PART III

GLOBAL TRENDS: THE CONTENT OF URBAN PLANS (SUBSTANTIVE)

CHAPTER 6

BRIDGING THE GREEN AND BROWN AGENDAS

One of the most significant contributions of the United Nations to global thinking about the future in recent decades has been the concept of sustainable development. Its application to cities, as discussed in this chapter, has helped to catalyse the rediscovery and renaissance of urban planning. Sustainable development, or sustainability, was defined by the Brundtland Commission[1] as development that meets the needs of people without compromising the ability of future generations to meet their own needs. In urban planning, as in other professions, this has meant a new recognition of how environmental and social aspects of development need to be integrated with economic development, as well as meeting basic human needs for the poorest parts of the world.

Because of the dominance of cities and towns in developed countries and rapid urbanization in developing countries, it is inevitable that urban areas currently use resources in very concentrated ways, with a major proportion of pollutants affecting the air, lakes, rivers, the ocean and the soil being generated there. On the positive side, however, it is in urban areas that most economic development is located, technological and social advances are made, and the wealth upon which national development depends is created.

As indicated in Chapter 1, sustainable cities should be environmentally safe, socially inclusive and economically productive. Simultaneously achieving these goals entails careful balancing of environmental management objectives against built (or human) environment objectives, as it is through the latter that basic human needs are met. Since the early 1990s, it has been recognized that the concept of sustainable cities has to include a number of fundamental objectives – that is, minimization of the use of non-renewable resources; achievement of the sustainable use of renewable resources; and staying within the absorptive capacity of local and global waste absorption limits. Action to attain these objectives provides the link between the natural and the built environment, or between the green and brown agendas. How these objectives have been and are being addressed in urban planning is the focus of this chapter.

SUSTAINABLE URBAN DEVELOPMENT: THE GREEN AND BROWN AGENDAS

Thinking on the application of the concept of sustainable development to cities started in the early 1990s, following the United Nations Conference on Environment and Development (UNCED) in 1992, and the United Nations Commission on Human Settlements at its 15th session in 1995, which identified the key measures needed to make sustainable development applicable to human settlements.[2] The commission showed that sustainable development was not simply a new way to describe environmental protection, but was a 'new concept of economic growth which provides for fairness and opportunity for all people in the world without destroying the world's natural resources and without further compromising the carrying capacity of the globe'. In 1996, the United Nations Centre for Human Settlements (UNCHS) (now the United Nations Human Settlements Programme, or UN-Habitat) extended the concept of sustainable development to urban planning, stating that 'Settlement planning is central to ensuring that urban development and management meets sustainable development goals.'[3]

The application of sustainable development to cities has challenged urban planning to find new ways of … addressing urban environmental issues, both natural and built

The application of sustainable development to cities has challenged urban planning to find new ways of addressing the pressing issues of urban poverty and wealth creation while simultaneously addressing urban environmental issues, both natural and built, and the social and cultural issues of urban communities. Urban planning is one of the few professions with a specific remit that encompasses these three areas of need – economic, environmental and social – and should therefore be at the centre of attempts to define new approaches that integrate solutions seamlessly. It is also very specifically oriented towards long-term issues, as city-building is a continuous process. Thus, urban planners should embrace the sustainable development approach if they are to leave a positive legacy for future generations.

Urban planning was probably not ready for the challenge of sustainable development, although it is not the only profession to fall behind in this respect. Many professions have been caught up in a kind of scientific modernism

The green agenda Natural systems, global, regional and local, used as services by cities	The brown agenda Human systems required to make cities healthy and liveable and which are part of the metabolism of the city
Ecosystems that provide green open space used by the city for biodiversity protection and recreation.	Waste systems to recycle and remove wastes from cities, including solid, liquid and air waste.
Water systems that cities use to tap the natural flow for water supply and waste disposal.	Energy systems to provide power, heating, cooling and lighting for all city functions.
Climate and air systems that provide cities with the requirements for healthy life.	Transport systems to enable mobility in the city, including the fuel.
Other ecological services, including agricultural and forestry systems providing food and fibre for cities.	Building and materials systems that provide the physical basis of life in cities.

Table 6.1

Characteristics of the green and brown agendas in the urban environment

that has reduced issues of development down to manuals and formulas inherently incapable of including all facets of need in cities. As stated in Chapter 3 of this Global Report, urban planning was, in many countries, caught up in a paradigm of master planning that sought to impose one best way of shaping urban development. This led to the New Towns of England and North America as well as the 'ideal cities' of Brazilia, New Delhi and Canberra. It led to the large-scale 'urban renewal' programmes that tore down generations of organic urban building and replaced them with high-rise uniformity. It led to the formulas of traffic engineering that imposed intrusive road structures and car dependence upon a generation of urban dwellers in wealthy cities, leaving them vulnerable to the vagaries of oil prices and climate change. Fixed notions of 'what should be' led to a paralysis over what to do about the rapidly growing informal settlements in the developing world, which exploded across cities, leaving millions without basic urban services.[4]

A significant … dilemma for planners … is how to integrate the … 'green agenda' and the 'brown agenda'

Box 6.1 The green agenda as set out by the Millennium Ecosystem Assessment

- Species extinction rates are now 100 to 1000 times above the background rate. During the last several decades, 20 per cent of the world's coral reefs have been lost and 20 per cent degraded, whilst 35 per cent of mangrove area has been lost.
- 60 per cent of the increase in the atmospheric concentration of carbon dioxide (CO_2) since 1750 has taken place since 1959. Climate change now threatens biodiversity and ecosystem services across the planet.
- Human beings produce as much biologically available nitrogen as all natural pathways and this may increase by a further 65 per cent by 2050.
- Approximately 60 per cent (15 out of 24) of the ecosystem services evaluated in the Millennium Ecosystem Assessment are being degraded or used unsustainably.
- 5 to possibly 25 per cent of global freshwater use exceeds long-term accessible supplies and 15 to 35 per cent of irrigation withdrawals exceed supply rates and are therefore unsustainable. People now use between 40 and 50 per cent of all available fresh water running off the land. Water withdrawal has doubled over the past 40 years.
- A number of countries that appeared to have positive growth in net savings (wealth) in 2001 actually experienced a loss in wealth when degradation of natural resources was factored into the accounts.
- There is evidence that changes being made in ecosystems are increasing the likelihood of non-linear changes in ecosystems (including accelerating, abrupt and potentially irreversible changes), with important consequences for human well-being.
- One of the targets of the Millennium Development Goals is that, by 2010, there should be a significant reduction in the rate of loss of biodiversity and a reversal in the loss of environmental resources.

Source: Millennium Ecosystem Assessment, 2005

'Sustainability could be called the post-modern equivalent of a grand narrative.'[5] In terms of urban planning, the grand narrative calls into question the modernist formulas of urban planning from the past century and challenges it to find new ways of integrating land development with sustainability. This is not a simple task, however, and practical guidelines on planning for sustainable urban development are still being developed. This chapter seeks to outline some of these new approaches. In the remaining part of the current section, the green and brown agendas are defined, showing how they need to be integrated at the city level. This is followed by a presentation of eight global trends in planning for sustainable urban development, highlighting recent innovations in bridging the green and brown agendas in cities all over the world. Finally, the chapter highlights some of the approaches that are necessary for integrating these innovations within urban planning and governance, drawing from recent practices that appear to be working.

The green and brown agendas

A significant practical dilemma that faces planners – as well as other urban professionals and politicians – when they try to implement sustainable urban development is how to integrate the two different sets of concerns of the 'green agenda' and the 'brown agenda' (i.e. the natural environment and the human environment; see Table 6.1).

The green agenda is about the natural systems of the local, bioregional and global ecosystem, which are used by cities and other settlements as services for open space, biodiversity, water provision, waste dispersion, healthy air, and reliable climate, food and fibre. These services were outlined in detail in the global Millennium Ecosystem Assessment and were shown to be in decline in most parts of the world (see Box 6.1).

One of the aims of urban planning is to ensure that the green agenda is managed effectively, as green functions in a city are not always provided through the market mechanism. However, they are often seen as non-essential – even water, food and fibre can be brought in from long distances, rather than from the local bioregion, and the green spaces and waste absorption systems are often traded off for other urban functions. The changes that have been made to ecosystems have contributed to substantial net gains in human well-being and economic development. Since 1960, while the world's population has doubled and economic activity increased sixfold, food production has increased 2.5 times, food prices have declined, water use doubled, wood harvest for pulp tripled, and hydropower doubled.[6] But these gains have been achieved at growing ecological costs which, unless addressed, will substantially diminish the benefits that future generations obtain from ecosystems.

The rapid growth of cities in the past 50 years has meant that managing the built (or human environment) while coping with environmental pollution and degradation has overwhelmed many cities, especially in the developing world. Box 6.2 sets out some facts about the brown agenda in cities.

The brown agenda is essential for making a city work, for a healthy and liveable environment, and for creating the human and economic opportunities that have driven cities throughout their history. All cities consume land and resources such as energy, water and materials, which they use for buildings and transport. In the process of making a city functional, these resources are turned into wastes. It is now possible to quantify this impact in one parameter called *ecological footprint*.[7] The brown functions of a city generally consume and degrade its green resources and processes, respectively, unless the city intervenes through processes such as urban planning and environmental management.

The brown agenda depends upon how the metabolism of the city is managed (i.e. how the throughput of resources into wastes is managed). Thus, the brown agenda is about the optimization of land use, engineering of waste systems, the minimizing of energy consumption and transport, the reduction in use of materials, and the creation of an efficient built environment. These systems have always been provided in cities using an increasing ecological footprint. In other words, the brown agenda has always tended to assume the green agenda, to consume it and to dominate it. Since this is no longer feasible, cities need to reduce their impact upon the natural environment locally, ensure that bioregional ecosystems are not degraded and that the global ecosystem is not damaged by climate change.

The green natural systems of a city have real limits and capacity issues associated with their use. The challenge for urban planning is to find ways that cities can integrate these two agendas – to respect the natural environment and to improve the human environment, at the same time.

The goal of sustainable urban development is to reduce the impact of consumption of natural systems (global, regional and local) by the city, thus keeping within natural limits, while simultaneously enabling human systems to be optimized for improving the quality of urban life. Thus, sustainable urban development must integrate the green and brown agendas – improving the human environment while reducing the impact of natural resource use and improving the natural environment of the city.

Ensuring that natural systems are part of the way in which cities function and are not engulfed by the city has been a part of the challenge of cities from their very beginning.[8] Separating clean water for drinking and recreation from wastewater was a very early insight and most ancient cities had systems in place to do this. However, it was the rise of industrial cities that brought the green and brown conflict to a head, as industrial metabolism consumed land and water, and spewed much larger amounts of waste into the environment. Cities rapidly grew and their ecological footprint grew faster. Limits to the capacity of air and water to absorb these wastes were quickly reached. Two professions emerged in response: first, *sanitary engineering* (now called environmental engineering), which was able to develop sewerage systems, storm water systems, air pollution control systems and solid waste disposal systems; and, second, *town planning*, which was able to show how land-use planning could help to site industry away from housing and which could set aside clear areas of natural systems to be part of city life.

Box 6.2 The brown agenda in cities: Some facts

- In cities of the developing world, one out of four households lives in poverty; 40 per cent in African cities.
- 25 to 50 per cent of people in developing cities live in informal settlements.
- Fewer than 35 per cent of cities in the developing world have their wastewater treated; 2.5 billion people have no sanitation and 1.2 billion do not have access to clean water.
- Half of the urban population in Africa, Asia, Latin America and the Caribbean suffer from one or more diseases associated with inadequate water and sanitation.
- Between one third and one half of the solid waste generated within most cities in low- and middle-income countries is not collected.
- Less than half of the cities of the world have urban environmental plans.
- Millennium Development Goals aim to halve the proportion of people without sanitation and clean water by 2015 and significantly improve the lives of at least 100 million slum dwellers by 2020.

Sources: UNEP, 2002; UN-Habitat, 2008b

Today, the green agenda has developed in several ways. First, it has become a global and regional agenda and not just a local one, as it was with the emergence of the first industrial cities. The metabolism of cities is such that global systems of climate and air are being adversely affected and global governance has now set limits to how much carbon can be expelled into it.[9] Global biodiversity limits are also now being addressed through mechanisms such as the Millennium Ecosystem Assessment. Similarly, limits are being set on a regional basis for issues such as open space, quality of water from rivers that feed cities along their water sheds, and for air quality in the air sheds of city-regions that are reaching limits from smog and particulates.

Second, the green agenda for ecological health – in terms of biodiversity and management of natural ecosystems – has shifted from addressing the means through which cities can reduce their impact to addressing the issue of how cities can enhance their natural environments and be part of the solution to biodiversity. This is difficult in many developing cities, but is now becoming feasible in the developed world.

The brown functions of a city generally consume and degrade its green resources

The following section examines the interaction between the green and brown agendas by identifying and discussing the main innovations that are occurring all over the world in order to synergise the green and brown agendas.

INNOVATIONS IN ACHIEVING GREEN AND BROWN SYNERGIES: GLOBAL TRENDS

Globally, eight major trends in the integration of the green and brown agendas in cities are identifiable. These focus on:

1 developing renewable energy;
2 striving for carbon-neutral cities;

Box 6.3 Renewable city models for the future

Dongtan is a new Chinese city near Shanghai which is designed to use 100 per cent renewable energy in its buildings. It will also be self-sufficient in water and food sourced from the surrounding farmland, and will feature a zero-carbon public transport system powered entirely by renewable energy. What happens to cars in the city is not yet clear. Energy plants will burn rice husks, normally just waste, near the city centre and the energy will be generated on a decentralized model, using combined heat and power.

Masdar City in the United Arab Emirates is an important first example of a city built from scratch with 100 per cent renewable energy and zero car use (in theory). It is being built with a 60MW solar photovoltaic plant to power all construction, and eventually a 130MW solar photovoltaic plant for ongoing power, as well as a 20MW wind farm and geothermal heat pumps for cooling buildings. Electric automatic pod cars on an elevated structure will be the basis of the transport.

North Port Quay in Western Australia will be home to 10,000 households and is designed to be 100 per cent renewable through solar photovoltaic small wind turbines called wind pods and a nearby wave power system. The development will be dense and walkable, with an all-electric transport system featuring electric public and private transport, linked to renewable power through battery storage in vehicles.

Source: Went et al, 2008; Newman et al, 2009

3 developing distributed power and water systems;
4 increasing photosynthetic spaces as part of green infrastructure;
5 improving eco-efficiency;
6 increasing a sense of place;
7 developing sustainable transport; and
8 developing 'cities without slums'.

These trends, some of which are quite innovative, are obviously overlapping in their approaches and outcomes; but each provides a perspective on how attempts to simultaneously improve the natural ecological base of cities and the human or built environment have been made.

While no one city has shown innovation in all eight areas, some are quite advanced in one or two. The challenge for urban planners is to apply all of these approaches together in order to generate a sense of purpose through a combination of new technology, city design and community-based innovation.

Movement towards a renewable energy future will require much greater commitment from cities

Development of renewable energy

There are now a number of urban areas that are partly powered by renewable energy techniques and technologies, from the region to the building level. Renewable energy enables a city to reduce its ecological footprint and, if using biological fuels, can be part of a city's enhanced ecological functions.

Renewable energy production can and should occur within cities, integrated within their land use and built form, and comprising a significant and important element of the urban economy. Cities are not simply consumers of energy, but catalysts for more sustainable energy paths, and can increasingly become a part of the Earth's solar cycle.

While some solar city projects, such as those in Box 6.3, are under way (including Treasure Island in San Francisco), there are currently no major cities in the world that are powered entirely by renewable energy. Movement towards a renewable energy future will require much greater commitment from cities themselves at all levels, including at the local and the metropolitan levels.

Urban planning is necessary to create the infrastructure needed to support solar and wind power at the scale required to help power a city. While finding locations for large wind farms near urban areas has been controversial (such as the wind farm proposal that was defeated off the coast of Cape Cod, Massachusetts, US), there are significant opportunities to harness solar and wind power. Studies are now also showing that wind (like photovoltaic solar) power can be integrated within cities and their buildings. A study at Stanford University examined the potential for wind power in regions and in cities globally. The study concluded that 'wind, for low-cost wind energy, is more widely available than was previously recognized'.[10]

Hydropower has also been used in cities such as Vancouver (Canada) and Christchurch (New Zealand) for decades. Hydropower is growing slowly due to the impact of large dams, but geothermal power appears to be offering a similar level of base-load renewable power.

New model cities that are 100 per cent renewable are needed, but retrofitting existing cities is just as important. For example, Cape Town (South Africa) has an Integrated Metropolitan Environmental Policy, which has an energy strategy designed to put the city in the lead 'in meeting energy needs in a sustainable way, where everyone has access to affordable and healthy energy services, where energy is used efficiently, and where transport is efficient, equitable and emphasizes public transport and compact planning'. This integration of the green and brown agendas includes 10 per cent of the energy supply coming from renewable sources by 2020. Another example is Adelaide, which has gone from 0 to 20 per cent renewable energy in ten years by building four large wind farms.[11]

The shift in the direction to the renewable city can occur through many actions: demonstration solar or low-energy homes created to show architects, developers and citizens that green can be appealing; procurement actions that source regionally produced wind and other renewable energy to power municipal lights and buildings; and green building standards and requirements for all new public as well as private buildings.

