the energy transition on the economy and makes it possible to reconcile development and climate policy.

Changing direction towards a decarbonized society, at moderate cost, is not only a question of achieving the reduced-emission objectives, but also of designing ambitious infrastructure policies (means of transport, housing…) that make it possible to reorganize economic activities spatially and to modify behaviour profoundly. The sooner this transition begins, the more progressive the renewal of infrastructures will be and the less burdensome the cost. However this supposes public initiatives able to give a clear direction to investment and to guarantee its profitability in the long term.

Cities account for 45% of all greenhouse gas emissions. Any strategy to mitigate carbon emissions and adapt urban areas to climate change will need to be implemented by urban planning and transport policies that modify the spatial organization of activities.
**ELECTRICITY: THE ENERGY OF DEVELOPMENT**

Energy, and electricity in particular, is a vital resource for economic and human development. The availability of electricity underpins the provision of basic services such as education (by supplying lighting in schools and homes), safe conservation of foodstuffs (through refrigeration), access to communication technologies or improved productivity in farming and economic activities. Nevertheless, the UNDP estimated that 1.6 billion people—most of whom live in the least developed countries—still had no access to a source of electricity in 2005. This is especially true for Africa: in some twenty countries, more than 75% of the inhabitants have no access to electricity, and this difficult situation is also found in Burma, Afghanistan, North Korea, Papua New Guinea and Cambodia.

In the developing countries, there are also great disparities between the situations in urban and rural areas. Even though access to electricity is not reliable in urban areas (unstable networks, tariff-setting problems, etc.), they are still the best-served zones. The differences are less acute in countries where the average rate of access to electricity is higher than 75%. In some African countries, less than 40% of urban residents have electricity: Liberia (7%), Central African Republic (14%) or Rwanda (25%). Nevertheless, in all countries, this limited urban access is higher than access in rural areas. In some countries, the disparities are especially large: in Afghanistan, only 13% of households in rural areas are connected to the electricity network compared to 74% of those living in cities. In Senegal, 24% of those living in the countryside have access to electricity against almost 85% of urban residents.

International co-operation has sought to remedy this state of affairs, in particular with the adoption of the eight Millennium Development Goals (MDGs) in 2000 by the United Nations. The MDGs are matched with a range of targets with precise deadlines in order to monitor the progress made in the fight against poverty, hunger, disease and exclusion, while at the same time promoting gender equality, health, education and respect for the environment. Although the goals do not include any explicit objective concerning the development of electricity, the international community recognizes the essential role that access to energy can play in achieving them. In particular, access to so-called “modern” fuels for cooking and heating (liquid or gas fuels as opposed to solid fuels, such as animal dung, charcoal or coal) is considered to be an improvement because of their higher energy content and reduced health risks (see Focus 5). However, the development of electricity is at present far below what is needed, especially in sub-Saharan Africa. Today, 1.6 billion people live without access to any source of electricity. This situation is frequent in sub-Saharan Africa in both urban and rural areas, and hinders economic activity and human development.
Africa and, unless new strategies to increase access to energy are adopted, the International Energy Agency (IEA) estimates that as far ahead as 2015 the situation will remain unchanged.

**THE CO-OPERATION CHALLENGE**

Developing modern energy services and, more specifically, electrical systems that are both sustainable, equitable and economically viable is however not an easy matter in the poorest countries. The investment required is enormous: 200 billion dollars, according to the IEA. The decentralized production of electricity (diesel motors, hydroelectric micro-stations, solar energy, biomass fuels...) in some cases may well be a wiser choice than extending existing networks, which is often very expensive. In the least developed countries, co-operation implies more than simply transferring technology. Giving the poorest sections of populations access to electricity also means strengthening institutional, financial and technical capacities. The key challenges are to place the development of access to energy at the core of national development strategies, mobilize investment and develop energy services locally.

Even if the situations are very unequal, urban areas are always better served by electricity than rural areas. The higher the level of a country’s development the smaller the gap, which shows that access to electricity is a sound indicator of a population’s general living conditions.

**RURAL DARKNESS**

**Electricity Access** (share of population in %)

Data refer to the most recent available year between 2000-2007

<table>
<thead>
<tr>
<th>Country</th>
<th>Rural areas</th>
<th>National average</th>
<th>Towns</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>98.5</td>
<td>99.4</td>
<td>100</td>
</tr>
<tr>
<td>Morocco</td>
<td>93</td>
<td>94</td>
<td>95</td>
</tr>
<tr>
<td>Brazil</td>
<td>86</td>
<td>97.5</td>
<td>99.6</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>71.3</td>
<td>96.7</td>
<td>100</td>
</tr>
<tr>
<td>Philippines</td>
<td>59.8</td>
<td>80.5</td>
<td>92</td>
</tr>
<tr>
<td>India</td>
<td>55.7</td>
<td>67.9</td>
<td>93.1</td>
</tr>
<tr>
<td>Nepal</td>
<td>43.2</td>
<td>51.2</td>
<td>90.1</td>
</tr>
<tr>
<td>Peru</td>
<td>38.8</td>
<td>75</td>
<td>96.4</td>
</tr>
<tr>
<td>Fiji</td>
<td>35.8</td>
<td>60</td>
<td>82</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>31.2</td>
<td>44.2</td>
<td>82.6</td>
</tr>
<tr>
<td>Nigeria</td>
<td>26</td>
<td>47</td>
<td>68.8</td>
</tr>
<tr>
<td>Senegal</td>
<td>24.5</td>
<td>49</td>
<td>84.8</td>
</tr>
<tr>
<td>Laos</td>
<td>24</td>
<td>47</td>
<td>90</td>
</tr>
<tr>
<td>Afghanistan</td>
<td>13</td>
<td>23</td>
<td>74</td>
</tr>
<tr>
<td>Georgia</td>
<td>9</td>
<td>67</td>
<td>91.5</td>
</tr>
<tr>
<td>Mongolia</td>
<td>8.7</td>
<td>37.2</td>
<td>91.4</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>5</td>
<td>16</td>
<td>72</td>
</tr>
<tr>
<td>Madagascar</td>
<td>5</td>
<td>10</td>
<td>42.8</td>
</tr>
<tr>
<td>Papua New Guinea</td>
<td>4</td>
<td>28</td>
<td>43</td>
</tr>
<tr>
<td>Togo</td>
<td>1.9</td>
<td>14</td>
<td>85.7</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>1.3</td>
<td>4.8</td>
<td>25.1</td>
</tr>
<tr>
<td>Rwanda</td>
<td>1</td>
<td>3.3</td>
<td>7</td>
</tr>
<tr>
<td>Liberia</td>
<td>0.3</td>
<td>5.1</td>
<td>14.7</td>
</tr>
<tr>
<td>Central Afr. Rep.</td>
<td>0.1</td>
<td>1.8</td>
<td>40</td>
</tr>
</tbody>
</table>