Few cities have been as active in seeking and nurturing a reputation as a solar city as Freiburg (Germany). Known to many as the 'ecological capital of Europe', Freiburg has adopted an impressive and wide-ranging set of environmental planning and sustainability initiatives, many focused on renewable energy, as shown in Box 6.4.

The City of Adelaide, in the State of South Australia, also envisions itself as a renewable city as part of its larger green city initiative. It has designated solar precincts for the installation of photovoltaic panels on the rooftops of buildings, including the Parliament House. There is a solar schools initiative, with a target of 250 solar schools with solar rooftop installations and educational curricula that incorporate solar and renewable energy issues. This idea has since been taken up by the Australian federal government to be

applied to every school in the country. Most creatively, the city has been installing grid-connected photovoltaic street lamps that produce some six times the energy needed for the lighting. These new lights are designed in a distinctive shape of a local mallee tree. This is one of the few examples of solar art or solar 'place' projects.

Along with incentives (financial and otherwise), solar cities recognize the need to set minimum regulatory standards. Barcelona has a solar ordinance, which requires new buildings, and substantial retrofits of existing buildings to obtain a minimum of 60 per cent of hot water needs from solar. This has already led to a significant growth of solar thermal installations in that city.

Transport can also be a major part of the renewables challenge. For example, the more public transport moves to electric power, the more it can be part of a renewable city. Calgary Transit's creative initiative called Ride the Wind provides all the power needed for its light rail system from wind turbines in the south of Alberta (Canada). Private transport can now also be part of this transition through a combination of electric vehicles and new battery storage technology, together called Renewable Transport.[12] Not only can electric vehicles use renewable electricity to power their propulsion, they can also be plugged in during the day and run on their batteries, as their power systems store four times their consumption. They can thus play a critical role in enabling renewables to build up as a much higher proportion of the urban energy grid. However, this breakthrough in technology will need to be carefully examined to ensure that cities use it to be fully sustainable and not justify further urban sprawl.

Renewable power enables cities to create healthy and liveable environments while minimizing the use and impact of fossil fuels. But, by itself, this will not be enough to ensure sustainable urban development.

Striving for carbon-neutral cities

The key objective of the trend towards 'carbon-neutral' cities is to ensure that every home, neighbourhood and business is carbon neutral. Carbon-neutral cities are able to reduce their ecological footprint through energy efficiency and by replacing fossil fuels, thus providing a basis for ecological regeneration by creating offsets in the bioregion.

In 2007, the head of News Corporation, one of the biggest media empires in the world, announced that his company would be going carbon neutral. This led to some remarkable innovations within the company as it confronted the totally new territory of becoming a global leader in energy efficiency, renewable energy and carbon offsets.[13] Many more businesses, universities and households are now committing to minimizing their carbon footprint and even becoming carbon neutral. But can it become a feature of whole neighbourhoods and even complete cities? There are those who suggest it is essential if the world is to move to 'post-carbon cities'.[14] Carbon neutrality can become the goal for all urban development but will require a three-step process:

Box 6.4 Environmental planning and renewable energy in Freiburg, Germany

Through its Solar Region Freiburg programme, the city has sought to actively support solar energy as an important element of its economic base, and even as a form of local tourism. The city has also become home to an impressive number of scientific and educational organizations dedicated to renewable energy to ensure that it has an economic edge in the next industrial era. The emphasis on solar energy in the city has, in turn, set the tone and context for businesses and organizations. The Victoria Hotel in the centre of Freiburg, for instance, now markets itself as the world's first zero-emission hotel.

Freiburg has, moreover, incorporated solar energy in all major new development areas, including Resielfeld and Vauban, new compact green growth areas in the city. Both active and passive solar techniques are employed in these projects, and the city also mandates a stringent energy standard for all new homes. In Vauban, some 5000 zero-energy homes – homes that produce at least as much energy as they need – have been built and a zero-energy office complex was added in 2006, along with two solar garages where photovoltaic panels cover the roof of the only allowable parking in the area. The emphasis on solar energy in the city has, in turn, set the tone and context for businesses and organizations. The Victoria Hotel in the centre of Freiburg, for instance, now markets itself as the world's first zero-emission hotel.

Source: Scheurer and Newman, 2008

1 reducing energy use wherever possible – especially in the building and transportation sectors;
2 adding as much renewable energy as possible, while being careful that the production of the renewable energy is not contributing significantly to greenhouse gases; and
3 offsetting any CO_2 emitted through purchasing carbon credits, particularly through tree planting.

There are a number of initiatives that focus on helping cities to reach these goals, including the International Council for Local Environmental Initiatives (ICLEI)-Local Governments for Sustainability's Cities for Climate Change, Architecture 2030, The Clinton Foundation's C-40 Climate Change Initiative, and UN-Habitat's Cities for Climate Change Initiative (CCCI). And as mentioned in the previous section, many municipalities have started to offer incentives and/or require that new buildings meet certain green building standards. Minimizing carbon at the building level has momentum as it is easier to integrate the technology within new buildings, and the benefits have been proven – not just in energy savings, but in increased productivity and fewer sick days in green office buildings.

Carbon neutral cities are able to reduce their ecological footprint

In Sydney (Australia), the State of New South Wales, through its Building and Sustainability Index programme, has mandated that new homes must now be designed to produce 40 per cent fewer greenhouse gas emissions, compared with an existing house (after initially requiring 20 per cent and finding it was relatively easy to achieve), as well as 40 per cent less water use. The programme aims at reducing CO_2 emissions by 8 million tonnes and water use by 287 billion litres in ten years.[15]

Zero-energy buildings and homes go well beyond what is required by any green building rating system. These have been built in The Netherlands, Denmark and Germany for at least ten years, and there are now increasingly positive examples in every region of the world. The UK government has decided that all urban development will be carbon

neutral by 2016, with phasing in from 2009. The Beddington Zero Energy Development initiative is the first carbon-neutral community in the UK. It has extended the concept to include building materials and, as it is a social housing development, it has shown how to integrate the green and brown agendas. In Sweden, the city of Malmö has stated that it has already become a carbon-neutral city, and Växjä has declared its intention to become a fossil fuel-free city. Other cities that also aspire to be carbon neutral include Newcastle in the UK and Adelaide in Australia. Each has taken important steps in the direction of renewable energy.

By committing to be carbon neutral, cities can focus their offsets into bioregional tree planting as part of the agenda for biodiversity as well as climate change. Preserving and planting trees helps to sequester carbon that is emitted. In all Australian cities, for instance, the carbon and greenhouse gas emissions associated with many municipal motor pools are being offset through innovative tree-planting initiatives and through organizations such as Green Fleet, which has recently planted its 2 millionth tree. The carbon offsetting is accredited through a federal government scheme called Greenhouse Friendly and provides a strong legal backing to ensure that tree planting is real, related to the money committed and guaranteed for at least 70 years, as required by the Kyoto Convention. Many of the carbon-offsetting programmes are going towards biodiversity plantations that are regenerating a bioregional ecology around cities.

Preserving and planting trees helps to sequester carbon that is emitted

Tree cover also helps to naturally cool buildings and homes and can reduce the use of energy for artificial cooling. An example of an urban initiative to provide greater tree coverage is the tree planting programme at the Sacramento Municipal Utility District in the US State of California. The programme has been actively promoting tree planting as a way of reducing energy consumption, and effectively addressing the urban heat island problem. Since 1990, the programme, which provides residents with free shade trees, has resulted in the planting of some 350,000 trees.[16]

Providing energy … through large centralized production facilities … is wasteful

All of these are good programmes; but none are committed yet to a comprehensive city-wide carbon-neutral approach that can link tree planting to a broader biodiversity cause. If this is done, cities can raise urban and bioregional reforestation to a new level and contribute to reducing the impact of climate change, simultaneously addressing local and regional green agenda issues.

Distributed power and water systems

The development of distributed power and water systems aims to achieve a shift from large centralized power and water systems to small-scale and neighbourhood-based systems within cities, including expansion of the notion of 'green infrastructure'. The distributed use of power and water can enable a city to reduce its ecological footprint, as power and water can be more efficiently provided using the benefits of electronic control systems; particularly through water-sensitive urban design, a city can improve its green character.

In large cities, the traditional engineering approach to providing energy has been through large centralized production facilities and extensive distribution systems that transport power relatively long distances. This is wasteful because of line losses, but also because large base-load power systems cannot be turned on and off easily, so there is considerable power shedding when the load does not meet the need.

Most power and water systems for cities over the past 100 years have continued to become bigger and more centralized. While newer forms of power and water are increasingly smaller scale, they are often still fitted into cities as though they were large. The movement that tries to see how these new technologies can be fitted into cities and decentralized across grids is called 'distributed power and distributed water systems'.[17]

The distributed water system approach is called 'water sensitive urban design'. It includes using the complete water cycle (i.e. using rain and local water sources such as groundwater to feed into the system and then to recycle 'grey' water locally and 'black' water regionally, thus ensuring that there are significant reductions in water used). This system can enable the green agenda to become central to the infrastructure management of a city, as storm water recycling can involve swales and artificial wetlands that can become important habitats in the city. Grey water recycling can similarly be used to irrigate green parks and gardens, and regional black water recycling can be tied into regional ecosystems. All of these initiatives require 'smart' control systems to fit them into a city grid and also require new skills among town planners and engineers, who are so far used to water management being a centralized function rather than being a local planning issue.[18]

Decentralized energy production systems offer a number of benefits, including energy savings, given the ability to better control power production, lessen vulnerability and achieve greater resilience in the face of natural and human-made disaster (including terrorist attacks). Clever integration of these small systems within a grid can be achieved with new technology control systems that balance the whole system as demand and supply fluctuates. A number of such small-scale energy systems are being developed to make cities more resilient in the future.[19]

There are now numerous cities that are able to demonstrate small-scale local water systems that are very effective.[20] The many developing country cities that already have distributed water supplies from community boreholes and small-scale sewage treatment can look to a number of cases where these have been made safe and effective without being turned into expensive centralized systems. For instance, Hanoi, the capital of Viet Nam, has a major system of wastewater reuse involving agriculture and aquaculture in the low-lying Tranh Tri district to the south of the city. Produce from the reuse system provides a significant part of the diet of the city's residents.[21]

The use of waste in a food production system must always be sensitive to public health requirements. Traditionally, wastewater has been gathered around cities and reused only after sufficient time has elapsed for human contaminants to be naturally removed. The use of the bioregion for waste treatment was feasible as its capacity to

Box 6.5 Urban sewage recycling in Calcutta, India

The largest single wastewater-fed aquaculture system in the world lies to the east of Calcutta, in West Bengal, India, in an area locally called the East Calcutta Wetlands. The wastewater-fed fish ponds currently occupy an area of about 2500ha, although they extended over an area of 8000ha up to the late 1950s. They are located in a 12,000ha waste recycling region for Calcutta City, which also includes cultivation of vegetables on wastewater and garbage, and paddy fields irrigated with fish pond effluent (see Figure 6.1). The wastewater-fed fish ponds have been developed by farmers who have, over the past 60 years, learned by experience how to regulate the intake of raw sewage into ponds to culture fish.

The area of wastewater-fed ponds has declined over the past 30 years, mainly due to urban expansion. Currently they provide employment for 17,000 poor fishermen and produce 20 tonnes of fish daily. Much of the harvest comprises fish less than 250g, which are purchased by poor urban consumers. The ponds provide a low-cost, natural wastewater treatment and reuse system for a city that lacks conventional wastewater treatment plants as well as providing fish food. The area of low-lying fish ponds also provides storm water drainage and a green area or lung for the city.

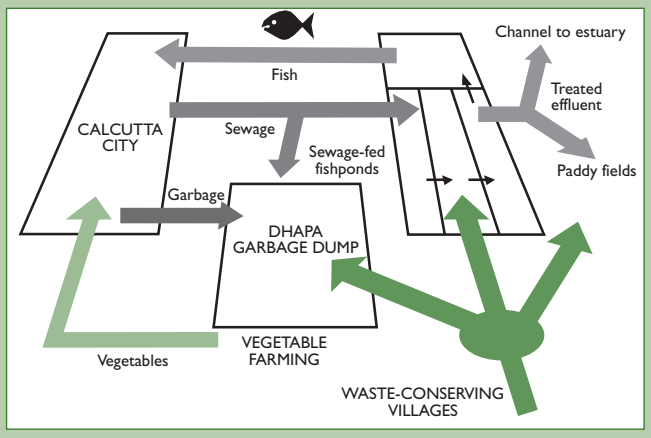

Figure 6.1

The waste reuse agro-ecosystem of the East Calcutta Wetlands, India

Source: Newman and Jennings, 2008

An important feature of the integrated wetland system is the participation of stakeholders: the Calcutta Metropolitan Water and Sanitation Authority, the local village authority, the fish farmers who lease the ponds, and the rice-farming households are all involved in the project. Agenda 21, the international plan of action which guides global, national and local action on human impacts upon the environment, emphasizes the need to institutionalize the participation of stakeholders in environmental improvement projects to achieve decentralized decision-making and management, in this case empowering a rural community for wastewater treatment and reuse. Another crucial feature is the successful implementation of a revenue-generating procedure that should ensure adequate management of the system.

Source: Newman and Jennings, 2008

treat was not exceeded. As cities have grown, the increase in waste has far outstripped natural treatment capacities. Thus, cities everywhere have to find ways of treating waste as well as reusing it. Approaches that can use new technology to totally remove waste are now feasible; but a distributed approach would try to use waste as much as possible in the bioregion for agricultural production, as in the East Calcutta Wetlands Project (see Box 6.5). Such approaches to water and waste require new technologies and management systems that integrate public health and environmental engineering with ecologically sound planning.[22]

Distributed power and water provision in cities needs community support. In Toronto a possible model similar to those outlined above in developing cities has been developed. Communities began forming 'buying-cooperatives' in which they pooled their buying power to negotiate special reduced prices from local photovoltaic companies that had offered an incentive to buy solar photovoltaic panels. This suggests the merits of combining bottom-up neighbourhood approaches with top-down incentives and encouragement. This support for small-scale distributed production – offered through what are commonly referred to as standard offer contracts (often referred to as 'feed-in tariffs' in Europe) – has been extremely successful in Europe, where they are now common. The same can be done with new technologies for water and waste, such as rainwater tanks and grey water recycling.

One other model example is the redevelopment of the Western Harbour in Malmö, Sweden. Here the goal was to achieve distributed power and water systems from local sources. This urban district now has 100 per cent renewable power from rooftop solar panels and an innovative storm water management system that recycles water into green courtyards and green rooftops.[23] The project involves local government in the management and demonstrates that a clear plan helps to drive innovations in distributed systems.

Distributed infrastructure is beginning to be demonstrated in cities across the globe. Utilities will need to develop models with city planners of how they can carry out local energy and water planning through community-based approaches and local management.

Increasing photosynthetic spaces as part of green infrastructure

Growing energy and providing food and materials locally … can bring substantial ecological benefits

Growing energy and providing food and materials locally is becoming part of urban infrastructure development. The use of photosynthetic processes in cities reduces their ecological impact by replacing fossil fuels and can bring substantial ecological benefits through emphasis on natural systems.

There has been a positive trend in planning in the direction of an expanded notion of urban infrastructure that includes the idea of 'green infrastructure' based on photosynthetic processes. Green infrastructure refers to the many green and ecological features and systems, from wetlands to urban forests, which provide a host of benefits to cities and urban residents – clean water, storm water collection and management, climate moderation and cleansing of urban air,

Box 6.6 Energy costs of food production in the US

The high energy costs of food production are vividly illustrated in the case of the US. It takes around 10 fossil fuel calories to produce each food calorie in the average American diet. So if an individual's daily food intake is 2000 calories, it takes around 20,000 calories to grow the food and get it to the person. This means that growing, processing and delivering food consumed by a family of four each year requires the equivalent of almost 34,000 kilowatt hours (kWh) of energy, or more than 3520 litres of gasoline. For comparison, the average US household annually consumes about 10,800kWh of electricity, or about 4050 litres of gasoline. Thus, as much energy is used in the US to grow food as to power homes or fuel cars.

Source: Starrs, 2005

among others. This understanding of green infrastructure as part of the working landscape of cities and metropolitan areas has been extended to include the photosynthetic sources of renewable energy, local food and fibre.

Renewable energy can be tapped from the sun and wind and geothermal sources using small-scale decentralized technology, as described in the previous section. However, renewable energy can also be grown through biofuels. The transition to growing fuels draws on crops and forests that can feed into new ways of fuelling buildings and vehicles. Farms and open areas around cities are being developed as sources of renewable energy, especially the production of biofuels. However, biofuels are also being produced as part of improving the urban environment. This means more intensive greening of the lower density parts of cities and their peri-urban regions with intensive food growing, renewable energy crops and forests, but greening the high-density parts of cities as well.

Renewable energy can be tapped from the sun and wind and geothermal sources using small-scale decentralized technology

The city of Växjä in Sweden provides an example of a locally based renewable energy strategy that takes full advantage of its working landscapes, in this case the abundant forests that exist within close proximity of the city. Växjä's main power plant, formerly fuelled by oil, now depends upon biomass almost entirely from wood chips, most of which are a by-product of the commercial logging in the region. The wood, more specifically, comes from the branches, bark and tops of trees, and is derived from within a 100km radius of the power plant. The power plant provides the entire town's heating needs and much of its electricity needs. Its conversion to using biomass as a fuel has been a key element in the city's aspiration to become an oil-free city. Clearly, each city can develop its own mix of local renewable sources; but Växjä has demonstrated that it can transition from an oil-based power system to a completely renewable system without losing its economic edge. Indeed, cities that develop such resilience early are likely to have an edge as oil resources decline.