Energy lies at the heart of development challenges. Access to energy makes it possible to step up agricultural productivity, as well as extend access to water, healthcare, and education. However, the energy services available in developing countries are sometimes very few and far between, or limited to energy sources harmful to both health and the environment. The fuel used for cooking and heating varies considerably according to the geographical region: gas is rarely used in Africa, except in some North African countries, with wood and charcoal being the most widely used sources. This is not the case in South America, where gas is also much used.

In these countries, especially in rural areas, the so-called “traditional” fuels (solid fuels like charcoal, dung or wood) are used for heating and cooking, as opposed to so-called “modern” fuels (gaseous or liquid, such as oil or natural gas). In 2007, only 40% of the populations in developing countries had access to these modern forms of energy. The situation is most worrying in sub-Saharan Africa where this energy represented only 17%. The Millennium Development Goals (MDGs) adopted in 2000 aim to increase these proportions to 70% and 58% respectively by 2015.

“MODERN” SOLUTIONS
This presents a major challenge: by IEA estimates, it means that more than a billion people would need to change the kind of fuel they use for day-to-day purposes. The use of traditional fuels can have serious effects on the environment and health: according to the WHO, domestic pollution caused by dangerous fuels results in the death of 1.3 million persons each year, more than malaria.

The development of modern forms of energy would also meet the challenges of energy sustainability and security in these countries. Many households do not have access to a reliable source of energy, and spend a sizeable part of their budget or time on obtaining a supply of energy. Overall, a real difference is observed between the least developed countries and those with emerging economies. Thus, the use of modern fuels is very widespread in the rural areas of South Korea, in Algeria (around 100% of the populations use gas in these two countries) or in South Africa (60% electricity, 20% paraffin). Gas is predominant in Thailand (around 50%) and in Argentina (over 60%). On the other hand, the rural areas of China have very little access to these new forms of energy (less than 20%, against 60% for wood and 20% for coal), which again highlights the national gap between urban and rural areas. A large part of sub-Saharan Africa (Mozambique and Uganda) uses only wood, which is also the case in India and Afghanistan. Overall, electricity is poorly developed in rural areas (see Focus 7).

The technical means available are however relatively diverse and accessible: it may be a matter of replacing oil or paraffin lamps by electricity produced by decentralised renewable sources (solar, micro-hydraulic), of moving from wood or coal stoves to improved cooking systems that use paraffin or gas, or of installing electrical systems for pumping water. However, in many less developed countries, the strategic plans to reduce poverty rarely include objectives for improving access to energy with timeframes for achieving them. International co-operation should therefore focus on developing the institutional capacities to implement national strategies offering access to energy, on mobilizing investment in modern and sustainable forms of energy, as well as on transmitting the relevant technical knowledge and know-how.

There are many issues at stake in the diversification of domestic energy sources: improving their energy efficiency, thereby reducing the cost to users, reducing noxious indoor pollution, and, finally, protecting the local environment against eventual over-exploitation.

URBAN TRANSPORT: CONTROLLING SUPPLY AND DEMAND

In 1850, each person on Earth travelled an average of 1,500 km a year, mainly on foot. Today the world average is 4,500 km a year, with almost half of this distance being covered in a private car. Goods traffic has multiplied 1,000 times over 150 years. All this transport accounts for more than half of the world’s oil consumption. Cities, which concentrate material wealth and half of the world’s population, are also where the most of these journeys take place, the number of vehicles at the disposal of city dwellers depending as much on their level of income as on the shape of their city.

In the cities of developing countries, the motorization rate is often well below 300 cars for 1,000 inhabitants, while in the OECD countries it varies between 300 and 800 vehicles for 1,000 inhabitants. Nevertheless, for similar levels of GDP, the situations in industrial countries are sufficiently contrasted results as to highlight the burden of their urbanization paths and of energy prices. The sprawling American cities were shaped by the automobile in the second part of the 19th century, whereas European and Japanese cities, being older, have less available space. Their higher density of urbanization has led to a proportionate reduction in the need for mobility and in the rate of motorization, even if in Europe the current trend is shifting towards urban sprawl. In the cities of developing countries, it is the low level of income per inhabitant that limits the level of energy consumption for transport. The challenge here is to disconnect energy consumption from economic growth, primarily by maintaining a compact urban shape that limits the inhabitants’ transport needs.