One of the most important potential biofuel sources of the future will be blue-green algae that can be grown intensively on rooftops. Blue-green algae can photosynthesize so all that it requires is sunlight, water and nutrients. The output from blue-green algae is ten times faster than most other biomass sources, so it can be continuously cropped and fed into a process for producing biofuels or small-scale electricity. Most importantly, city buildings can all utilize their roofs to tap solar energy and use it for local purposes without the distribution or transport losses so apparent in most cities today. A green roof for biodiversity purposes, water collection, photovoltaic collectors or biofuel algal collectors can possibly become a solar ordinance set by town planners as part of local government policy.

Few cities have done much to take stock of their photosynthetic energy potential. Municipal comprehensive plans typically document and describe a host of natural and economic resources found within the boundaries of a city – from mineral sites, through historic buildings, to biodiversity; but estimating incoming renewable energy (sun, wind, wave, biomass or geothermal) is usually not included. In advancing the renewable energy agenda in Barcelona, the city took the interesting step of calculating incoming solar gain. As a former sustainable city counsellor noted, this amounted to '10 times more than the energy the city consumes or 28 times more than the electricity the city is consuming'.[24] The issue is how to tap into this across the city.

As well as renewable fuel, cities can incorporate food in this more holistic solar and post-oil view of the future. Food, in the globalized marketplace, increasingly travels great distances – apples from New Zealand, grapes from Chile, wine from South Australia, vegetables from China. 'Food miles' are rising everywhere and already food in the US travels a distance of between 2400km and 4000km from where it is grown to where it is consumed. Any exotic sources of food come at a high energy cost. The growing, processing and delivering of food in the US consumes vast amounts of energy on par with the energy required to power homes or fuel cars, as shown in Box 6.6.

There are now good examples of new neighbourhoods and development projects that design in, from the beginning, spaces for community gardens that attempt to satisfy a considerable portion of food needs on site or nearby. Growing food within cities and urban (and suburban) environments can take any number of forms. Community gardens, urban farms and edible landscaping are all promising urban options.[25] Prominent and compelling examples of edible urban landscaping have shown that it is possible to trade hard-scape environments for fruit trees and edible perennials. In the downtown Vancouver neighbourhood of Mole Hill, for instance, a conventional alleyway has been converted to a green and luxurious network of edible plants and raised-bed gardens, in a pedestrianized community space, where the occasional automobile now seems out of place. New urban development can include places (rooftops, side yards and backyards) where residents can directly grow food. This has been a trend in developed cities as new urban ecological neighbourhoods have included community gardens as a central design element (e.g. Viikki in Helsinki, Finland; South False Creek in Vancouver, Canada; Troy Gardens in Madison, US), but is perhaps most famous in Cuban cities over the past few decades in response to being cut off from oil imports (see Box 6.7). Urban agriculture is also widespread in other developing country cities, where it provides food and incomes for many poor households.

Cities need to find creative ways to promote urban farming where it is feasible, without creating tension with

redevelopment for reduced car dependence through increased density. This may mean that a city can utilize the many vacant lots for commercial and community farms in areas that have been blighted (e.g. the estimated 70,000 vacant lots in Chicago, US). However, if these areas are well served with good transit and other infrastructure, then such uses should be seen as temporary and, indeed, can be part of the rehabilitation of an area, leading to the development of eco-villages that are car free and models of solar building. Many cities have embarked on some form of effort to examine community food security and to promote more sustainable local and regional food production. These can be integrated within ecologically sustainable urban and regional rehabilitation projects[26] and can utilize the intensive possibilities of urban spaces, as in urban permaculture.

Progress in moving away from fossil fuels also requires serious localizing and local sourcing of building materials. This, in turn, provides new opportunities to build more photosynthetic economies. The value of emphasizing the local is many-fold and the essential benefits are usually clear. Dramatic reductions in the energy consumed as part of making these materials is, of course, the primary benefit. It is also about strengthening local economies and helping them to become more resilient in the face of global economic forces, and it is also about reforming lost connections to place.

Box 6.7 Urban food production in Havana, Cuba

After the collapse of the USSR during the late 1980s, Cuba lost Soviet aid, which had provided the country with modern agricultural chemicals. Thus 1.3 million tonnes of chemical fertilizers, 17,000 tonnes of herbicides and 10,000 tonnes of pesticides could no longer be imported. Urban agriculture was one of Cuba's responses to the shock, intensifying the previously established National Food Programme, which aimed at taking thousands of poorly utilized areas – mainly around Havana – and converting them into intensive vegetable gardens. Planting in the city instead of only in the countryside decreased the need for transportation, refrigeration and other scarce resources.

By 1998, over 8000 urban farms and community gardens had been established, run by over 30,000 people in and around Havana.

Today, food from the urban farms is grown almost completely with active organic methods. Havana has banned the use of chemical pesticides in agriculture within city boundaries.

Urban agriculture now taps into a significant part of the photosynthetic resource of the city; thus, the green agenda is advanced through the brown agenda of the city synergistically.

Source: Murphy, 1999

Improving eco-efficiency

In an effort to improve eco-efficiency, cities and regions are moving from linear to circular or closed-loop systems, where substantial amounts of their energy and material needs are provided from waste streams. Eco-efficient cities reduce their ecological footprint by reducing wastes and resource requirements, and can also incorporate green agenda issues within the process.

A more integrated notion of energy and water entails seeing cities as complex metabolic systems (not unlike a human body) with flows and cycles and where, ideally, outputs traditionally viewed as negative (e.g. solid waste and wastewater) are re-envisioned as productive inputs to satisfy other urban needs, including energy. The sustainability movement has been advocating for some time for this shift away from the current view of cities as linear resource-extracting machines. This is often described as the eco-efficiency agenda.[27]

The urban eco-efficiency agenda includes the 'cradle to cradle' concept for the design of all new products and new systems such as industrial ecology, where industries share resources and wastes like an ecosystem.[28] Innovative examples exist in Kalundborg (Germany) and Kwinana (Australia).[29]

The agenda has been taken up by the United Nations and the World Business Council on Sustainable Development, with a high target for industrialized countries of a tenfold reduction in consumption of resources by 2040, along with rapid transfers of knowledge and technology to developing countries. While this eco-efficiency agenda is a huge challenge, it is important to remember that throughout the Industrial Revolution of the past 200 years, human productivity has increased by 20,000 per cent. The next wave of innovation has a lot of potential to create the kind of eco-efficiency gains that are required.[30]

The view of cities as a complex set of metabolic flows might also help to guide cities that rely to a large extent on resources and energy from other regions and parts of the world. Relevant policies can include sustainable sourcing agreements, region-to-region trade agreements, and urban procurement systems based on green certification systems, among others. Embracing a metabolic view of cities and metropolitan areas takes global governance in some interesting and potentially very useful directions.

This new paradigm of sustainable urban metabolism requires profound changes in the way in which cities and metropolitan regions are conceptualized, as well as in the ways they are planned and managed. New forms of cooperation and collaboration between municipal agencies and various urban actors and stakeholder groups will be required. Municipal departments will need to formulate and implement integrated resource flow strategies. New organizational and governance structures will be necessary, as well as new planning tools and methods. For example, municipal authorities that map the resource flows of their city and region will need to see how this new data can be part of a comprehensive plan for integrating the green and brown agendas.

Cities and regions are moving from linear to circular systems … where … their energy and material needs are provided from waste streams

Toronto, for instance, has a trash-to-can programme, which allows the city to capture methane from waste to generate electricity. This not only reuses waste and provides an inexpensive energy source, but captures a significant amount of methane that would otherwise be released into the air. Before it reached capacity in its operation, it is estimated that Toronto's Keele Valley Landfill generated Cdn$3 million to Cdn$4 million annually, and provided enough power for approximately 24,000 homes.[31]

One extremely powerful example of how this eco-efficiency is able to shape urban design and building can be seen in the new dense urban neighbourhood of Hammarby

Box 6.8 Informal solid waste recycling in Cairo, Egypt

The problems surrounding solid waste management are common to all cities; but some of the solutions in Cairo are quite particular. For over half a century, Cairo has hosted traditional garbage-collecting communities called the Zabaleen. These communities collect trash throughout the city and have created what could arguably be one of the world's most efficient resource recovery and waste recycling systems. With their roots based in agriculture, the Zabaleen use the collected waste to generate income by selling sorted secondary material (paper, plastic, rags, glass, etc.) and using organic waste as pig fodder. It was estimated in 1997 that the Zabaleen collected 3000 tonnes of garbage every day, which is about one third of the total rubbish produced by Cairo's 14 million inhabitants. Almost 85 per cent of this waste was successfully recycled and used by artisans or for agricultural purposes, which is significantly higher than any industrialized waste collecting system. Yet, despite the incredible efficiency, many of the practices of the Zabaleen are considered environmentally unsound and the mixed use of the spaces in the communities is thought to be a threat to the health of their inhabitants.

In recent years, the city of Cairo has begun contracting large international waste management companies in an effort to upgrade its organization and technical standards and meet the needs of its ever-increasing population. Indeed, the need for regulation is felt when the municipal solid waste collection efficiency ranges anywhere from 10 per cent to 90 per cent. The aim of this system was to provide a uniform collecting system that would dispose of the garbage into designated landfills according to standardized procedures that would limit health and environmental hazards. Because these systems are technology based, however, effective processing, recycling and disposing of waste depend upon efficient management and training programmes, which often do not meet required performance standards. This privatization of waste collection has also caused a series of negative repercussions, manifested through public resistance to the new system and measures taken to implement it. Many prefer the informal methods used by the Zabaleen, and the linkage of the rubbish-collecting fees to the electricity bill has been the source of much complaint and resistance. The rubbish-collecting communities are threatened by the competition in a variety of ways. Instead of replacing the traditional methods, a complementary approach could prove to be more adequate.

Collection methods aside, much progress has been made with respect to the cleaning-up of informal city dump sites and the construction of several sanitary dump sites for Cairo to replace existing public landfills and open informal landfills. In 2004 the Ministry of State for Environmental Affairs launched a plan for the removal of historic dump sites in the city; in 2005, 7.75 million cubic metres of rubbish were moved to designated landfills. The removal of the waste aims to prevent fire hazards, improve health standards, and alleviate visual and olfactory blight, while providing public open spaces, thus integrating the green and brown agendas.

Source: Duquennois and Newman, 2008

Sjöstad in Stockholm. From the beginning of the planning of this new district, an effort has been made to holistically understand the inputs, outputs and resources that would be required and that would result. For instance, about 1000 flats in Hammarby Sjöstad are equipped with stoves that utilize biogas extracted from wastewater generated in the community. Biogas also provides fuel for buses that serve the area. Organic waste from the community is returned to the neighbourhood in the form of district heating and cooling. There are many other important energy features in the design as well. The neighbourhood's close proximity to central Stockholm and the installation of a high-frequency light rail system have made it truly possible to live without a private automobile (there are also 30 car-sharing vehicles in the neighbourhood). While not a perfect example, it represents a new and valuable way of seeing cities, and requires a degree of interdisciplinary and inter-sectoral collaboration in planning systems that is unusual in most cities.

Eco-efficiency does not have to involve just new technology, but can also be introduced into cities through intensive use of human resources, as in Cairo's famous Zabaleen recycling system (see Box 6.8). There are many other examples of how cities across the developing world have integrated waste management within local industries, buildings and food production.[32]

Increasing sense of place

Cities and regions increasingly understand sustainability more generally as a way of developing their local economies, building onto a unique sense of place, and as a way of nurturing a high quality of life and a strong commitment to community. The more place oriented and locally self-sufficient a city's economy is, the more it will reduce its ecological footprint and ensure that its valuable ecological features are enhanced.

Local economic development has many advantages in the context of sustainable development, including the ability of people to travel less as their work becomes local. Finding ways to help facilitate local enterprises becomes a major achievement for cities in moving towards a reduced ecological footprint. For instance, initiatives designed to help small towns in the US to grow their own jobs have been developed.[33] An approach for creating local enterprises that builds on the passions and resources of the local community and supports local businesses in their early vulnerable steps has also been developed.[34] The inaugural Enterprise Facilitation project, which is designed to create local jobs, was pioneered in the small rural town of Esperance, Western Australia, in 1985, but has since spread across three continents. The success of this initiative is reflected in the words of its chair:

> *We are proud to say almost 800 businesses – or 60 per cent of the entrepreneurs – we met are still running successful, sustainable operations and have contributed more than AU$190 million in revenue to the local economy … We have averaged almost 40 new business start-ups a year consistently in the last 20 years, which is quite a track record given Esperance has a population of just 13,500 people.*[35]

Local economic development has many advantages in the context of sustainable development

Pioneers of these initiatives have found, time and time again, that place really matters. When people have a sense of belonging and an identity in their town or city, they are keen to create local enterprises.

When communities relate strongly to the local environment, the city's heritage and its unique culture, they develop a strong social capital of networks and trust that forms the basis of a robust urban economy. As part of their local economic development priorities, many cities are placing increasing emphasis on local place identity, as social capital has been found to be one of the best ways to predict wealth in a community.[36] This approach to economic development, which emphasizes place-based social capital, has many supporters, but very few relate this to the sustainabil-

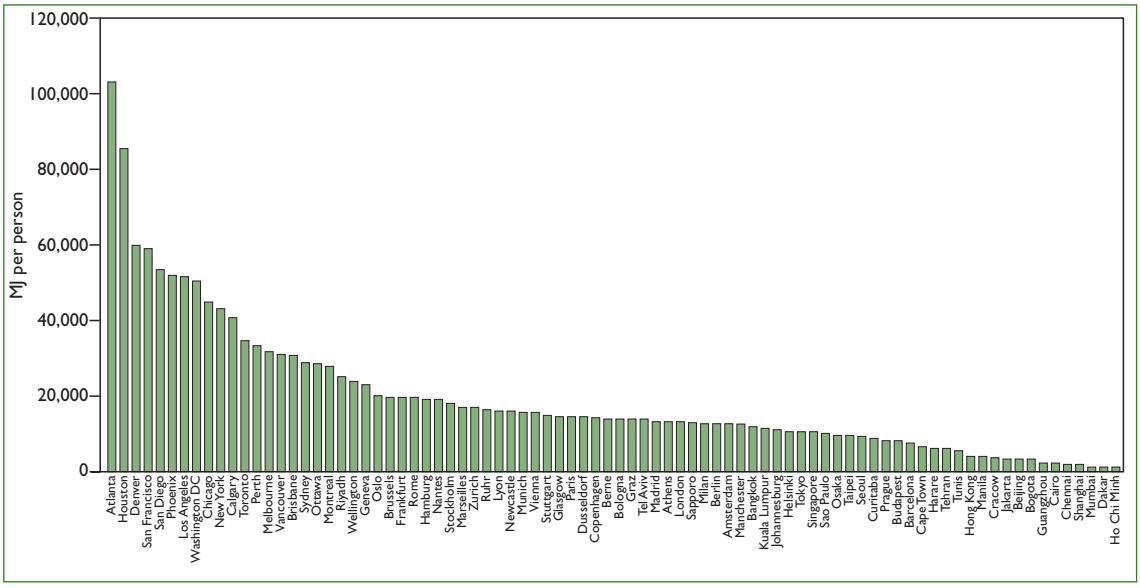

Figure 6.2

Private passenger transport energy use per person in selected cities, 1995

Source: Kenworthy and Laube, 2001

ity agenda in cities. For example, energy expenditures – by municipalities, companies and individuals – represent a significant economic drain as they often leave the community and region. Producing power from solar, wind or biomass in the locality or region is very much an economic development strategy that can generate local jobs and economic revenue from land (farmland) that might otherwise be economically marginal, in the process recirculating money, with an important economic multiplier effect. Energy efficiency can also be an economic development strategy. For example, as noted above, research on renewable energy and the creation of related products have developed into a strong part of the economy in Freiburg (Germany).

Efforts at localizing energy, food, materials and economic development remain dependent upon the strength of the local community. A study that examined a range of European urban ecology innovations concluded that when the innovations came from a close and committed community, they became ingrained in people's lifestyles, giving the next generation a real opportunity to gain from them. However, many architect-designed innovations that were imposed on residents without their involvement tended to fall into neglect or were actively removed.[37]

Sense of place is about generating pride in the city about all aspects of the economy, the environment and the culture. It requires paying attention to people and community development in the process of change – a major part of the urban planning agenda for many decades. This localized approach will be critical to integrating the green and brown agendas. It creates the necessary innovations as people dialogue through options to reduce their ecological footprint, which in turn creates social capital that is the basis for ongoing community life and economic development.[38] City dwellers in many countries already increasingly want to know where their food is grown, where their wine comes from, where the materials that make up their furniture come from. This can move towards every element of the built environment. Thus, as well as a slow movement for local foods, a slow fibre and slow materials movement for local fabric and building purposes can also help to create a sense of place and bring the green and brown agendas together.

City economies in the past had their own currencies and it has been argued that national currencies often fail to express the true value of a city and its bioregion.[39] Transforming urban economies towards a more bioregional focus has been assisted in some places by adopting complementary currencies that provide an alternative to national currencies and by establishing local financial institutions. It has been argued that a complementary local currency not only facilitates change, but also creates a community with a mutual interest in productive exchange among its members in the bioregion.[40] In this way, a community affirms its identity and creates a natural preference for its own products. Over 1000 communities around the world have issued their own local currencies to encourage local commerce. How this has been related to urban planning is set out in Box 6.9.