ON FOOT, BY BUS, OR ON TWO WHEELS?
The economy, geography and history of each city explain the specific features of its transport system. In Dakar (Senegal), walking is still the main way of moving around, as it is in most African cities, and accounts for 75% of all journeys, with 14% of travel by mini-bus, far ahead of the 5% by private motor vehicle (cars, taxis or motorbikes). However, the use of the latter transport modes is increasing rapidly—by 8% a year. Buses are the primary means of transport in Bogota (Colombia), thanks to rapid bus routes that use dedicated lanes, such as the Transmilenio on the city’s main thoroughfare. Only 10% of trips take place in cars. In Bangalore (India), a third of trips are made using public transport and a quarter on foot or by bicycle. As in most Asian countries, motorized two-wheelers or tricycles are increasingly used. In China, moving

Sprawling, low density cities not only take up large areas of land, but also consume considerable transport resources for the daily trips of their inhabitants.
around in the very large cities on the East coast is not done in the same way as in the rest of the country. In Wuhan, the capital of Hebei province, three-quarters of all trips are made on foot, by bicycle or by bus. In Beijing, on the other hand, China’s most motorized city, the share of trips by car rose from 26% in 2000 to 35% in 2008.

Today’s transport systems are being called into question worldwide due to scarcity of oil resources and the fight against climate change. For the OECD countries, this is an unavoidable requirement. It is also a major constraint for the emerging countries, which must combine rapid urban development with the use of energy-light transport systems.

The wealth of city dwellers is an important factor in determining the number of private vehicles. The cities of the least developed countries are the ones whose inhabitants have the fewest cars and motorbikes. Yet, given similar income levels, it is the relative compactness of a city that creates the need to use (or not) motorized forms of transport.

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**FOCUS 9**

**URBAN TRANSPORT**

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**THREE WORLDS OF URBAN TRANSPORT**

Private Car Ownership and GDP per Capita

- **Motorization rate** (per 1,000 inhabitants)
- **GDP per capita** (in dollars)

Location of urban areas:
- Western Europe
- Eastern Europe
- Oceania
- North America
- Latin America
- Asia (OECD)
- Asia (non-OECD)
- Africa and Middle East

Source: Compiled by C. Barbier (Iddri) based on Millennium Cities data (UITP), processing LEPII (Grenoble).

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**CITIES TRAVELLING LIGHT**

Share of Trips according to Transport Mode (%)

- **Walking**
- **Bicycle**
- **Bus**
- **Car and taxi**
- **Other**

**Dakar** (Senegal)

**Wuhan** (China)

**Bangalore** (India)

**Bogota** (Colombia)

Source: Compiled by C. Barbier (Iddri) based on Millennium Cities data (UITP), processing LEPII (Grenoble).
The growth of urban populations in developing countries is accelerating at an unprecedented pace (see Focus 13). Among the myriad challenges this poses, the conditions for supplying cities and towns with foodstuffs raises a series of related questions: will the cities and towns in developing countries have their food increasingly supplied by international markets? Can peri-urban agriculture meet the challenge of food security? Is the growth of markets a vector of local or sub-regional development? Do urbanized lifestyles create nutritional imbalances? The answers vary greatly depending on the continent or region. Observations of trends in Africa or Asia, where food problems are of most concern according to the different projections (Agrimonde, World Bank...), provide some basis for discussion.

**THE GROWING INFLUENCE OF MARKETS**
In most countries, there is a correlation between urbanization and the per capita increase of food imports. Higher levels of imports signify first and foremost a change of food consumption patterns: urban consumers prefer products that are easy to prepare and regularly available on the markets. Urban consumption of imported cereals (wheat, rice), meat (chicken) and vegetables (potatoes, onions) also rises sharply. Higher imports also point

- Rice is one of the staple foods of African urban populations and the rising demand tends to exceed local production capacities. In terms of food security, this creates a dependence on imports and thus on world prices.

**GHANA, LIVING ON IMPORTED RICE**

The Rice Commodity Chain in Ghana: Interregional Trade and Imports 2007

<table>
<thead>
<tr>
<th>Rice traded (in thousands of tonnes)</th>
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</thead>
<tbody>
<tr>
<td>21</td>
</tr>
<tr>
<td>15</td>
</tr>
<tr>
<td>5</td>
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<table>
<thead>
<tr>
<th>Volume of rice available on the markets (in thousands of tonnes)</th>
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<tbody>
<tr>
<td>20</td>
</tr>
<tr>
<td>10</td>
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to the problems that food crop farming has to adjust to these changing food consumption patterns. Gradually, food markets become segmented: domestic food products are mainly consumed in the rural areas and secondary urban centres, whereas the imported products are for the main urban centres.

The soaring world food prices in 2007/2008 revealed markedly different situations depending on the country. Today, urbanites in Senegal depend almost entirely on imported rice, which forms their staple diet, whereas those in Mali mainly consume locally grown cereals (rice, maize, sorghum, millet…). Whatever the trend, the question of feeding cities and towns is one of access: in many cases, the standard of living as well as the health of the national economy can compensate for the high level of food dependency. The problems begin when urban dwellers can no longer afford to buy their food.