Many developed cities have created development bonuses similar to Curitiba's that are part of the non-monetary economy of the city. In contrast, cities in developing countries do not have much to invest in their public spaces; hence, the whole city economy suffers. Curitiba illustrates how cities could break that mould. Through the planning system, cities can create their own sustainability currencies for what they most need as determined by their local citizens – they just need to define them as 'development rights'. These new 'sustainable development rights' could be related to biodiversity credits, greenhouse reduction credits, salinity reduction credits, affordable housing credits or anything else that a community can create a 'market' for in their city and its bioregion.

Energy efficiency can also be an economic development strategy

Sustainable transport

Cities, neighbourhoods and regions are increasingly being designed to use energy sparingly by offering walkable transit-oriented options, often supplemented by vehicles powered by renewable energy. Cities with more sustainable transport systems have been able to reduce their ecological footprints

Box 6.9 Urban planning as 'complementary currency' in Curitiba, Brazil

Curitiba grew dramatically in the past few decades and a majority of its new residents lived in *favelas*. The town garbage collection trucks could not even get into the *favelas* because there were no streets suitable for them. As a consequence, the rubbish piled up, rodents got into it and all kinds of diseases broke out. Because they did not have the money to apply 'normal' solutions, such as bulldozing the area to build streets, Curitiba created a new currency: recyclables in garbage for bus tokens; biodegradable materials in garbage for a food parcel of seasonal fresh fruit and vegetables; and a school-based garbage collection programme also swapped garbage collected by students for notebooks. Soon the neighbourhoods were picked clean by tens of thousands of children, who learned quickly to distinguish even different types of plastic. The parents used the tokens to take the bus downtown, where the jobs were, so they were drawn into the formal economy.

What the city did was invent Curitiba money. The bus tokens, food chits and notebook credits were a form of complementary currency. Today, 70 per cent of all Curitiba households participate in this process. The 62 poorer neighbourhoods alone have exchanged 11,000 tonnes of garbage for nearly 1 million bus tokens and 1200 tonnes of food. During the past three years, more than 100 schools have traded 200 tonnes of garbage for 1.9 million notebooks. The paper recycling component alone saves the equivalent of 1200 trees each day.

Curitiba also has another complementary currency in its planning system that is commonly used by many cities, but is not thought of as a complementary currency. The system is called *sol criado* (literally, 'created surface') and it is similar to what many cities do by providing 'development or density bonuses', which are a form of money given whenever a developer does something that the local government wants but cannot always require (e.g. heritage restoration, conservation of green spaces, social housing or social infrastructure).

In Curitiba, like most cities, there is a detailed zoning plan that specifies the number of floors that can be built in each zone. Like most cities, there are two standards: the normal allowable standard and the maximum level, which can be allowed if other development credits can be given. For instance, a hotel with a ground plan of 10,000 square metres is being built in an area where the normal allowable level is 10 floors and the maximum 15. If the hotel owner wants to build 15 floors, he has to buy 50,000 square metres (five floors x 10,000 square metres) in the *sol criado* market. The city itself only plays the role of an intermediary matching demand with supply in that market. The supply for this *sol criado* currency is historical buildings based on another Curitiba currency. For instance, a beautiful historic landmark building called the Garibaldi House needed a serious restoration job. The club that owned it did not have the money to restore the building. But because it is located in an area where up to two floors of new construction could theoretically be built, it sold 50,000 square metres (two floors x 25,000 square metres) to the highest bidder for development rights. The proceeds belong to the club to administer, but have to be used to restore the property. Therefore, the hotel owner ends up paying for restoring the historic edifice in order to obtain the right to build the extra floors of the hotel, without financial intervention from the city.

Other sources of supply for such *sol criado* are green areas where trees are protected, and the construction of social housing in other parts of the town. Several of Curitiba's recent 16 extensive nature parks, open to the public, have been completely financed in this way. The owner of a large plot of land obtained the right to develop one side of the street on the condition that the other side became a public park. The new housing has an extra value because it is located at walking distance from the park; the people of Curitiba have another park for their weekend strolls; and the township does not have to go into debt or raise taxes to obtain all of that. Everybody wins when sustainability issues are made into a local currency.

Source: Newman and Jennings, 2008

To reduce a city's ecological footprint … it is necessary to manage the growth of cars and trucks and their associated fossil fuel consumption

from their reduced use of fossil fuels, as well as through reduced urban sprawl and reduced dependence upon car-based infrastructure.

The agenda for large cities now is to have more sustainable transport options in order to reduce traffic while reducing greenhouse gases by 50 per cent by at least 2050, in line with the global agenda set through the Intergovernmental Panel on Climate Change (IPCC). For many cities, the reduction of car use is not yet on the agenda, apart from seeing it as an ideal to which they aspire. Unfortunately, for most cities, traffic growth has been continuous and appears to be unstoppable. To reduce a city's ecological footprint and enhance its liveability, it is necessary to manage the growth of cars and trucks and their associated fossil fuel consumption.

Figure 6.2, which shows the variations in private transport fuel use across 84 cities, illustrates that there is a very large difference in how cities use cars and petroleum fuels.[41] A number of studies have shown that these variations have little to do with climate, culture or politics, and even income is very poorly correlated; but they have a lot to do with the physical planning decisions that are made in those cities.[42] There is debate about the relative importance of urban planning parameters, although within the profession there is increasing awareness that sustainable transport will only happen if much greater attention is paid to urban form and density; infrastructure priorities, especially relative commitment to public transport compared to cars; and street planning, especially provision for pedestrians and cyclists as part of sustainable mobility management.

■ Urban form and density planning

The density of a city determines how close to urban activities most people can be. Very high-density city centres mean that most destinations can be reached with a short walk or they can have highly effective public transport opportunities due to the concentration of people near stations. If densities are generally lower, but higher along corridors, it is still feasible to have a good transit system. If, however, low densities are the dominant feature of a city, then most activity needs to be based around cars as they alone can enable people to reach their destinations in a reasonable time. Public transport finds it hard to be competitive as there are just not enough people to justify reasonable services. Most low-density cities are

now trying to increase their densities in order to reduce their car dependence, as illustrated by the experience of Vancouver (Canada) described (see Box 6.10).

Density is a major tool available to planners in cities. It is best used where a city has good transit or wants to build transit, as the resulting transit-oriented developments (TODs) can reduce car use per capita among its residents by half and save households around 20 per cent of their income since they have, on average, one less car (and often none).[43] In the US, according to a 2007 study, shifting 60 per cent of new growth to compact patterns would reduce CO_2 emissions by 85 million metric tonnes annually by 2030.[44] TODs reduce ecological footprint in cities and undermine the kind of car-based sprawl that eats into the green agenda of cities. Thus, the TODs' strategy can enable a city to put in place a clear urban growth boundary and to build a green wall for agriculture, recreation, biodiversity and the other natural systems of the green agenda. Cairo's green belt is one attempt to do this.

If cities are dense, as in many developing countries, but do not have adequate public transport and allow too much traffic to develop in their streets, they can easily develop dysfunctional transport systems. However, their density will always enable them to provide viable public transport solutions if they invest in them, whereas low-density cities are always struggling to provide other options. High density means easier non-car-based access, but it can also mean much greater congestion whenever vehicles are used. If the vehicles in these confined spaces are poorly maintained diesel engines, then serious air pollution can result – so cities need to carefully manage the source of such emissions.

Infrastructure priorities and transit planning

The transit-to-traffic ratio measures how effective public transport is in competing with the car in terms of speed. A recent study has shown that the best European and Asian cities for transit have the highest ratio of transit-to-traffic speeds and have achieved this invariably with fast rail systems.[45] Rail systems are faster in every city in the study sample by 10 to 20 kilometres per hour over bus systems that rarely average over 20 to 25 kilometres per hour. Busways can be quicker than traffic in car-saturated cities; but in lower-density car-dependent cities, it is important to use the extra speed of rail to establish an advantage over cars in traffic. This is one of the key reasons why railways are being built in over 100 US cities, and, in many other cities, modern rail is now seen as the solution for reversing the proliferation of the private car. Rail is also important because it has a density-inducing effect around stations, which can help to provide the focused centres so critical to overcoming car dependence, and they are also electric, which reduces vulnerability to oil.

Many cities in the world are unable to make transit politics work effectively. While major US cities such as New York and Chicago are dense and walkable, and their mayors have been lauded for their green plans and for signing onto the Mayor's Climate Change Initiative, the mass transit systems of these cities continue to experience budget cuts. The city of Seattle, whose mayor is credited with initiating the US Mayor's Climate Change Initiative, has struggled to implement any type of rail system. While the State of California is a global leader on some state initiatives, it has not yet developed a plan for how its heavy oil-using cities will wean themselves off their cars.

Yet, across the world, cities are building modern electric rail systems at vastly increasing rates as they simultaneously address the challenges of fuel security, decarbonizing the economy in the context of addressing climate change, reducing traffic congestion sustainably and creating productive city centres. The trend towards fast electric rail in cities is now being called a 'mega trend'.[46] Chinese cities have moved from their road-building phase to building fast modern rail across the nation. China is committed to building 120,000km of new rail by 2020. Investment will rise from 155 billion yuan (US$22 billion) per year in 2006 to 1000 billion yuan per year by 2009 (US$143 billion), with around 6 million jobs involved. These projects are part of China's response to the recent global economic downturn.[47] Beijing now has the world's biggest metro. In India, Delhi is building a modern electric metro rail system, which has considerably boosted the city's pride and belief in the future. The 250km rail system is being built in various stages and will enable 60 per cent of the city to be within 15 minutes' walking distance of a station.[48]

Cities are building modern electric rail systems at vastly increasing rates

In Perth, Australia, a 172km modern electric rail system has been built over the past 20 years, with stunning success in terms of patronage and the development of TODs; the newest section runs 80km to the south and has attracted 50,000 passengers a day, where the bus system carried just 14,000 a day – the difference is that the train has a top speed of 130 kilometres per hour and averages 90 kilometres per

Box 6.10 Creating a walking city, Vancouver, Canada

The population of the city of Vancouver, like many North American downtown areas, began declining in the 1970s and 1980s, but then began to turn around and has since grown by 135,000 people in the last 20 years. Strong leadership from the city council led the 'return to the city' initiative as the city established policies to help create quality urban spaces, good cycling and walking facilities, reliable transit (generally, electric rail and electric trolley buses) and, most of all, high-density residential opportunities with at least 15 per cent social housing (public and co-operative housing). So successful has this been that the transportation patterns in the city have been transformed. A survey between 1991 and 1994 showed that there was a decline in car trips in Vancouver of 31,000 vehicles per day (from 50 to 46 per cent of trips), while the amount of cycling and walking went up by a staggering 107,000 trips per day (from 15 to 22 per cent). In the central area, car trips went down from 35 to 31 per cent.

Vancouver has been creating a walking city and families are moving back into the city in droves so that schools, childcare centres and community centres are becoming crowded, while there are fewer cars owned in the city than five years ago – probably establishing this as a world first, especially in a city undergoing an economic boom. One of the critical policies that has helped to make this work is the 5 per cent social infrastructure policy, where the city requires public spaces and social facilities to be provided through each development equal to 5 per cent of the cost of the development. The walkability of the city is the main focus of this money. Vancouver has also redeveloped many of its station areas around the Sky Train with similar walking qualities and, apart from a recent mistake, has not allowed freeway development.

Source: Newman et al, 2009

Box 6.11 Reclaiming public spaces through reducing car dependence in Paris, France

Paris, like many European cities, has a strong transit system and a walkable central area; but over recent decades it has lost a lot as it has given over more and more space to the car. Now, in a bid to reclaim its public spaces, it is implementing a series of policies to reduce the number of cars in the city, which include:

- creating a neighbourhood traffic calming programme to rival any city in the world;
- building 320km of dedicated bike lanes, along with the Velib Bike hire scheme in which bicycles are available every 300m throughout Paris;
- developing a new light rail transit (LRT) linking a dozen subway and express train lines as it goes around the city, providing cross-city linkages;
- setting aside 40km of dedicated bus-ways, or bus rapid transit (BRT), that enable buses to travel at twice their normal speed and with bus stops that have real time information;
- slowing down traffic on the 'red axes', which were once for one-way express traffic but will now be two-way 'slow ways', including cycle lanes and narrowed for the provision of more street trees;
- removing 55,000 on-street parking spaces every year;
- working towards a 'car free' oasis in the centre of Paris that includes all of the major iconic buildings and places; and
- planning to sink the Peripherique, the ring road freeway, and cover it with a huge park.

The mayor of Paris, who has swept Paris into the vanguard of best practice for greening urban transportation, says this makes good politics, as 80 per cent support has been found from Parisians for these innovations.

Source: Newman et al, 2009

hour, so the trip takes just 48 minutes instead of over an hour by car. London, especially with its congestion tax, which is recycled into the transit system, and Paris have both shown European leadership in managing the car (see Box 6.11).

While greening buildings, developing renewable fuel sources and creating more walkable communities are critical elements of the sustainable city, investing in viable, accessible transit systems is the most important component for them to become resilient to waning oil sources and to minimize the contribution of urban areas to climate change. Transit not just saves oil; it helps to restructure a city so that it can begin the exponential reduction in oil and car use so necessary for a sustainable future.

Building freeways does not help either the brown agenda or the green agenda

The opportunities for making major changes in a city if quality transit is a priority can be imagined; but their extent is often not seen to be more than a mere slowing of traffic growth. It has been shown that an exponential decline in car use in cities that could lead to 50 per cent less passenger kilometres driven in cars is possible.[49] The key mechanism is a quantitative leap in the quality of public transport, accompanied by an associated change in land-use patterns. This is due to a phenomenon called *transit leverage*, where 1 passenger kilometre of transit use replaces between 3 and 7 passenger kilometres in a car due to more direct travel (especially in trains), trip chaining (doing various other things, such as shopping or service visits associated with a commute), giving up one car in a household (a common occurrence that reduces many solo trips), and eventually changes in where people live as they prefer to live or work nearer transit.

■ Street planning and mobility management

If cities build freeways, car dependence quickly follows. This is because the extra speed of freeways means that the city can quickly spread outwards into lower-density land uses as the freeway rapidly becomes the preferred option. Building freeways does not help either the brown agenda or the green agenda. It will not help a city save fuel, as each lane rapidly fills, leading to similar levels of congestion that existed before the road was built.[50] Indeed, studies have shown that there is little benefit for cities when they build freeways, in terms of congestion, and as this is the main reason for building them, it does seem to be a waste. There is no overall correlation between delay per driver and the number of lanes of major roads built per head of population for the 20 biggest cities in the US.[51]

If, on the other hand, a city does not build freeways but prefers to emphasize transit, it can enable its streets to become an important part of the sustainable transport system. Streets can be designed to favour pedestrians and cyclists, and wherever this is done, cities invariably become surprised at how much more attractive and business friendly they become.[52]

Sustainable mobility management is about 'streets not roads' – the streets are used for a multiplicity of purposes, not just maximizing vehicle flow. The emphasis is on achieving efficiency by maximizing people movement, not car movement, and on achieving a high level of amenity and safety for all street users. This policy also picks up on the concept of integration of transport facilities as public space. One of the ways in which US and European cities are approaching this is through what are called 'complete streets', or, in the UK, 'naked streets'. This new movement aims to create streets where mobility is managed to favour public transport, walking and cycling, as well as lower speed traffic. The policy often includes removing all large signs for drivers, which means they automatically slow down: in Kensington High Road in London the traffic accident rate has halved because of this.

Gender needs to be considered in all stages of public transport planning, from design to implementation, in order to enable efficient mobility. In many developed countries, recognition of women as the main users of public transport and the multipurpose nature of their trips has led to some innovative design solutions. Stations and terminals in cities such as Tokyo (Japan) and Maryland (US) now contain grocery stores, childcare centres and improved public toilets. Changes to fare structures, such as discounts for women, families and elderly on off-peak services, have also allowed greater access to public transport. Designing public transport to suit the needs of users in this way encourages the substitution of less fuel-efficient forms of transportation such as private vehicles.

For urban planners, the choices for a more sustainable city are quite stark, although politically they are much more difficult, as the allure of building more road capacity remains very high. Many cities that have confronted the provision of a freeway have been global leaders in the move towards more sustainable transportation. Copenhagen, Zurich, Portland, Vancouver and Toronto all had to face the cathartic

experience of a controversial freeway. After a political confrontation, the freeway options were dropped. They decided instead to provide other greener options – hence, the building of light rail lines, cycle-ways, traffic calming and associated urban villages began to emerge. All of these cities had citizen groups that pushed visions for a different, less car-oriented city, and a political process was worked through to achieve their innovations. Similar movements are active in Australia.[53]

Freeways have blighted the centres of many cities and today there are cities that are trying to remove them. San Francisco removed the Embarcadero Freeway from its waterfront district in the 1990s after the Loma Prieta earthquake. The freeway has been rebuilt as a friendlier tree-lined boulevard involving pedestrian and cycle spaces. As in all cases where traffic capacity is reduced, the city has not found it difficult to ensure adequate transport, as most of the traffic just disappears. Regeneration of the land uses in the area has followed this change of transportation philosophy.[54] Seoul, in Korea, has removed a large freeway from its centre that had been built over a major river. The project has been very symbolic, as the river is a spiritual source of life for the city. Now other car-saturated Asian cities are planning to replace their central city freeways.[55]

What these projects have shown and encouraged is to 'think of transportation as public space'.[56] Freeways thus, from this perspective, become very unfriendly solutions as they are not good public spaces. However, boulevards with space for cars, cyclists, pedestrians, a bus-way or light rail transit (LRT), all packaged in good design and with associated land uses that attract many people, are the public spaces that make green cities good cities. In the UK, the Demos Institute has shown how public transport enables the creation of good public spaces that help to define a city.[57] The change of awareness amongst traffic engineers of this new paradigm for transportation planning is gathering momentum. 'Road engineers are realizing that they are in the community development business and not just in the facilities development business.'[58] This has been called the 'slow road' movement. In essence, it means that urban planners are asserting their role over traffic engineers or, at least, adopting an integrated approach rather than one that reduces city function down to vehicle movement.

With this changed approach to city planning, the small-scale systems of pedestrian movement and cycling become much more important (see Box 6.12). Pedestrian strategies enable each centre in a city to give priority to the most fundamental of human interactions: the walking-based face-to-face contact that gives human life to a city and, in the process, reduces ecological footprint.

Cycle-oriented strategies can be combined with the development of greenways that improve the green agenda and lower ecological footprint. Enough demonstrations now exist to show that pedestrian and bicycle strategies work dramatically to improve city economies and to integrate the green and brown agendas. Pedestrian and bicycle strategies in Copenhagen, most Australian cities, London, New York and San Francisco and Bogotá, as well as the dramatic changes in Paris with the Velib bicycle scheme and the growing awareness that it works in developing country cities, are all testament to this new approach to cities.[59]

Box 6.12 The Association of Bicycle Riders in São Paulo, Brazil

São Paulo, in Brazil, is a megacity of 19 million people. The dense transit-based city has a traffic problem, like many cities that have allowed cars to increase despite limited space. The result is one of the worst smog records in the world, causing severe respiratory problems. Cycling is not therefore an easy option for people. However, a growing movement for cycling facilities has led to an innovative project called ASCOBIKE (Association of Bicycle Riders). Cyclists wanting to ride to the rail station in Mauá had nowhere to park, so the station manager created a space for bikes to be locked up. Seven hundred spaces filled quickly; therefore a facility was created to park bikes, repair and maintain them and to provide a changing area for ASCOBIKE members who pay US$5 a month for the service. Approximately 1800 members have signed up. According to the environmental secretary of the city of São Paulo and the head of the bicycle working group: 'the parking lot in Mauá is interesting because users pay a low fee for a good service, and jobs are created as well. There is no reason why we could not reproduce this successful and efficient service throughout São Paulo.'

Source: Newman and Kenworthy, 2007

Developing cities without slums

'Cities without slums' is currently one of the most important goals of urban planning in developing countries. During recent years, there has been a resurgence of global concern about slums, manifested in the adoption of specific targets on slums, drinking water and sanitation in the Millennium Development Goals (MDGs). Attaining the goal of cities without slums will require innovative approaches that can enable slums to be upgraded, if not as models of sustainability, certainly in ways that address the most pressing brown and green agenda challenges of poor access to safe drinking water and sanitation, as well as degrading environmental conditions.

The United Nations Global Report on Human Settlements in 2003 entitled *The Challenge of Slums* presented the first global assessment of slums, emphasizing their problems and prospects. It showed that in many developing country cities, the numbers of slum dwellers far exceeded the numbers in formal residences. At present, slum dwellers constitute 36.5 per cent of the urban population in developing countries, with the percentage being as high as 62 in sub-Saharan Africa and 43 in Southern Asia. This section examines, briefly, the question of slums only in terms of the integration of the green and brown agendas and how this is contributing towards the realization of the goal of cities without slums.

Cycle-oriented strategies can be combined with the development of greenways that improve the green agenda

Cities are about opportunity and, across the world, people have moved to cities in increasing numbers, especially poorer people seeking a new life, with greater employment or livelihood opportunities – real or perceived. In many cities the ability to provide housing and services for large numbers of poor people is limited. Slums develop because of a combination of rapid rural–urban migration, increasing urban poverty and inequality, marginalization of poor neighbourhoods, inability of the urban poor to access affordable land for housing, insufficient investment in new low-income housing, and poor maintenance of the existing housing stock.

Most slums in developing country cities are generally built on empty public or private land on the periphery of the city, or elsewhere on physically unsafe land that is vulnerable to natural hazards. Often, such land is on steep slopes prone to landslides or in low-lying areas prone to flooding, or is so severely contaminated that no one else in the city wants it. Slums usually have dire consequences for the urban environment. They often deprive the city of foreshore land for flood control and natural bio-filtration from fringing wetland vegetation; severe erosion can result from steep slopes when they are settled upon; and, as the only source of domestic energy for slum dwellers is firewood, nearby land on the periphery of the city is often deforested.

Thus slums pose a significant threat to the green agenda. At the same time, the brown agenda for those living in the slums is seriously compromised as well. Most slum housing is built of simple and often makeshift materials that can only provide rudimentary protection against natural hazards. Invariably, levels of access to clean drinking water and safe sanitation are extremely low, resulting in basic health problems. Electricity is frequently stolen from grids and presents many risks in its use. The majority of slum dwellers can only participate in the informal economy, partly as a result of the social stigmatization of slums and of low levels of education and training.

Slums pose a significant threat to the green agenda

Despite these obvious problems, there are some positive aspects of slums in terms of the green and brown agendas. Slums are a very organic form of urban development, similar to how most cities in the world were originally formed and grew. They tend to create dense and mixed land-use forms that are similar to most 'walking cities' of ancient times. The narrow streets between slum buildings are suitable only for walking and, hence, the resultant areas, if upgraded, can become 'car free' and desirable, thus fulfilling one of the goals of sustainable urban design. This highly compact urban form is the basis for the strong urban communities and high levels of social capital that characterize most slum areas. Community ties in slums are often found to be much stronger, with higher levels of trust than in affluent suburbs where people do not know each other.

Slum upgrading is largely concerned with the brown agenda

Addressing the slum challenge is now a constant political issue in the cities of most developing countries. There are now some key guiding principles designed to help urban local authorities and governments in doing this, as further elaborated upon in Chapter 7 of this Global Report. The current trend is to address the phenomenon of slums through two strategies: first, large-scale upgrading of existing slums, which is the concern of the present discussion; and, second, adoption of urban and housing policies that prevent the emergence of new slums – which is the concern of the whole of this report.

Slum upgrading is largely concerned with the brown agenda. It consists of improving security of tenure (often through regularization of the rights to land and housing) and installing new or improving existing infrastructure and services, up to a satisfactory standard, especially water supply, sanitation and waste management, but also storm water drainage, electricity, access roads and footpaths. Typical upgrading projects provide improved footpaths, basic access roads, drainage, street lighting, water supply and sewerage. In most cases, upgrading does not involve home construction since the residents can do this themselves, but, instead, offers optional loans for home improvements. The poor are often willing and able to invest their own resources (labour and finance) in their housing. This has been demonstrated in many slum upgrading and site-and-service projects in many cities all over the world. This is the reason why the current best practice in slum upgrading involves communities from the outset and requires a contribution from poor households.

Further actions include the removal of environmental hazards, providing incentives for community management and maintenance, as well as the construction of facilities for basic social services, especially clinics and schools. Tenure rights are usually given to the occupants. Those who must be moved to make way for infrastructure may be given serviced plots in nearby areas. UN-Habitat has developed broad guidelines on large-scale slum upgrading, and some international initiatives, such as the joint World Bank–UN-Habitat Cities Alliance, have similar guidelines.[60]

Upgrading has significant advantages; it is not only an affordable alternative to clearance and relocation, which costs up to ten times more than upgrading, but it also minimizes the disturbance to the social and economic life of the community, including the often high levels of social capital – as illustrated in Box 6.13. The results of upgrading are highly visible, immediate and make a significant difference to the quality of life of the urban poor, especially in the area of environmental safety and human health.

With specific reference to the integration of the green and brown agendas, provision of basic infrastructure services, especially water supply, sanitation, waste management and energy, is at the core of slum upgrading. However, cities need to determine whether slum upgrading is appropriate if a slum community is occupying land that is vulnerable to natural hazards. Some river foreshore communities built into the river itself, for example, will always be highly vulnerable to floods. Engineering can be used to resolve this where feasible, as it is much better to enable a slum community to build on its foundations rather than be shifted.

Small-scale and distributed infrastructure of the kind that is outlined earlier in this chapter can be introduced into the narrow streets of slum communities. This will prevent complete destruction of the organic structure of slum areas by traditional pipes and roads that would not necessarily make it any better than new small-scale technology. However, there is also an argument that significant investment in city-wide trunk infrastructure by the public sector is necessary if housing in upgraded slums is to be affordable to the urban poor and if efforts to support the informal, often home-based, enterprises run by poor slum dwellers are to be successful.

Working with the community to enable them to participate in the development process and in the management of infrastructure can enable a slum community to thrive and develop pride in their green and brown achievements. They can become models of sustainability as they

create reduced levels of resource consumption while creating healthy and attractive living environments for the residents.

ADDRESSING THE GREEN AND BROWN AGENDAS THROUGH URBAN PLANNING AND GOVERNANCE

From the above trends in urban planning for sustainability and the many innovative examples cited, it is possible to see the potential integration of the green and brown agendas; the examples given throughout this chapter show many cities with solutions that work. One conclusion that can be made, however, is that those cities demonstrating these early elements of sustainability invariably have a serious commitment to urban planning. They were therefore prepared to try out some programmes or projects that could be seen as having long- term benefits for the city. It is, in fact, very hard to see how these innovations can be introduced into cities without viable and active urban planning systems. Thus, some conclusions are made below, drawing from these eight trends, about how urban planning can enhance sustainable urban development, before examining the kind of governance that is needed to make this happen.

Urban planning for sustainable urban development

The above eight sustainability trends (developing renewable energy; striving for carbon-neutral cities; developing distributed power and water systems; increasing photosynthetic spaces as part of green infrastructure; improving eco-efficiency; increasing sense of place; developing sustainable transport; and developing cities without slums) suggest that in order to integrate the green and brown agendas in cities, there will need to be:

- Renewable energy strategies showing how to progressively tap local resources. Such strategies should involve recognition of renewable resources in and around a city as part of the capital base of the city and establishing ordinances on buildings that facilitate the application of renewable energy.
- Carbon-neutral strategies that can enforce energy efficiency, integrate with the renewables strategy and direct the biodiversity offsets to the bioregion. This can be enforced through planning schemes that mandate standards for significant reductions in carbon and water in all development, that prevent the loss of arable and natural land in the bioregion, and direct planting to areas that are most in need of revegetation.
- Distributed infrastructure strategies that enable small-scale energy and water systems to flourish. This can be built into the requirements for urban development and can be facilitated by providing incentive packages with new buildings for technologies, such as photovoltaic cells, grey water systems and water tanks, with local plans for the governance of community-based systems, as well as region-wide strategies for recycling sewage.
- Green infrastructure strategies that include the photosynthetic resources of the city and which can enhance the green agenda across the city through food, fibre, biodiversity and recreation pursuits locally. This can be achieved through development controls that focus on how the rooftops (and walls) of buildings can be used for photosynthetic purposes, as well as zoning areas for urban photosynthetic activity, including growing biofuels, food and fibre, and biodiversity in and around the city.
- Eco-efficiency strategies linking industries to achieve fundamental changes in the metabolism of cities. This can be done by taking an audit of all the wastes of the city and seeing how they can be reused through stakeholder participation and government facilitation.
- Sense of place strategies to ensure that the human dimension is driving all of the other strategies. This can be assisted by local economic development strategies, by place-based engagement approaches to all planning and development processes, and by the innovative use of 'sustainability credits', or complementary currencies, to implement local sustainability innovations as development bonuses.
- Sustainable transport strategies incorporating:
  - quality transit down each main corridor, which is faster than traffic;
  - dense TODs built around each station;
  - pedestrian and bicycle strategies for each centre and TOD, with cycle links across the city;
  - plug-in infrastructure for electric vehicles as they emerge;
  - cycling and pedestrian infrastructure as part of all street planning; and

Box 6.13 Impacts of resettlement of slum dwellers in high-rise apartments, Jakarta, Indonesia

A study of slum dwellers living along the Ciliwung River in Jakarta surveyed the residents and compared them to residents of a nearby high-rise apartment block who had previously been slum dwellers but had been moved out into a modern high-rise complex. The question Arief (1998) asked was whether the shifting of squatters was more sustainable in terms of their impact upon the environment, their economic opportunities and their community health. The apartment dwellers were found to use a little less energy and water (as they had to pay for it), and their waste management was considerably better since the slum dwellers put all waste directly into the river. In human terms, the apartment dwellers had improved incomes and employment (they were able to enter the formal economy) and had similar levels of accessibility and health (surprisingly); but in terms of all community parameters, the slum development was far superior because the layout of the housing encouraged people to know and trust their neighbours. Over 80 per cent of people were able to trust their neighbours and lend them things, while this was less than 20 per cent in the high-rise development. The lack of community orientation in the high-rise design questions the fundamentals of its development ethos. Arief points to alternatives such as the Kampung Improvement Scheme, which is a more organic way of rebuilding slums that uses the community structure in the area.

Source: Silas, 1993; Arief, 1998

Cities demonstrating … elements of sustainability invariably have a serious commitment to urban planning

Urban governance function	Example structure/ mechanism	Skills required
Regional strategic planning that can cross local boundaries on transport, biodiversity, climate change, water, waste, housing, etc. and cover the whole metropolitan region	Regional planning authority	Big picture planning, visionary, strategic planning frameworks
Statutory development control function that can be encouraged at the regulate for common good outcomes and implement the regional plan in each local community	Town planning schemes and by-laws for building and development approvals	Appropriate regulation and recognition of how innovation can same time
Project assessment function that can enable infrastructure and land development to be controlled for common good outcomes	Planning and environment authority	Relates strategic goals to the assessment of spatial benefits and costs of infrastructure, as well as establishing conditions on major developments
Development facilitation function that can help to set up demonstrations of sustainability innovations, especially in redevelopment projects	Development authority	Relates strategic goals to innovations and demonstrations; sets up partnerships between government and private sector
Development financing function that can link sustainability programmes to innovative ways of financing change	Local authority and regional planning authority	Able to generate funds from rates, taxes, bonds, public–private partnerships, development bonuses (non-cash finance) and land value capture
Community engagement function that can enable decisions to be made that ensure sustainability outcomes	All planning bodies	Deliberative democracy skills that bring all stakeholders together with professionals and citizens to ensure visionary plans are translated into actions

Table 6.2

Planning and governance for sustainable urban development

  - a green wall growth boundary around the city preventing further urban encroachment.
- Innovative approaches that can enable slums to be upgraded, if not as models of sustainability, in ways that address the most pressing brown and green agenda challenges of poor access to safe drinking water and sanitation as well as degrading environmental conditions.

Governance for sustainable urban development

Sustainable urban development planning, like all long-term planning, requires governance that goes beyond market forces and can help to create widely accessible infrastructure and community services.[61] Table 6.2 sets out the six core functions of urban governance that would be needed for sustainable urban development. Examples of the types of structures, or mechanisms, that are needed for this and the professional skills required are also listed.

Sustainable urban development planning … requires governance that … can help create widely accessible infrastructure and community services

A regional planning process to guide the integration of the green and brown agendas is necessary. The challenges outlined in this chapter cannot be addressed effectively without a regional plan that incorporates the whole city and its region. Cities have grown everywhere to engulf local authorities in surrounding rural areas; in many countries, there is now a need for a metropolitan-wide perspective on most of the issues raised in this chapter. However, this will mean nothing without a local planning process capable of delivering public goods and services (see Box 6.14).

There is also need for an effective statutory process to enable key land-use decisions and regulations to be made legally enforceable. Urban planning has become enmeshed in regulations from the past and needs to revise these at the same time as it faces the new challenges of sustainable development. Bigger projects and decisions on infrastructure should be part of a development assessment process that can bring in wider economic benefits and reduce costs while setting common good conditions.

To balance this kind of regulatory approach, urban governance should also include a development facilitation function to ensure that innovations and demonstrations are set up in partnerships between government, industry and the community. The glue that will make this all work will be a development financing function that can tap old money sources, such as rates and taxes, and new money sources, such as public–private partnerships, development bonuses and capture of increased land value. A partnership process, including public–private partnerships in financial capital and public–community partnerships in social capital, are useful for demonstrating innovations in sustainable urban development. Private-sector partnerships in infrastructure can enable governments to do more, to spread risk, to improve their innovations and to lock in key links between infrastructure and land use, such as TODs and rail. Community-sector partnerships, as in the case of Vauban, can enable community values and visions to be tapped and turned into mainstream strategies.[62]

Finally, there is need for a participatory process that can help to develop and deliver sustainability visions, as already elaborated upon in Chapter 5. The social capital of the city needs to be strengthened as these new challenges are faced. This cannot happen without deliberative processes engaging communities in their future.[63] It is further important to incorporate a gendered perspective in planning for sustainable development and to engage women (who are often more directly dependent upon and involved with the urban natural environment) fully in the process. Many cities' sustainability strategies now include goals of equity and social justice, with gender included under this umbrella. Urban planning has experimented with emerging engagement processes and must now seek to make them part of day-to-day governance systems.