What’s more, urbanization “massifies” the demand for food products, and this necessitates regular provisioning of large quantities of food of consistent quality. Supply systems adapt by developing wholesale trading, which requires investment in infrastructures and information systems (markets, roads, etc.). The search for an economy of scale also reinforces specialization in some production zones. Markets tend to become regional in order to satisfy urban demand. For example, the high plateaus of West Cameroon increasingly supply the coastal towns of Gabon and Equatorial Guinea with market-gardening produce. Overcoming the logistical constraints of supply and distribution networks in

It is the urban zones that structure the food crop markets. Production and distribution of food products are organized to meet the demand of urban consumers. The underlying logics are unhindered by political borders, and regional markets are now seen to be emerging.
order to feed urban centres represents a major challenge for atomized, family production structures.

The growth of cities and towns is also a pivotal vector of technological change for the food crop farmers who find their main outlets in urban areas. This does not involve the intensification of production systems or productivity improvements using industrial inputs (fertilizers, pesticides), as projected by demo-economic or Green Revolution models. In many cases, local farming methods adapt by becoming more labour-intensive (agroforestry, mixed farming systems, etc.). These strategies use and enhance the know-how of local farming communities by optimizing the potential of ecosystems: biodiversity, complementarity between plants or between farming systems, and localized production conditions. Despite their enormous potential and flexibility, the ability of these intensified systems to increase productivity is still barely explored and difficult to measure.

Land pressure in urban areas is causing agriculture to gradually disappear and move out into the surrounding green belts. Often specialized in high value-added market-gardening produce, this type of farming is highly labour-intensive. Given the geographical proximity between production and consumption areas, it is often presented as guaranteeing the freshness and sometimes the health quality of products. In reality, however, the widespread use of inputs to protect crops is threatening food safety, product quality and consumer health, as well as polluting water resources. When agricultural production is sustainably supported by public policy, this is with a view to social objectives such as generating income for socially marginalized populations, or environmental objectives such as preserving green spaces. Only a few specific production chains for fresh produce, like leafy vegetables and lettuce, are resisting this trend.

**URBANIZATION AND NUTRITION**

Sedentary urban lifestyles reduce people’s physical activity while offering them a wide choice of food products—some of which are relatively cheap (sugar and fats). The resulting nutritional imbalance is responsible for the explosion of many non-communicable diseases (obesity, diabetes, cardiovascular diseases, etc.) which require health care that is both more costly and more complex than the “classic” infectious diseases. In poorer families, malnutrition is thus taking on extreme forms, and studies have shown that for one person suffering from obesity, one person suffering from serious nutritional deficiencies is to be found within the same family. First observed in the countries and regions experiencing economic and nutritional “transition” (Latin America, South-East Asia, China, North Africa), this trend is now appearing in the large cities.
CAMEROON: THE LIMITS OF MAIZE

Traditionally, cereals are the staple food of North Cameroon populations, who spend nearly 60% of their food budget on these foodstuffs. High demographic growth in this border region is fuelling an ongoing urbanization and a demand for products adapted to urban dwellers: the annual rate of increase of cereal production (4.2%) thus closely matches the annual growth rate of the population in the region (4.5%).

While millet and sorghum are still the two most characteristic crops of North Cameroon, production levels are not keeping pace with these growing needs, and the consumption of other cereals has developed substantially: in 2008, rice accounted for 39% of the household food budget in the region, ahead of maize (36%), millet/sorghum (17%) and pasta (8%). Although a large part of these cereals (wheat, rice, pasta) is imported, local production of maize has developed considerably since 1990 thanks to strong public investment policies, rising from 57,000 tonnes to 500,000 tonnes in 2007. Maize is thus on the point of becoming the region’s foremost urban food product, firstly because its price varies little throughout the year and also because it can be cooked in very diverse ways—boiled or grilled ears, sanga, pap, fritters and couscous—, but mainly due to the fact that it has benefited from investments by public authorities.

While this trend appears to show a diversification of local production and improved food security, does it in fact offer a sustainable solution for urban food supply? Can growing maize locally balance out the uncertainties that weigh on the mostly imported supply of rice? Will production be able to meet the increased food demand not only for human consumption but also for livestock feed, or even non-food uses (energy)? Does maize production not mean that food farming in developing countries will be technologically dependent (seeds, inputs) on industrialized countries?


It nonetheless requires taking integrating so many levels of information (international prices, regional availabilities, local needs) that it would be difficult to ask local authorities to address these challenges alone.

\[ ▶ \text{Eating well is as much a question of quality as of quantity. As is eating badly: a person may be hungry, but he may also have a highly unbalanced diet. Studies show that in many cases, these two conditions are compounded: populations that are underfed also have unbalanced diets.} \]

\[ \text{Sources: F. Delpeuch (IRD), on data from WHO, (www.who.int) and Kelly et al. (2008) “Global burden of obesity in 2005, and projections to 2030”}. \]
GLOBAL PLAYERS, LOCAL STAKES

ACTORS: LEARNING TO NETWORK FOR SUSTAINABILITY

For a long time cities were relegated to the role of local cogs in the wheels of national administration but, over the 20th century, they gradually developed into political actors in the full sense of the term, recognized and organized at the international level. Networks of cities have sprung up, and are at the same time the cause and result of this evolution. They are especially numerous, visible and effective on all issues relating to sustainable development at local level, such as improving housing, protecting the environment, providing health and transport services, etc.

1913 CGLU
› Creation of the International Union of Local Authorities (IULA) at The Hague (Netherlands) in order to strengthen local governments. Following the Second World War, the IULA represented the interests of local governments in intergovernmental organizations, notably the United Nations.

1956 CGLU
› Creation of the World Federation of Twinned Cities at Aix-les-Bains (France) to promote inter-city exchanges. The network became the World Federation of United Cities (WFUC) at the end of the 1980s.