CONCLUDING REMARKS

Linking the green and brown agendas in a comprehensive and planned way is a relatively new challenge for cities. This will not be possible without a revived and regenerated approach to urban planning. As one writer suggests:

> *The urban planning profession needs a new generation of visionaries, people who dream of a better world, and are capable of designing the means to attain it. That, after all, is the essence of planning: to visualize the ideal future community, and to work towards its realization.*[64]

The sustainable urban development vision is a big one. It is being embraced, in part, by some cities; but none are able yet to fully demonstrate how to improve human health and liveability while simultaneously reducing their ecological footprints and improving the natural environment. It is likely that there will be many years of demonstrations and innovations before the necessary processes of sustainable urban development are fully mainstreamed. Urban planners should be at the forefront of these demonstrations and innovations, whether they are working in the government, private or non-governmental sector. They now need to find ways of creatively integrating these innovations within mainstream urban planning and governance systems.

Those cities that are hoping to compete in the global marketplace are realizing that they cannot only emphasize economic growth, but must at the same time create a good urban environment. This chapter has established that a good urban environment requires a simultaneous integration of improvements to the built and the natural environments. This integrated agenda is very difficult to implement without effective urban planning and an urban governance system that facilitates it. As a result, there is an increased need for urban planning to play a major role in the cities of the 21st century.

The biggest challenge facing cities in the near future will be how to manage the transition to a post-fossil fuel world, as the global governance system increasingly firms up its commitments. This will be compounded by the recent global financial downturn, which may slow down some of the major green and brown agenda integration programmes, such as slum upgrading. However, government-funded green infrastructure and energy programmes currently being initiated in some developed countries in order to stimulate economic activity and generate jobs may offer significant opportunities for cities to implement some of the innovations described in this chapter.

Box 6.14 Renewing urban governance in Indian cities

Like many cities in the emerging economies of the world, Indian cities have the combined challenges of a rapidly growing population, increasing consumption and mobility, inadequate infrastructure, and an urban governance system dating from colonial times. In December 2005, the Government of India announced the Jawaharlal Nehru National Urban Renewal Mission – a programme of US$11 billion over seven years designed to renew the infrastructure, clean the environment and reduce poverty in the 60 largest cities in India. However, for cities to access the fund, they must undergo 22 reforms in their urban governance.

The reforms are essentially to enable cities to have a more devolved and local democratic form of governance, and to develop a more healthy municipal tax base. Both are critical to making urban planning work better. Cities in India have largely been the responsibility of state governments, particularly in the area of housing, transport and urban development. This means that they are mostly financed by small budgetary allocations from states, so local governments cannot create a strong urban planning function. Civic government expenditure in India is just 0.6 per cent of national gross domestic product (GDP), compared to 5 per cent in Brazil and 6 per cent in South Africa, and even higher levels in developed countries.

The first of the Jawaharlal Nehru National Urban Renewal Mission projects are in solid waste management and sewerage systems. Changes in urban governance are under way. Delhi, for example, which is governed by a municipal commissioner appointed by the state government, will now appoint a Metropolitan Planning Committee to ensure that devolved and integrated urban planning occurs and to facilitate more effective financing of infrastructure through the use of bonds and public–private partnerships. Both innovations require local involvement through tapping of social capital and ensuring there is a local revenue base. It is hoped that as a result of such reforms, the capacity and legitimacy of urban planning will be further enhanced in the city.

Source: Johnson, 2008

A good urban environment requires … simultaneous … improvements to the built and the natural environments

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CHAPTER 7

PLANNING AND INFORMALITY

The dynamics of urban change include both expansion to accommodate growth and constant adaptation of urban built environments. Planning aims to facilitate and regulate both; but in practice they take place without reference to the planning system, especially in the cities of developing countries. The conventional assumption is that such development which does not conform to planning regulations is both undesirable and illegal. Much effort has been devoted to extending land-use planning and development regulation to incorporate all urban development, while existing informally developed areas have often been neglected or demolished. The impossibility of achieving the goal of controlling all new development and redevelopment, given the rapid pace of urban change and resource limitations, has led to some rethinking.

The conventional assumption is that … development which does not conform to planning regulations is both undesirable and illegal

The aim of this chapter is to identify the trends and patterns of informal development in urban areas, discuss their implications for urban planning and review recent urban planning responses to informality. It begins with an overview of the concept of informality and then reviews this specifically within the context of urban areas. Trends in informal development and the resultant urban forms are examined next, with reference to various regions of the world. Based on this analysis, challenges and opportunities for planning are summarized in the subsequent section, followed by a review of innovative planning responses to informality and urban expansion. Ways in which planning can, within the context of wider urban governance and management systems, respond to informality are also outlined. Finally, the conclusion assesses the prospects for addressing the challenges posed by informal urban development more effectively through new and more responsive planning approaches.

There are many links between formal and informal operators and activities

INFORMALITY

The term 'informal sector' is attributed to Keith Hart in a paper on the working poor in Accra (Ghana) given at a conference in 1971[1] and immediately taken up by the International Labour Organization (ILO) in a study of the urban economy in Kenya.[2] Coined to describe small-scale economic activities and unregulated employment, the term is also applied to land and property development. The existence of practices and enterprises with the characteristics that came to be labelled 'informal' had, however, long been recognized in analyses of urban centres throughout the world.

Early definitions such as that of the ILO focused on three of the key characteristics of informal enterprises, including those involved in house construction and service delivery: first, in each enterprise there is a substantial overlap between the provider of capital and the provider of labour; second, the sector consists largely of unincorporated enterprises that operate outside employment regulations and without acquiring non-labour inputs, such as licences; third, the sector is characterized by the small scale of enterprise operations and high levels of competition.[3] Many studies and also official statistics adopt a definition that focuses on the second of these characteristics – the violation of formal state rules and regulations related to planning, building, employment, licensing, taxation, etc.

Often, the 'informal sector' is seen as a distinct sphere operating independently from the formal sector and the state. However, in practice there are many links between formal and informal operators and activities, and informal activities do not exist in isolation from state structures or bureaucratic requirements – rather than being 'outside' the state sphere, they interact with it in complex ways.[4] Not only do many informal operators interact with and depend upon state employees and service providers, informal activities are pervasive within bureaucratic structures, ostensibly formal development processes and formal enterprises (e.g. the use of political and personal connections to do business and the evasion of regulatory requirements).

Despite the lack of conceptual clarity, diversity of definitions and a tendency to categorize 'formal' and 'informal' as a dichotomy, the terms have continued to be widely used, even by their critics. Both have long been acknowledged as problematic concepts; but because there are no satisfactory alternatives, they will continue to be used in the remainder of the chapter on the understanding that they are 'constructed opposites':[5] rather than there being two distinct sectors or types of activity, there is a continuum of closely related development activities, enterprises and forms of work.

CHARACTERISTICS OF URBAN INFORMALITY

The formal–informal continuum is central to contemporary analyses of urban development. It has been applied to many aspects of urban development, especially the built environment, the urban economy and the provision of services. A state land administration system embraces tenure and its registration, regulation of land use and development, property taxation, and direct public intervention, often involving public landownership. Generally, urban development that comes within the purview of this system and complies with its legal and regulatory requirements is labelled 'formal' and all land subdivision and development that do not comply with one or another requirement are considered 'informal'.

The characterizations and definitions of informal urban land and housing development have varied greatly.[6] Generally labelled shanties, squatter settlements or slums, the existence of informal housing areas had been recognized and often condemned long before the 1970s, although the processes by which they were produced were often assumed rather than properly understood. Backed by the writings of Charles Abrahams and John Turner, calls for recognition of the role of 'self-help housing' in accommodating growing urban populations were made during the first United Nations Conference on Human Settlements in 1976 in Vancouver (Canada). It was recognized that land subdivision and transfer, construction, livelihoods strategies and the provision of services can have formal and informal characteristics.

Informal land and property development occurs in areas that are undeveloped because they are zoned for future development, are beyond the current built-up area or are unsuitable for development. Thus, informal settlements, especially those formed and occupied by the poor, are often on sites that are reserved for environmental conservation purposes or are vulnerable to floods, landslips or other hazards. However, much informal settlement occurs on land that is suitable for development, although it may be beyond the area served by mains services.

The extent to which development in such areas is consonant with official planning standards varies, depending upon how the process of subdivision and occupation is organized and how realistic the official standards are for low-cost development. Actual tenure rights depend upon who owns the land, who sanctions transfers to new owners, political connections, the attitude of the responsible authorities and the prospects for regularization. In many settlements, property owners have no security of tenure and therefore invest little in their houses or other aspects of neighbourhood development. Frequently, however, because the informal subdivision was undertaken by people with ownership rights to the land, time has elapsed without evictions, political connections have been made, and some services have been installed, property owners perceive their tenure as relatively secure and invest in building improvements. Typically, informal provision of the most crucial services (i.e. water, transport and electricity) is organized by individual households or local entrepreneurs as soon as settlement occurs. Other entrepreneurs open businesses to serve local demand, including personal services, building materials supply and privately run clinics, pharmacies and schools. Whether an area becomes permanent, receives official services and generates investment in house improvements depends upon whether or not it is recognized by the responsible authorities. In some cases, individual property owners may seek to register title to the land they have bought. More frequently, leaders and residents in an area seek tenure regularization and physical improvements for the area as a whole.

In addition to the processes of informal settlement described above, in many cities there is much informality in the development of middle- and upper-income residential neighbourhoods. Landowners often manage to obtain detailed layout and building permission for developments in areas not zoned for immediate development, either because the development permission process is ineffective or through influence or corruption. Such areas are often gated communities, built to high standards and self-sufficient in terms of services, but may not comply with broad strategic planning or environmental policies. Alternatively, development may occur in designated areas, but at a higher density or lower building standard than specified because development and building-control officers are powerless to enforce regulations or can be prevailed upon through influence or under-the-counter payments. Reports of buildings constructed in this way as collapsing are all too frequent. Formal service provision sometimes lags behind the development of such areas.

The formal-informal dichotomy is central to contemporary analysis of urban development

Informal development also occurs within existing built-up areas; as densities increase, owners invest in their properties and worn-out buildings are renewed. In both informally developed and formal areas, including areas of government housing, increased plot coverage or the construction of additional storeys may take the density of development beyond the permitted plot coverage and floor area ratios; building extensions and business operations may intrude into public space, including roads; and buildings may be put to uses other than those for which the area is zoned.

Urban enterprises that do not comply with registration, licensing and employment regulations are considered to be informal

An additional aspect of informality in urban areas relates to economic activities. Urban enterprises that do not comply with registration, licensing or employment regulations are considered to be informal. Failure to comply with legal requirements may also mean that the goods and services produced are themselves illegal. However, this is not necessarily the case, and a distinction can be drawn between informal and criminal activities.[7] Informal service provision can refer either to services provided by organizations that are not registered, regulated or subcontracted by the relevant provider, or to the illegal use of official services.

Further to the close association between informality and illegality, a link is often made between informality and disorganization. This perception persists despite many analyses that have drawn attention to the complex economic and social networks that enable informal actors, processes and enterprises to operate, on the one hand, and constrain their independence, on the other.[8] In practice, informal activities,

Regions	Procedures (number)	Time (days)	Cost (% of income per capita)
Developed countries	7.3	21	7.1
Developing countries	9.8	51.5	79.9
Africa	10.7	52.6	138.8
Asia and the Pacific	8.8	39.5	40.7
Latin America and the Caribbean	9.8	68.3	43.6

Table 7.1

The cost of regulation: Requirements to start a legal business

Note: Number of procedures, time and cost have been calculated as averages for countries in the respective region.

Source: World Bank, 2007a

like formal activities, comply with rules, although the sources of rules and the means through which they are specified and enforced are different from laws governing formal activities.[9] Sometimes the apparent lack of organization is considered to prevent the informal sector from fulfilling its potential as a generator of new employment, profits and economic growth. The policy prescriptions to which such perceptions give rise include variants on the theme of formalization and encouragement of residents and informal entrepreneurs to form organizations. The latter is said to enable groups (e.g. savings and credit groups, co-operatives, land development trusts and market committees) to assemble resources, access government services or reduce risk.

The view of informal activities as illegal or irregular has given rise to various debates – in particular, whether they occur because of the constraining effects on developers, individuals and enterprises of laws, regulations and bureaucratic requirements, and whether the public costs of non-compliance exceed private benefits. Generally, informal land subdivision and property development is a response to ineffective planning, inappropriate standards and unenforceable regulations. The presence of informal economic activities illustrates governments' inability to catch all enterprises in the regulatory or statistical net – they are informal because of arduous registration procedures and inappropriate standards or requirements (see Table 7.1). Employment in the informal sector is also generally considered as a survival strategy when there is insufficient formal employment for all and no social safety net, as well as responses to demand generated by wages earned in formal employment. The motivations for informal development thus vary, from a desperate need to find an affordable place to live and work, to a desire to maximize profit.

Informal land subdivision and property development is a response to ineffective planning

Views on whether the informal economy is potentially a source of economic growth and development vary. Depending upon the line taken, different responses to the informal sector are considered appropriate. For example, if informal activities are thought to occur because of inappropriate legal and bureaucratic requirements, and this is seen as hindering market development and economic growth, then reducing or reforming regulatory restrictions may be advocated.[10] Similarly, if formal actors and government agencies are perceived to be willing and able to extend their activities and reach poor households, they may be facilitated to do so, while informal processes and enterprises are temporarily tolerated or restricted. Alternatively, if informal actors are considered to be responding to demands that government agencies or formal enterprises are unwilling or unable to meet (e.g. for land subdivision, house construction, convenience retailing or personal services), then policy prescriptions may facilitate rather than constrain their activities – for example, by simplifying bureaucratic requirements or providing credit.[11] However, if the public costs of evasion are considered significant, then governments may attempt to ensure compliance with regulations, register property and bring informal enterprises and workers within the regulatory and tax systems.

In the cities of rich Northern countries with well-developed planning systems, development regulations are widely accepted and observed. When only occasional violations occur, it is possible to enforce laws and regulations, with the result that almost all development complies with land-use plans and associated standards and regulations. At the other end of the spectrum, in some cities very little development fully complies with planning laws and regulations; implementation of standards, often unrealistic, is limited; and enforcement when violations are widespread is impossible.

GLOBAL TRENDS IN URBAN INFORMALITY AND EXPANSION

In this section, trends with respect to informal urban development in different parts of the world are reviewed, with particular emphasis on processes of urban expansion, although informality within the urban built environment as it evolves over time is also considered. On the basis of the review, the factors that shape informality are identified and the influences of informality on urban forms summarized.

Asia

Much economic activity in Asian cities takes the form of 'informal' manufacturing and services, which, on average, accounted for an estimated 65 per cent of non-agricultural employment between 1995 and 2000.[12] The scanty time series data available indicates that informal employment as a proportion of total urban employment has increased over time in the region.[13] In Mumbai, for example, this has increased from one third during the 1960s to two-thirds during the 1990s, as formal job creation has not kept pace with growth in the urban labour force.[14]

Informality in cities of the region is also manifested in terms of housing. In 2005, an estimated 36.5, 42.9, 27.5 and 24 per cent of the urban population in Eastern Asia, Southern Asia and South-Eastern Asia and Western Asia, respectively, lived in slum settlements.[15] While the proportion of urban slum dwellers in the sub-regions is high on average, there are variations between countries ranging from as high as 78.9 per cent in Cambodia to 26 per cent in Thailand.[16]

Within the built-up area of cities, neighbourhoods that do not comply with planning and building regulations include both areas of tenement housing and informal settlements. The former, including, for example, *bustees* in Kolkata or *chawls* in Mumbai, are inner-city areas that may

be zoned for housing, but in which densities have increased over time, services are overburdened, buildings are structurally dilapidated and the environment is degraded.

Wherever there are pockets of undeveloped public and, to a lesser extent, private land, they are likely to have been informally occupied under a variety of tenure arrangements, including squatting and informal rental, as poor people seek places to live that provide them with access to livelihoods and services. Even when tenure rights are negotiated with the landowner, the development does not comply with regulatory requirements due to its supposed temporary nature, the poverty of its inhabitants, or the use of locations unsuitable for residential use (e.g. areas liable to flooding, land in road and railway reserves).

In addition to the densification and redevelopment of existing towns and cities, it is estimated that much future urban growth in the region will be accommodated in peri-urban areas where informal development is widespread: three-quarters in Jakarta, over half in Bangkok and 40 per cent in China by 2025.[17] Demographic and physical growth in urban areas has led, over the last 20 to 30 years, to the emergence of sprawling metropolitan regions. The term *desakota*,[18] for example, was coined to describe the new urban forms observed in South-East Asia.[19] These emerged in areas with historically high rural population densities, typically associated with smallholder agriculture. They are the result of economic and physical development processes, including the outward migration of residents, entrepreneurs and developers from the built-up areas of cities in search of vacant lower-cost land; the de-agrarianization of rural economies in peri-urban areas; and the densification of villages by local landowners in response to growing demand for housing. Metropolitan growth was also encouraged by the weakness of regulatory controls. Local governments allowed substandard construction, failed to enforce environmental regulations and permitted lax labour practices in their efforts to secure investment.[20] Rapid economic growth and globalization have intensified the process, leading to the emergence of extended metropolitan regions that, in some cases, span the borders between countries.