1956 United States
› President Eisenhower launches the Sister Cities movement with the aim of developing citizen diplomacy.

1957 WHO
› The annual WHO Assembly discusses the relationship between urbanization and public health.

1975 CGLU
› Cités Unies France (CUF), the French section of WFUC, federates 500 French local governments that are involved in international co-operation activities.

1976 UN
› The first United Nations conference on human settlements leads to the setting up of the United Nations Human Settlements Programme (UN-Habitat).

1979 AIMF
› At the initiative of the Mayors of Paris and Quebec, the International Association of French-speaking Mayors is created, to develop local democracy and the political representation of the cities in its network.

1982 Mayors for Peace
› The Mayor of Hiroshima creates a network of cities that are opposed to the use of nuclear weapons. Today the network comprises 700 cities in 19 countries.

1984 Metropolis
› Abidjan, Addis-Ababa, Barcelona, Buenos Aires, Cairo, Colombo, London, Los Angeles, Mexico City, New York, Paris, Tokyo and Turin created Metropolis, bringing together the world’s largest cities in order to increase their influence on policy-makers. Affiliated to the UCLG, the association today has 100 member cities.

1985 Europe
› The European Charter of Local Self-Government is adopted, organizing the representation of local elected officials at the EU following the model of the German system.

1986 Eurocities
› The Eurocities network is founded in Rotterdam (Netherlands), bringing together the cities of Rotterdam, Barcelona, Birmingham, Frankfurt, Lyon and Milan, in order to step up the lobbying of the European Commission by major cities.

1987 UN
› The European Office of the WHO proposes to cities that they be involved in its “Health for All” initiative, through the Healthy Cities programme. Other similar networks are set up in North America, Latin America, Asia and Africa.

1987 Metropolis
› The “A Better Life for All in Metropolises” Congress is held in Mexico City.

1990 Europe
› Publication of the “Green Paper on the Urban Environment”, the first overview of the urban environment at the European Community level, emphasizing the common needs of European cities concerning the management of their environment.

1953 Europe
› The first States-General of the Council of European Municipalities adopts the European Charter of Municipal Liberties.

THE FIVE LARGEST CITIES IN 1900

- London: 6.6 million
- New York: 4.2 million
- Paris: 3.3 million
- Berlin: 2.7 million
- Chicago: 1.7 million

THE FIVE LARGEST CITIES IN 1950

- New York: 12.4 million
- London: 8.8 million
- Tokyo: 7 million
- Paris: 5.9 million
- Shanghai: 5.4 million

LONDON
6.4 MILLIONS
NEW YORK
4.2 MILLIONS
PARIS
3.3 MILLIONS
BERLIN
2.7 MILLIONS
CHICAGO
1.7 MILLIONS

2009
THE FIVE LARGEST CITIES
NEW YORK
10.1 MILLIONS
SHANGHAI
15 MILLIONS
TOKYO
12.6 MILLIONS
LONDON
9.7 MILLIONS
PARIS
6.2 MILLIONS

2019
THE FIVE LARGEST CITIES
NEW YORK
12.4 MILLIONS
TOKYO
7 MILLIONS
PARIS
5.9 MILLIONS
SHANGHAI
5.4 MILLIONS
LONDON
8.8 MILLIONS

5
10
for Sustainability actors: learning to network

In Europe, the focus on climate protection with the aim of promoting an active policy for climate protection in the environment, health and urban and sustainable development strategies.

The 13th IULA World Congress adopts the Oslo Declaration on the Environment, Health and Lifestyle.

More than 200 local governments from 43 countries, meeting at the United Nations headquarters in New York in the World Congress of Local Governments for a Sustainable Future, found the International Council for Local Environmental Initiatives (ICLEI). The network becomes an organization with German, Austrian, Italian and Dutch municipalities as members, and with its secretariat in Frankfurt (Germany).

The Congress of Montreal (Canada) discusses the relationship between “The Citizen and Sustainable Development”: policies for low-income populations, atmospheric pollution and its effects on health, transport services, planning, economic strategies and solid waste management.

The Charter of European Cities and Towns Towards Sustainability, adopted in Aalborg (Denmark), identifies cities as key actors in the progress towards sustainability.

The Heidelberg Conference, organized with the OECD and the European Commission, presents results obtained on climate change and local management of energy issues.

The first World Summit of Mayors on climate change in New York brings together 150 representatives of local governments and asks cities to take on board precise targets to reduce their greenhouse gas emissions, to improve the quality of their air and living conditions and to achieve sustainable development. Today more than 600 cities are taking part in these actions.

The network becomes an organization with German, Austrian, Italian and Dutch municipalities as members, and with its secretariat in Frankfurt (Germany).

The 1st World Assembly of Cities and Local Authorities creates a co-ordination unit (WACLAC) of several organizations in order to speak with a single voice at the international level and to promote the idea of a world charter of local self-government. The unit ceased operations in 2004, for lack of resources.

The Lisbon Action Plan, approved by 1,000 local governments meeting at the second European Conference on Sustainable Cities, seeks to implement the Aalborg Charter.

Ten international organizations of local governments and Habitats propose the elaboration of a “World Charter of Local Self-Government” inspired by European texts. Re-launched several times, this project has yet not achieved its goal.

The Hanover Appeal is supported by 250 Mayors from 36 European countries meeting at the 3rd European Conference on Sustainable Cities and renews a range of commitments to protect the environment and to reduce the impact of cities on the climate.

Creation of the United Nations Advisory Committee of Local Authorities (UNACLA) in order to strengthen the relations between national governments and local authorities in the implementation of the UN-Habitat Agenda. UNACLA, which has half of its members appointed by local governments, is the first official consultative body of local governments attached to the United Nations.
GLOBAL PLAYERS, LOCAL STAKES

2000 Climate Alliance
› The General Assembly in Bolzano (Italy) adopts a declaration committing its several hundred member cities to fix targets for reducing their emissions in the short term.

2001 CGLU
› The Rio summit of IULA and WFUC calls on the local governments of the whole world to support the process of merging the two networks to build a strong and united world organization of local governments.

2001 MDP
› The MDP becomes a regional organization composed of national associations of local authorities in West and Central Africa. 15 of the 24 countries of the region are represented.

2002 Eurocities
› Eurocities participates in the Convention on the Future of Europe, which was working on the institutional reorganization of the EU. The draft of the European Constitution, published in June 2003, included an explicit recognition of the rights and responsibilities of local and regional authorities.

2002 ICLEI
› After the World Summit on Sustainable Development in Johannesburg (South Africa), the ICLEI launches Local Action 21, which seeks to promote the participatory governance of environmental challenges.

CITIES ALLIANCE: A NETWORK FOR CITIES IN THE DEVELOPING WORLD

PRINCIPLES
Reducing poverty is the main objective of Cities Alliance. Launched in 1999 by the World Bank, this is more a network providing assistance to the emerging and developing countries rather than a network of cities. It enables international co-operation to act directly at the municipal level instead of transiting via national governments. It promotes contacts between cities on the one side, and multilateral agencies and financial institutions on the other side. It advocates the role of local governments in contributing to development and acts in the field of urban growth management by helping cities to design sustainable financing strategies (attracting capital and foreign investment, giving institutional support...).

ACTION PROGRAMMES
The Alliance finances projects in the framework of three action programmes:
- The City Development Strategies programme seeks to support local authorities in the elaboration of policies that promote economic growth and reduce poverty, by helping them to define investment priorities.
- The Citywide and Nationwide Slum Upgrading programme is a part of the Cities without Slums action plan, which includes promoting their housing stock, accessing sources of financing and implementing public policies that aim to prevent the expansion of slum areas.
- The “sustainable financing strategy” seeks to support cities in their efforts to attract long-term investment for urban infrastructures. Its goal is to generate stable resources and to increase urban capital.

MEMBERS
- Slum Dwellers International
- The United Cities and Local Governments network
- The following countries: Australia, Brazil, Canada, Chile, Nigeria, Norway, South Africa, Spain, Sweden, the United Kingdom and the United States of America.
- The Asian Development Bank, the European Union, the United Nations Development Programme, UN-HABITAT, the World Bank.
Internet site: www.citiesalliance.org
2003 **Comité 21**
› Signature of the Charter on Decentralized Co-operation for Sustainable Development between the Comité 21, the French Association of the Council of European Municipalities and Regions (AFCCRE) and Cités unies France.

2003 **WHO**
› WHO creates a support and sharing network for the cities participating in the Healthy Cities programme.

2004 **CGLU**
› The merger of IULA and WFCU leads to the founding of United Cities and Local Governments (UCLG) in Paris (France). The technical headquarters of the new network is located in Barcelona (Spain). Bertrand Delanoë, Mayor of Paris (France), Smangaliso Mikhatshwa, Mayor of Tshwane (South Africa), and Marta Suplicy, Mayoress of São Paolo (Brazil) were elected as Presidents.

2004 **Eurocities**
› Eurocities opens its ranks to economic organizations. In France, for example, the companies Renault Trucks, Algoe Consultants and Kéolis are Associated Business Partners.

2004 **ICLEI**
› The Procure Campaign seeks to develop the demand for ecological and social products and services through local government purchasing.

2005 **C40 Cities**
› The London Summit brings together 18 major cities on the topic of global warming. At the end of the conference, a communiqué states that the cities need to take measures and co-operate to reduce greenhouse gas emissions.

2005 **CCI**
› Launching of the global Clinton Climate Initiative (CCI), with the prime objective of helping major cities to reduce their carbon gas emissions.

2006 **Climate Alliance**
› The General Assembly adopts targets for reducing CO₂ emissions.

2006 **EU**
› The EU Energy Efficiency Action Plan foresees the creation of a “Covenant of Mayors” in view of reinforcing and recognizing the actions taken by cities, as well as developing dialogue between the local and European levels.

2007 **C40 Cities**
› C40 member cities, meeting in New York, commit themselves to fixing targets for reducing their greenhouse gas emissions.

2007 **CCI**
› The Clinton Foundation provides guarantees to five banks for loans obtained by 16 very large cities to finance the renovation of old buildings responsible for 70% of the greenhouse gases emitted in those cities.

2008 **UN**
› Habitat adopts guidelines on the decentralization and reinforcement of local governments.

2008 **CCI**
› Launching of the Covenant of Mayors encompassing those European cities ready to take energy efficiency measures over and above the European targets. The Council of European Municipalities and Regions, Climate Alliance, Eurocities and Energie-Cités participate in this initiative.

2009 **C40 Cities**
› 80 major cities participate in the 3rd C40 Summit in Seoul (South Korea). The final declaration commits them to reducing their emissions and carbon consumption, and to establishing a regular reporting system on the results achieved.

2010 **Europe**
› 6th European Conference on Sustainable Cities in Dunkirk (France).