Much of the development in expanded metropolitan regions is informal, as government and planning systems fail to cope with the pressures. Many of the settlements fail to comply with planning and building standards, lack the space for amenities, have inadequate services and are distant from mass transit.[21] Protests against the adverse environmental impacts of encroachment on areas not scheduled for development also pit environmentalists against residents of informal settlements, making it more difficult for the latter to obtain service improvements and even exposing them to the threat of eviction.[22] The juxtaposition of high-income residential areas with low-income informal settlements and rapidly urbanizing villages is, however, evident, reflecting the emergence of a middle class, increased inequalities and changing consumption patterns and lifestyles (see Box 7.1).[23]

Higher-cost residential and industrial development in metropolitan areas may also fail to comply with official requirements in one or more respects.[24] Developers are often able to exploit regulatory or governance capacity of governments in peripheral areas. This leads to large-scale private development in locations beyond the official development boundary (e.g. in Haryana, outside the National Capital Territory of Delhi), where there are fewer restrictions on the activities of private developers.[25] Local governments themselves may circumvent planning and environmental regulations to relocate heavy and polluting industries from cities, attract foreign investment or develop high-technology industries and services. In China, many local administrations that control peripheral land raise revenue by selling it for industrial or residential development. For example, in Guangdong Province, over half of the urban expansion has occurred on village collective land through informal processes.[26] The process may be marked by protests as the new enterprises compete with existing livelihood activities or local people are threatened by eviction with few safeguards against arbitrary expropriation and inadequate compensation.[27]

Much future urban growth … will be accommodated in peri-urban areas where informal development is widespread

Today, the patterns of metropolitan development vary, from clusters of towns and cities (e.g. the Pearl River Delta in southern China), to regions dominated by megacities (e.g. the Bangkok Metropolitan Region), to urban corridors in which cities, towns and special economic zones are linked by railways and expressways, sometimes across national borders (e.g. Tokyo–Kyoto and Mumbai–Pune).[28] Similar urban forms have emerged in other parts of Asia, including the transition economies of Viet Nam and China. The latter are distinguished from extended metropolitan regions elsewhere in Asia mainly by the greater speed of their transformation in a situation of uncertainty over the legal basis for emerging land markets.[29] In the absence of planned investment in mass transit,[30] such metropolitan expansion is heavily reliant on vehicle transport, both public and private, exacerbating the process of unplanned sprawl and resulting in long journeys to work for many. The result is disjointed rather than integrated development, sometimes leading to the neglect of urban cores and a 'hollowing out' of cities.[31]

The planning approach typical of Asian countries is based on master plans that assume a 'command and control' approach, especially in the former planned economies in the region.[32] Plan preparation is time consuming and top down, plans are unrealistic and resources to implement plans are lacking. Furthermore, multiple and often inconsistent laws and administrative responsibilities hinder coordinated action. The land administration system is generally inefficient and based on outdated base and cadastral maps, disorganized, incomplete and discriminatory registration systems, costly, lengthy and discriminatory dispute-resolution mechanisms, multiple land transaction taxes and levies, and poor development control regulation enforcement. National planning agencies have generally not attempted to re-conceptualize the approach to planning, although there have been some innovations, which will be considered later in this chapter.[33] The result is that plan proposals are largely difficult to implement and the supply of formally subdivided and serviced land is limited, leading to price increases for formal land and property, and widespread evasion.

The supply of formally subdivided and serviced land is limited, leading to price increases for formal land and property, and widespread evasion

Moreover, local authorities have resorted to evicting inhabitants of informal settlements in several instances.

Box 7.1 An extended metropolitan region in Asia: Jakarta, Indonesia

Jakarta is subdivided into five cities and forms part of a wider metropolitan region called Jabotabek, which includes Jakarta and three surrounding districts: Bogor to the south, Tangerang to the west and Bekasi to the east, including the four cities of Bogor, Depol, Tangerang and Bekasi. The population of the metropolitan region increased from 17.1 million in 1990 to 21.1 million in 2000 and an estimated 25 million in 2005, although the population of the city itself increased relatively little from 8.2 million in 1990 to an estimated 8.7 million in 2005.

Much of the urban expansion of Jakarta in recent years has taken place in peri-urban areas to the west, south and east. Investment in roads has enabled members of rural households in peripheral areas to commute to urban jobs, and increased incomes have enabled investment in agricultural intensification, non-farm economic activities and house improvements. Gradually, villages have urbanized *in situ* and joined up by mixed-use infill development. Informal land and housing development on former rice fields in and around early urban settlements and peripheral villages has provided large numbers of affordable houses for low- and middle-income households. Today, approximately 60 per cent of Jakarta metropolitan region's population live in *kampungs* (urban villages), most of which have been provided with basic services and integrated within the city.

Along with ineffective planning and uncoordinated management, the expansion of Jakarta's metropolitan region has been characterized by haphazard land development. One of the main drivers of this has been the development permit system. Under this system, developers who have obtained investment clearance and a development permit have the sole right to purchase a site, in return for compensation based on improvements alone. Until ceilings were imposed in 1999, development permits were a powerful tool for speculation and land hoarding. Developers acquired even untitled land, forcing low-income residents to sell their land or occupancy rights at below market value.

In response to the rapid increase in demand for suburban sites for industry and housing in the 1980s, land designated for low- and middle-income housing was released to private developers, and affordable housing quotas were rarely enforced. Local officials eagerly facilitated the private real estate sector and convinced local communities to sell their land. The mega-projects of the ruling elite and politically connected individuals were especially exempted from planning controls and market competition.

The result was leapfrog development, large-scale construction for and by foreign investors, and a massive increase in high-cost housing in self-contained gated communities or dormitory settlements dependent largely upon private transport and toll roads, juxtaposed with unplanned, poorly serviced mixed-use low- and middle-income development.

Planning and management of the metropolitan area has been fragmented and ineffective; developer interests have been prioritized over planning policies, public priorities and the needs of low-income people; development control has been limited and inconsistent; and property rights are weakly defined. It is estimated that only one third of the land is fully titled, one quarter has no official title and the remainder is subject to intermediate forms of title – rights to build or use.

Despite attempts to decentralize responsibility for local development and land management, the metropolis still has poorly coordinated government, a lack of capacity to implement plan proposals, unsynchronized planning and land laws, inadequate land administration and a dysfunctional development permit system. The 'privatized planning' of new towns, gated communities and shopping malls linked by toll roads continues to provide middle- and upper-income households with protected lifestyles, while most low-income residents have little choice but to seek accommodation in existing or new informal settlements.

Source: Firman and Rakodi, 2008

Throughout the 20th century, low- and middle-income groups were unable to access affordable serviced land and formal housing

Despite legislation that entitles people living in informal settlements to proper notice, compensation and relocation, many evictions bypass formal provisions, including eviction by state agencies (e.g. in Delhi and Karachi).[34] While some informal development has been replaced by formal buildings, as low-rise structures are replaced by high-rise shopping, office and residential complexes, often these are located adjacent to slums and the replacement of worn-out infrastructure lags behind need. In Phnom Penh (Cambodia), for instance, much of the infrastructure is 70 to 80 years' old.[35] The proliferation of informal settlements therefore remains a key challenge for urban planning in the region.

Latin America and the Caribbean

As in most other parts of the world, the demographic growth of Latin American cities slowed during the 1980s; but rapid peripheral growth has continued and informal economic activities have expanded. About 60 per cent of all those employed in the region work in the informal sector, ranging from 37 per cent in Chile to nearly 90 per cent in Haiti, and it is estimated that four out of every five new jobs are in the informal sector.[36] In terms of housing, 27 per cent of the urban population in the region currently live in slums, although this varies between countries and cities. For example, over 60 per cent of urban residents in Jamaica live in slums, compared to only 9 per cent in Chile.[37] Furthermore, an estimated 70 per cent of new housing production in Latin America and Caribbean is informal.[38] The widespread use of informal transportation is closely associated with both residence in informal settlements and engagement in informal income-generating activities.

Throughout the 20th century, rapid urban demographic growth occurred in the face of limited resources and governance capacity, while the policies adopted were often inappropriate. These included public housing programmes and the concentration of public investment in infrastructure in limited areas, which raised land and housing prices. As a result, low- and middle-income groups were unable to access affordable serviced land and formal housing.[39] Informal settlements proliferated through organized invasion, incremental squatting and informal subdivision, depending upon landownership patterns, topography, political circumstances and official policies.[40] For

example, in Venezuela squatting has been the main means of informal settlement development, whereas in Colombia and other countries, informal land developers are prominent.[41] The Roofless Workers of the Centre (*Movimento Sem Teto do Centro*) in Brazil had, by 2007, allotted accommodation to 400,000 urban families through the occupation of undeveloped land or vacant formal buildings.[42]

Within existing built-up areas of cities, as areas of tenement housing degenerate into slums, non-compliance with standards and regulations and informal modification of buildings often increases. In planned cities such as Brasilia (Brazil) and Ciudad Guayana (Venezuela), residents have transformed the formal planned environment by extending their housing units to accommodate additional generations of the original household. Such modifications of original building structures strain infrastructure, overwhelm road capacity and make the provision of services and policing more difficult. There are, in addition, pockets of informal housing in the core districts whose existence clashes with politicians', residents' and planners' modernist visions for the city.[43]

Although the proportion of housing that is irregular – measured by indicators such as insecure tenure or the lack of sewer connections – is declining in some countries, there is a vicious circle of informality in which the high incidence of urban poverty limits municipal revenue generation and, thus, public investment in servicing land. This leads to increased prices for formal land and housing, which forces low- and middle-income households to adopt informal options, even though these are not necessarily cheap and may further impoverish people (e.g. through the lack of economic opportunities or high journey-to-work costs). Residents' continued poverty reinforces the vicious circle.[44] Social inequalities, limited economic opportunities, political disenfranchisement and lack of reach by the public law enforcement agencies also result in continuing high levels of informal economic activity, some of which is criminal. In more extreme cases such as Brazil, drug lords have become the administrators and law enforcers in informal settlements.[45]

Informality is also a prominent feature of development in metropolitan areas. Polycentric urban forms, with a core region around the largest cities, and growth of subsidiary cities in the wider metropolitan region are evident in several countries. For example, this can be observed around Mexico City (see Box 7.2), Buenos Aires, Santiago and São Paulo, where peripheral towns and villages have been integrated within the daily sphere of influence of the metropolis and have undergone significant land-use transformations. Such metropolitan development is characterized by centrifugal flows of services and people between peripheral areas and the urban core, as well as in-migration directly into the peripheral areas. As in other parts of the world, much of the development is concentrated in corridors connecting major cities, with suburban centres around existing or new towns that provide cheap labour, services and dormitory locations for commuters (see Chapter 8). Foreign investment in offices, shopping malls, industry, residential development and leisure facilities is a key factor fuelling further expansion.

As such, the suburbs of Latin America and Caribbean cities are characterized by inadequate infrastructure, lack of safety and security, and wide disparities in wealth. Exclusive enclaves of industry, services and high-income housing are juxtaposed against extensive informal settlements. Those able and willing to pay for better living conditions and private security have segregated themselves in gated communities, which have proliferated in cities throughout the region, often leading to further informal settlement close by to take advantage of the low-wage service employment that they generate.

Informal processes have been occurring in countries of the region alongside processes of formalization: some older informal settlements are removed and all or some of their residents relocated to formal housing areas, while others are regularized, providing residents with formal tenure and improved utilities and services. However, often, political dynamics determine which settlements are regularized and improved and which are not. Community leaders may receive individual rewards in return for ensuring electoral support, while areas known to support opposition parties are denied improvements. In either case, residents' ability to influence decision-making is generally limited.[46]

There is a vicious cycle of informality in which the high incidence of urban poverty limits municipal revenue generation and, thus, public investment in servicing land

Moreover, residents of informal settlements may also be reluctant to relocate, partly because many of the longer-established areas have secured utilities and services, and developed supportive communities, particularly important in the face of growing socio-spatial polarization and segregation. Formal business activities, formal-sector workers and residents in formal housing also generate demand for goods and services, much of which is met by informal enterprises, which often provide livelihoods for the residents in centrally located informal settlements. Hence, significant proportions of the urban population continue to live in informal areas, many of which are characterized by official neglect and poor-quality living environments.

Where informal settlements have been regularized, the results are often positive. However, because of the location of many settlements on land that is expensive to service, the unit cost of upgrading may exceed the cost of new development. Regularization also leads to increased land and house prices and increased service costs, which may result in gentrification, forcing low-income residents to move to informal settlements elsewhere in the city.[47]

Political dynamics determine which settlements are regularized and improved and which are not

As indicated in Chapter 3, planning approaches in many countries of the region are technocratic, with a strong spatial emphasis. They are based on master or comprehensive planning and zoning, and have changed little in the face of either planning failure or political change. The institutional framework for planning is fragmented, both territorially and between different levels of government. Agencies have poorly defined functions and responsibilities. Even planners who recognize the desirability of participatory planning are, in practice, often reluctant to abandon older planning approaches. Some municipalities are developing more strategic and proactive approaches to planning and implementation – for example, Bogotá in Colombia and Curitiba, Rosario and Porto Alegre in Brazil. However, the ways in which plan proposals deal with informal development processes are

Box 7.2 Informal development in Mexico City

The metropolitan area of Mexico City can be divided into the existing built-up area in which the core is losing population; an inner peri-urban zone characterized by mixed urban and rural uses, which is functionally integrated within the city and which grew most rapidly between the 1970s and the 1990s; and an outer peri-urban area where growth has been rapid since the 1990s and which has only been integrated within the city more recently. Between 1990 and 2000, roughly half of the city's growth occurred in informal areas and about a third was due to the incorporation of rural areas into the metropolitan area. By 2005, the metropolitan region had a population of just under 20 million and 60 per cent of those employed work in the informal sector.

Growth has mainly occurred along three corridors: towards Pachuca, to the north-east and to the south-west. The cities and towns along these corridors are characterized by a declining share of agricultural employment, manufacturing growth, housing development, infrastructural improvements and, to the east, the emergence of large swathes of poorly serviced informal settlement. The supply of serviced land is insufficient to meet demand and drives up prices, with the result that people who earn less than three times the minimum wage cannot afford formal land or housing. Instead, they are forced to resort to informal alternatives, typically on the urban periphery.

Informal settlement occurs on both privately owned land and areas held under group tenure (*ejidal*), which until 1992 farmers were not permitted to sell. Some *ejidal* land has been converted to full legal ownership, and land in well-located areas where residential use is permitted has been sold to developers, mainly for large housing complexes for the middle and upper-middle classes. However, there are many obstacles to converting *ejidal* land to full legal ownership, including its location in areas that are unsuitable for residential development or difficult to service. Thus, many farmers continue to subdivide and sell their land informally. Land subdividers regulate supply, with the result that prices have also risen in this market.

To the south of the city, urban development is invading a hilly rural area of ecological and water recharge value. In the absence of effective development regulation, creeping settlement led to the loss of 10,000ha or more of agricultural land and forests between 1970 and 1995, with adverse environmental impacts. Population growth has occurred in small towns on the mountain slopes, where farmers holding *ejidal* land have sold land illegally for urban uses, to accommodate both the towns' own population growth and for sale to middle-class in-migrants from the city, giving rise to a fragmented land-use pattern. In addition, poor people have illegally occupied land, often in risk-prone areas.

Nevertheless, more recently, better enforcement, more new housing provision in the core city and slower peripheral population growth have somewhat reduced the extent of illegal development and its adverse environmental impacts. In addition, many informal settlements have been regularized, although responsibility for regularization of settlements on private and *ejidal* land rests with different agencies, the selection of areas for regularization is often *ad hoc* and the process cannot keep pace with informal settlement growth. However, in some areas increased land and housing prices and service costs have led to gentrification and the displacement of low-income people, who are forced to seek accommodation in other informal settlements. In some cases, areas unsuitable for residential use have been regularized, threatening broader planning goals, resulting in high infrastructure costs and encouraging further informal settlement in the expectation of future regularization.

Because their lack of access to credit and low incomes force low-income families to seek land and housing in informal settlements, many of which are in the peripheral and only affordable locations, they are faced with long and costly journeys to work, often using informal public transport. A study found that 82 per cent of residents living in a peripheral and 69 per cent in a central informal settlement do not utilize formal transport networks to travel to work. Instead, roughly 39 per cent of residents in the former and 33 per cent in the latter rely on shared vans (*pesaros*) in which users pay for their portion of the journey to work.