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The five largest cities in 2009:

- **TOKYO** - 33 millions
- **SEOUL** - 23.9 millions
- **MEXICO CITY** - 22.9 millions
- **DELHI** - 22.4 millions
- **MUMBAI** - 22.3 millions

Chronology prepared by N. Maisetti (La Sorbonne), I. Biagiotti (Le Courrier de la planète) and B. Martimort-Asso (Idri).
GLOBAL PLAYERS, LOCAL STAKES

ACTORS SUSTAINABLE DEVELOPMENT AND CITY NETWORKS

Transnational networking between urban spaces is not a 20th-century invention. The formation of the modern State, based on a monopoly of the use of violence and of the right to levy taxes, has for centuries obscured the international role that cities have played. However, it was not until the end of the Second World War and the emergence of a citizen diplomacy that they managed to organize themselves in the international arena. This movement has greatly expanded over the last thirty years, with a prevailing trend in most countries towards a diminishing role for the State and greater decentralization in most countries. Cities are recognized as major players in promoting an economic growth characterized by the connectedness, mobility and seemingly territorialized nature of exchange. They are thus competing to attract capital and foreign investment. The city is also a main public actor in social issues at

<table>
<thead>
<tr>
<th>Date and Place of Creation</th>
<th>CGLU</th>
<th>EUROCITÉS</th>
<th>COMITÉ 21</th>
<th>ÉNERGIE-CITÉS</th>
<th>CLIMATE ALLIANCE</th>
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<thead>
<tr>
<th>Geographical Scope</th>
<th>World</th>
<th>Europe</th>
<th>France</th>
<th>Europe</th>
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<tr>
<th>Institutional Link</th>
<th>UN</th>
<th>EU</th>
<th>Ministry of the Environment</th>
<th>EU</th>
<th>EU</th>
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<tr>
<th>Networking</th>
<th>World-wide organization</th>
<th>Share know-how and ideas, - exchange experience, - analyse problems and develop solutions through forums, working groups and projects</th>
<th>Pool innovative tools and best practices, and produce recommendations on strategies and methodologies</th>
<th>On-line directory of the activities of European cities in the field of energy efficiency, renewable energies and urban mobility</th>
<th>Share best practices in the area of energy performance and in the usage of a growing part of renewable energy</th>
</tr>
</thead>
</table>

| Lobbying | Actions and influence on local governments and their ties with global governance | “Give the European city a voice” by initiating a dialogue with European institutions on all aspects of Community legislation, policies and programmes that impact cities and their citizens. | Publication and distribution of documents about best practices | Representing members’ interests at the level of EU institutions so as to influence Community policy in the areas of energy, environmental protection and urban policy | Making public opinion and decision makers aware of the stakes of tropical deforestation |

| Campaigning | Source of support for efficient and innovative local governments that are close to their citizens | Making local authorities and citizens aware of urban issues | Supporting members in implementing sustainable development: raising awareness internally, identifying strategic and managerial issues, implementing Agenda 21 | Implementation of projects financed by European programmes; organization of an annual conference | Involvement in the reduction of greenhouse gas emissions by 10% between now and 2011 |

| Members | More than 1,000 cities in 195 countries | 137 members in 34 European countries | 400 members grouped in 4 colleges (enterprises; local governments; associations; public bodies and media); UNEP and UNDP are members by right | 1,000 local authorities in 26 European countries | 1,400 members (local and regional authorities and some NGOs in Europe) |
local level as they deal with the most deprived or fragile populations, and international networks have been built around such issues. Whilst it generates environmental disturbance, the city is also the first victim of these imbalances and thus at the forefront in the search for innovative solutions: the management of water, waste and transport or the construction of environment-friendly buildings, etc. In this respect also, intercity co-operation has given rise to many networks: thematic, world-wide, regional and national networks.

Although the list is not exhaustive, it is possible to identify the main rationales of the networks that are now officially recognized by the political systems in which they operate (United Cities and Local Governments for the United Nations; Eurocities for the European Union; Cités unies France for France), as well as the networks dedicated to managing sustainable development issues (Energie-cités, Climate Alliance, C40, Healthy Cities, ICLEI and Comité 21). All seek to represent and defend the interests of local governments at the supranational level and are organized around three key principles: Networking: sharing know-how among the members; Lobbying: influencing governmental policy-makers or intergovernmental negotiations; Campaigning: making local authorities and citizens aware of urban issues.

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<th>C-40</th>
<th>Healthy Cities</th>
<th>ICLEI</th>
<th>CREATIVE CITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Geographical Scope</strong></td>
<td>World</td>
<td>French section of world and European network</td>
<td>World</td>
<td>World</td>
</tr>
<tr>
<td><strong>Institutional Link</strong></td>
<td>World Bank</td>
<td>WHO</td>
<td>UN-Habitat</td>
<td>UNESCO</td>
</tr>
<tr>
<td><strong>Networking</strong></td>
<td>Participation in “Clean Development Mechanism”</td>
<td>Exchange of local experience and tools for promoting health</td>
<td>Exchange of experience within a global platform, in the context of creative tourism</td>
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</tr>
<tr>
<td><strong>Lobbying</strong></td>
<td>Pressure on governments and international organizations concerning greenhouse gas reduction</td>
<td>Mobilization in favour of Health for All, with a view to reducing inequalities and developing a diversified and innovative economy</td>
<td>Enhanced use of public and private partnerships</td>
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</tr>
<tr>
<td><strong>Campaigning</strong></td>
<td>Involvement in the World Bank programme to finance the carbon market</td>
<td>Organizing symposia on public health issues, and diffusing the principles of the Ottawa Charter and of Health for All</td>
<td>Making local authorities aware through three major campaigns: Local Action 21, Cities for Climate Protection, and the Water Campaign</td>
<td>Strengthening local capacities by training local cultural actors and gaining greater visibility</td>
</tr>
<tr>
<td><strong>Members</strong></td>
<td>40 “world” cities</td>
<td>In Europe, the network is composed of 1,200 cities in 30 countries including 66 cities and one urban community in France</td>
<td>1,104 cities in 68 countries</td>
<td>20 cities selected by UNESCO</td>
</tr>
</tbody>
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Source: based on data from Nicolas Maisettini, Centre de recherches politiques de la Sorbonne, Paris, France.
Diseases do not stop at frontiers—hence, the need for international co-operation between large pharmaceutical laboratories and governing agencies. A case in point is the urban outbreak of the swine flu, which began in Mexico and then spread quickly to North American cities and other metropolises around the world. The Mexican and American cities, which largely escaped the fear and economic repercussions of the SARS outbreak, are among the most affected populations. Unlike other 20th-century 'flu outbreaks, the H₁N₁ virus did not emerge from South Asia, nor did it impact their cities in the same way as the SARS virus, which had rapidly infiltrated the cities of developing countries such as Beijing. Information flows, managed by the World Health Organization and national agencies, monitored the spread of the virus: to and from research laboratories, hospitals, public health agencies, government organizations and pharmaceutical companies, back to the general public.

**URBAN IMPACTS**

Dealing with such epidemics is a matter of urban security and has consequences for urban and spatial planning in terms of biomedical infrastructures (health care, laboratories, research). In Europe and North America, there is a growing trend to bring these infrastructures nearer to the populations to be treated. Many private laboratories prefer to set up in the cities and towns rather than in suburban business parks, as in the case of the East River Science Park in Manhattan and the MaRS project in Toronto (Canada), with...
its art galleries and direct access to the transportation network. The Academic Medical Centre in Amsterdam, whose buildings are all connected internally, is attracting many biotech companies. The Asian cities that have been the epicentre for recent viruses (SARS and avian ‘flu), have begun to develop different logics for medical urban planning. The fear of contagion now means that they have relocated medical centres from city centres to suburban campuses such as Biopolis in Singapore and the biotech science park of Hsin-Chu in Taiwan. Health centres are thus shifting in line with the diseases themselves and with societal representations of the most effective way of tackling them.

**PUBLIC AND PRIVATE MOBILIZATION**

*A Chronology of Information Flows between Actors Managing the H₁N₁ Flu*

15 March – 2 July 2009

**Type of actor**

- **Public actors** (governments, United Nations, public laboratories, etc.)
- **Private actors**
- **Information flows**

**Source:** based on maps by H. Sample, MOS-Office (New Haven, United States) and derived from data from the World Health Organization (www.who.int), the Public Health Agency of Canada (www.phac-aspc.gc.ca) and the Center for Disease Control and Prevention (www.cdc.gov).
Coastal cities will be particularly exposed to the impact of climate change over the next decades. They will be in the front line against the heightened risks associated with rising sea levels, cyclones and other storms. Moreover, these risks will be all the greater given that a very large proportion of the world’s population, infrastructures and investments is now concentrated in cities, and given that this concentration is increasing. Today, it is estimated that 23% of the world’s population lives less than a hundred kilometres from the sea and at less than a hundred metres above sea level. And, in a world where the urban population exceeds the rural population (see Focuses 3 and 4), twenty of the planet’s largest cities are ports. Flooding, brought on by storms, during which masses of water driven by strong winds submerge coastal regions, poses the greatest risk for coastal areas in general and for port cities in particular. The case of the hurricane Katrina in 2005 was especially revealing as to the scale of disasters caused by floods. The impact of climate change with respect to the risk of flooding is twofold. The combined effect of the thermal expansion of the oceans and the ice melt (both consequences of global warming) will bring about a rise in the overall level of the oceans. If the sea level is higher, the same storm will wreak greater damage. What’s more, climate experts expect to see an increase in the frequency and intensity of such extreme weather events (storms, cyclones…) as a result of climate change. And this will inevitably bring with it a greater risk of flooding.

**MULTIPLE RISKS**

A recent OECD study lists the 20 cities that are the most exposed to such events not only today but also in 60 years time (2070), in terms of both population and capital. It emphasizes that climate change is not the only factor of change. Coastal areas are also made more fragile by urbanization, population growth and subsidence or, in other words,—the collapsing of the Earth’s crust due to natural forces (geological) or human actions (pumping underground water, gas or oil extraction, tunnel digging…).

The study also highlights the fact that a substantial share of the population is already vulnerable to coastal flooding in the large city ports, which would indicate that this issue needs to be addressed as of now, without waiting for the climate to change. The study also evidences that these risks are shifting towards the developing countries: although today the exposed cities are evenly spread between countries in the North and those in the South, in the future, 17 of
the most exposed cities will be in what are now developing countries, especially in South-East Asia. Yet, the main finding of the study is to show that the growing urban risk results first and foremost from urban development itself. Urban sprawl coupled with population growth and economic development almost automatically steps up the cities’ exposure to risk, and increases the number of people and the amount of capital under threat. Climate change is present as an aggravating factor, as is subsidence.

The question then arises as to whether simply adapting to the impacts of climate change is sufficient, or whether strategies for adapting to the risk of coastal flooding should be envisaged in a broader context that integrates demographic, social and economic change. While the solutions may seem obvious, their practical application points up the high level of complexity involved in integrating all the various constraints..., which goes to explain why this aspect is often neglected. Yet, the core of the overall challenge of urban development is now: how to integrate climate-related considerations into a context of global change that takes into account social and economic evolutions often more crucial than those linked to climate.