Source: Aguilar et al, 2003; Iracheta, 2004; Wigle, 2006; Perry, 2007; Aguilar, 2008; Iracheta and Smolka, undated

Cities in Africa are … dominated by informal activities and widespread informal settlements

inconsistent and ambivalent, with the result that many activities and settlements are not integrated within regular planning processes and governance institutions.[48]

With regards to informal commerce, some city governments (e.g. Quito, Lima, Caracas, Bogotá and Mexico City) have tried to formalize it by imposing time and locational restrictions on vending activities. However, the sheer size and scale of the informal sector has made it hard to regulate. Thus, policies towards the informal economy often simultaneously embrace and condemn it.[49]

Africa

Cities in Africa are, with few exceptions, characterized by low densities, peripheral sprawl, economies dominated by informal activities and widespread informal settlements with limited services. The proportion of urban dwellers living in informal settlements is higher in Africa as a region than any other part of the world. A staggering 62.2 per cent of the urban population in sub-Saharan Africa live in slums, while, in contrast, 14.5 per cent of North Africa's urban population reside in such settlements.[50]

It is estimated that the informal economy labour force accounts for around 60 per cent of urban jobs, and an even larger proportion of women's economic activities.[51] During the early years after independence, informal economic activities were seen as an 'inconvenient reality which would, no doubt, disappear as modernization spread through the economy'.[52] The relationship between informal entrepreneurs and the state was ambivalent, marked by both periodic harassment and a degree of tolerance, albeit backed by bribes. The fall in formal-sector employment with structural adjustment and economic liberalization drove a large proportion of urban workers into the informal sector, but also increased competitive pressures from cheap imports. Home-based enterprises, street trade and informal markets

proliferated. The mixture of toleration, support and repression continued, with the latter often justified on grounds of informal activities' illegality, contravention of health and safety regulations, and 'untidiness'.[53]

The web of formal investment in industry and infrastructure interspersed with formal and informal residential settlements that is typical of many Asian cities, and the linking of cities to metropolitan corridors are much less common in Africa. However, there are some similar urban corridors, such as Gauteng in South Africa, Cairo–Alexandria in Egypt and, arguably, the coast of West Africa, where city expansion combined with the urbanization of small towns and villages is leading to the emergence of some extended metropolitan areas such as Cotonou–Porto Novo in Benin.[54] The absence as yet of many significant metropolitan corridors reflects the relative absence of inter-urban transport infrastructure, limited investment in formal-sector enterprises and weak integration of peri-urban settlements within city economies. Commonly, the authorities under-provide infrastructure and overly restrict on-plot development, contributing to low-density sprawl, which increases costs for both firms and households and the providers of public transport. Investment climate surveys of formal manufacturing firms in urban locations in six African countries compared with four in South and South-East Asia, for instance, found that the main constraints on their operations were typically inadequate infrastructure and services.[55]

Colonial authorities in Africa often aimed to control in-migration to urban areas. One mechanism for ensuring that only those needed to provide the necessary labour lived in urban centres was to accommodate them in planned areas of rental housing. However, informal settlements frequently sprang up to accommodate those who had come to the end of their contracts or arrived in town to take advantage of the economic opportunities created by colonial urbanization. Depending upon patterns of landownership and the attitudes of the colonial authorities, such settlements involved incremental squatting on land belonging to the colonial administration, allocation of plots in areas still under customary tenure, 'shack farming' on European-owned land or occupation of hazardous areas. Independence in most countries was marked by the relaxation of migration controls, increased urban employment opportunities and rapid urban growth. The planning and housing policies inherited from the colonial authorities proved completely unable to cope with the scale and speed of urban growth, and the scale of informal settlement increased markedly.

As older informal settlements have been consolidated, densities have risen and open areas have been encroached upon. Some services have either been officially provided or have evolved informally, generally to address the most urgent health problems. Encouraged by international agencies such as the World Bank and UN-Habitat, many governments have attempted to upgrade and regularize selected settlements. Sometimes these attempts have been limited and tokenistic; but elsewhere they have been widespread, although it has proved difficult to control further development and densification or to maintain the services and infrastructure provided.

Limited capacity to supply formally subdivided and serviced land, operate development regulation or provide affordable public or private-sector housing mean that not only low-income, but also many middle-income urban households find that their only option is to seek building plots or houses in informal settlements. Even where considerable public investment in planned settlements occurs, there is frequently a mismatch between what is built and what people need and want, so that the results fall far short of those intended.

The shelter construction process is generally managed by owner-builders, funded from income and savings, and reflects an incremental process of investment and improvement, depending upon perceived and actual security of tenure and resource availability. The resulting houses and business premises rarely satisfy planning and building regulations and some are extremely makeshift. Services are generally either self-provided, or are provided by informal enterprises.

The planning and housing policies inherited from the colonial authorities proved completely unable to cope with the scale and speed of urban growth

A prominent feature of urbanization and growing informality in Africa has been the expansion of the built environment into peri-urban areas. This is characterized by contestation over access to, control over and use of land-based resources, as well as limited governance capacity for infrastructure development, planning and development regulation.[56] Although there is some international investment in industry and services[57] and some investment in commercial agricultural production in these areas (e.g. horticulture and flowers for export around Kenyan and Zimbabwean urban areas), it is limited compared to cities elsewhere in the world. More often, economic liberalization in the 1990s was associated with a proliferation of small-scale investment in housing, agriculture and micro-enterprises. For example, around Dar es Salaam, the 'zone of survival' has given way to a 'zone of investment' as liberalization has improved access to private and public transport, with linear settlements along the roads being in-filled with housing and diversified small and micro-enterprises.[58]

A prominent feature of urbanization and growing informality in Africa has been the expansion of the built environment into peri-urban areas

The channels through which land for peri-urban development is supplied combine adapted customary practices with official and semi-official procedures.[59] The former are dominant where cities are surrounded by areas under customary tenure (see Box 7.3), but are also influential elsewhere because the customary rules for land transactions are widely understood by urban residents, many of whom are first- or second-generation migrants from rural areas. However, informal brokers and local government officials who unofficially draw up plans or authenticate written agreements of sale often mimic formal-sector procedures and practices, and may use their official connections to undertake their land market roles. Often, the planning standards and layouts do not comply with those specified in official plans and regulations. In some instances, however, subdividers and middle-income house builders will attempt, within affordability constraints, to emulate good practices (e.g. safeguarding road reserves and sites for schools, markets, etc.). They may also try to comply with official requirements in order to facilitate later regularization.

Box 7.3 Informal customary land management, Enugu, Nigeria

Public authorities in rapidly growing cities in Nigeria have failed to provide necessary services and infrastructure, including planned land for orderly development. In Enugu, indigenous customary landowners linked by communal and familial affiliations control the bulk of peripheral land where active conversion from rural to urban uses is occurring, with family landholding being the dominant form of ownership and control. Enugu is an important administrative, industrial and commercial centre in the eastern part of southern Nigeria, with a population in 2006 of 722,664 and an annual growth rate of 3 per cent. Its origin dates back to the discovery of coal in the area by the British in 1909. Public-sector land delivery is only able to meet a small proportion of demand.

There is evidence that, as far back as the 1930s, indigenous communities in Enugu had begun to formally subdivide their land and sell plots to private buyers. Thus, a close relationship has existed from a very early stage between formal and informal land delivery and management processes in the city. In recent years, purchasers have sought legal protection by attempting to obtain formal titles over land acquired from traditional sources. This has created an important interface between informal and formal land management practices. Verification of customary land status by government agencies before formal titling and submission of planning schemes prepared by indigenous communities to public authorities for approval represent other areas where functional interfaces between formal and informal customary land management practices have emerged.

Within a context of limited public-sector capacity to supply land for housing, the strength of customary land delivery in Enugu is its ability to deliver large numbers of plots to members of indigenous families by allocation and inheritance and to middle- and upper-income households by sale of leases in less complex, slow, unpredictable and opaque ways than the formal land delivery system. The main weaknesses of this dominant land delivery channel, however, are the inability of landowning communities to service land and to guarantee acceptable tenure security for land purchasers. Also, an urban land production and delivery system dominated by non-formal sub-markets, which does not operate within a framework of urban development plans, can be extremely costly for the economy because of the additional costs of retrofitting infrastructure in unplanned areas. Nevertheless, rather than continuing to try unsuccessfully to operate the current system or importing models from elsewhere, it is desirable that learning from local evolving practices is maximized to identify the improvements most likely to succeed.

Source: Ikejiofor, 2008

Planning approaches based on legislation that has, in some cases, changed little from that inherited from colonial times and master plans implemented through public-sector investment and development control have proved completely unable to guide urban development in much of Africa. Planning's reach has generally been confined to central business districts, high-income residential areas and their associated facilities. Its ineffectiveness can be attributed to financial and human resource limitations, especially at local government level; limited political and public understanding and support of urban planning; administrative fragmentation, especially in peri-urban areas; and the perceived incompatibility of informal employment and settlement with political and bureaucratic visions of the modern city (see Chapter 3).

Planning's reach has generally been confined to central business districts, high-income residential areas and their associated facilities

Even where projects to regularize and upgrade informal settlements have been implemented, planners and other bureaucrats have often been reluctant partners, while attempts to supply low-cost serviced plots through sites and services schemes have frequently fallen victim to economic crisis. Other problems have included land and housing market distortions arising from their small scale; 'leakage' of plots targeted at low-income beneficiaries upwards to higher-income households; and corruption in plot allocation. Rather than limited planning resources being targeted at making a strategic difference to urban expansion and land supply for urban development, they have been used to prepare conventional city-wide and detailed urban plans that can only be implemented in limited sections of the city. Despite the moves towards more strategic action-oriented approaches to planning discussed in Chapter 3, the ability of planning systems in African cities to prevent or deal with widespread informal economic activity, land subdivision, housing construction and service delivery remains extremely limited, with the partial exception of South Africa.

Developed and transitional countries

There is little informal settlement in contemporary European and North American cities, with the exception of tiny travellers' settlements and some small-scale squatting, generally in disused buildings. Some informal occupation and modification of formal buildings occurs in inner-city areas, especially by slum landlords and poor urban residents, including recent migrants. The expansion of settlements into areas surrounding cities has also been observed. For example, in the Veneto Plain in northern Italy, agriculture and urban development have been closely related. The latter has occurred not just through the expansion of cities such as Venice and Padua, but also through the largely uncontrolled expansion of numerous villages for artisanal industry, commerce and residential uses. Such development has blurred the divide between urban and rural areas and transformed the whole metropolitan region into an urban–rural continuum.[60]

Typically, employment in developed countries is in formal enterprises, and urban planning and regulation systems are strongly developed. Compliance with labour and development regulations is widespread and enforcement effective. However, economic liberalization since the 1980s has been associated with the growth of various kinds of economic informality, including unregulated wage employment as a means of reducing costs or accommodating recent immigrants, as well as moonlighting or self-employment that evades the tax system. It is estimated that in the highly developed Organisation for Economic Co-operation and Development (OECD) countries, the informal economy accounts for about 16 per cent of value added.[61]

In Southern Europe, until the 1970s, planning and development regulation systems were relatively ineffective and prone to evasion. In Italy, for example, more than 1 million unauthorized housing units are estimated to have been built between 1982 and 2002.[62] On joining the European Union, access to funds was often conditional on the production of regional and urban plans. This provided a significant incentive to strengthen the weak planning and regulatory systems. Today, the planning systems of most Southern European countries are as strongly developed as those in Northern Europe.

In the transitional economies of Europe and the former USSR, city governments have had to cope with signif-

icant economic change, the restoration of private property markets and transformations in governance arrangements (see Chapter 2). The transition from centrally planned to market-based economies was associated with dramatic increases in poverty, inequality and unemployment, forcing many people formerly employed by state enterprises into informal-sector employment (see Box 7.4).

During 2002/2003, it was estimated that the informal economy accounted for about 40 per cent of GDP in 25 transitional countries.[63] An emerging group of real estate investors exploited weak planning and building deregulation to maximize their profits. Residential property prices escalated, reflecting inherited housing shortages, the growth of a middle class and demographic changes. Upper- and middle-class households have relocated to suburban residential parks, gated urban enclaves and upmarket inner-city neighbourhoods. Peripheral residential developments were often initiated by international investors and encouraged by peripheral municipalities keen to increase their revenue base.[64] Lower-income households have remained in or been pushed into privatized deteriorating housing estates or low-cost housing in peripheral villages and informal settlements, where they are joined by poor in-migrants and refugees, especially in the cities of parts of South-East Europe and the Caucasus states.

Cheaper land and low-cost services (e.g. the use of wood rather than electricity or gas for heating, water from wells and refuse disposal in roadside dumps) attract low-income residents to existing peripheral settlements. However, for many, polluting industry relocated from inner-city areas, as well as the poor levels of connectivity to infrastructure and services, result in unhealthy living conditions, physical isolation and social exclusion, especially for women, whose limited mobility can restrict their participation in business and civic life.[65] Suburbanization and urban sprawl have thus been driven by the location of warehouses, light industrial and retail developments near transport nodes beyond the suburban ring, and by global influences, such as the desire to attract foreign direct investment.

The inherited planning systems had difficulty in adapting to market-based urban development during the 1990s. They failed to cope with the implications of economic reform, decentralization and the entry of multiple actors into land and housing development, and were discredited and marginalized. Obsolete master plans, lack of municipal expertise and resources, and bureaucratic obstacles to obtaining development permission led to widespread illegal development. For example, occupants of apartments often enclosed balconies, or built extensions and additional floors to increase the living space available, or converted parts of residential buildings for small-scale enterprise. It was estimated that about one quarter of all new housing in Tirana (Albania) and half in Belgrade (Serbia) was illegal and substandard, much being built on road reserves and green spaces. Construction took place without building permits on both titled and untitled land, the latter being, in part, a result of delays in land restitution. In this chaotic period, the civil law-based master planning system that was supposed to provide a high degree of certainty and legality through ensuring compliance with detailed planning provisions was routinely sidestepped; amendments were granted at the whim of local officials; permission for new suburban industrial, retail and residential developments was given with little regard to their transport or environmental implications; and corrupt practices proliferated. Unauthorized changes in approved layouts were frequent. Much planning consisted of the *ex post facto* regularization of informal development, exacerbating further informal development in the expectation of future regularization.[66]

During the last ten years, however, governments in many countries in the region have reasserted control over their shadow economies and recognized the need for effective planning. A new generation of planning legislation has been introduced, reforms have revitalized planning systems, and urban development plans have been updated, especially in countries such as Slovenia, Slovakia and the Czech Republic. Nevertheless, progress is hindered by the lack of a strong legal basis for development regulation, coherent national urban development policies, detailed strategies, proper funding for implementation and effective arrangements for metropolitan government.[67]

Box 7.4 Informal employment, Romania

In spite of continuous economic growth in recent years, informal employment is a key feature of the Romanian labour market, accounting for between 20 and 50 per cent of total employment, depending upon the definition used. Two main groups can be identified among those in informal employment: those who work informally because they have no real alternative and for whom informal employment constitutes a survival strategy, and those who deliberately evade taxes and social security contributions. The first group includes some forms of informal work in agriculture and contributing family workers. The second comprises non-registered firms, or firms which do not register their workers and hire them without labour contracts, firms that under-report their sales and workers who under-declare their earnings and receive so-called 'envelope payments' in cash.

Three main groups of factors can explain the persistence of informal employment in Romania. First, socio-economic developments following transition, such as economic restructuring and privatization of state-owned enterprises, low or negative economic growth, unemployment, and increased poverty and inequality are among the main reasons pushing people into informality. Moreover, emigration abroad, with its links to informal employment, is an additional determinant of informal work, as many temporary migrants return to Romania for short periods of time and engage in informal work. Second, institutional factors, such as labour market regulations and the structure of the tax and social security systems, also determine informal employment. In addition, bureaucracy, heavy public administration and the subsequent corruption are thought to be connected with informal work. Last, but not least, informal employment is also determined by a number of behavioural/societal factors, such as the culture of non-compliance, the lack of trust in public institutions, negative perceptions of the role of the state, and partial understanding or underestimation of the benefits derived from social security.

Some efforts have been made in recent years, especially with the reform of the tax and benefit system and the introduction of the new pension plan. However, until recently, most efforts focused on punishment rather than on prevention of informality or the creation of appropriate incentives for formal versus informal work. In addition, policies to help the most vulnerable groups and offer them the necessary skills and assets to participate in formal work are uncommon.

Source: Parlevliet and Xenogiani, 2008

The transition from centrally planned to market based economies was associated with dramatic increases in poverty … forcing many people … into informal sector employment

FACTORS AFFECTING INFORMALITY

It is apparent from the above review of urban informality trends in various regions of the world that a number of key factors give rise to informal economic activity, land and property development and service delivery. These are discussed below.

In developed and many transitional countries where most economic activities comply with formal regulatory requirements governing employment, registration, health and safety, informalization has been associated with competitive pressures arising from economic crisis, privatization, economic liberalization and global competition. For example, employers attempt to reduce costs by outsourcing aspects of production to unprotected workers (e.g. home workers) casualizing their own labour force, ignoring health and safety regulations, or evading the tax net.

In developed and many transitional countries … most economic activities comply with formal regulatory requirements

In developing countries, the growth of formal enterprises is often restricted by limited domestic demand for the goods and services that they produce, international competition, shortages of capital for investment, and difficult operating conditions, including obstacles to accessing suitably located land, poorly developed infrastructure and unreliable services. In addition, contemporary manufacturing is often capital intensive, generating relatively little employment. Because the urban labour force has expanded more rapidly than formal wage employment, and in the absence of state-provided social safety nets, urban men and women have few options but to establish or seek wage employment in informal enterprises. More often than not, their limited education and skills and restricted access to institutional credit constrain the choice and scale of enterprise within the informal sector. Other niches for informal enterprise include some goods and services that the formal sector does not provide due to insufficient demand, and some for which small and micro-enterprises can undercut formal producers. Micro-enterprises' need for cheap premises further leads to the proliferation of home-based enterprises, the occupation of unused land and street trading.

In developing countries … urban men and women have few options but to establish or seek wage employment in informal enterprises

Central and local governments are often unable to implement laws and regulations governing enterprise, land and housing development because of insufficient political backing and public support, inadequate organizational and financial resources, and mismatches between official approaches and the needs of most urban businesses and residents. As a result, plan proposals and regulatory requirements are over-ridden or disregarded, completely or partly, by large-scale developers, those catering for formal businesses and high-income households. They are also ignored by informal enterprises and low-income households, sometimes from ignorance, but more often because of desperate need. The evasion of planning requirements is often a result of government ineffectiveness, or may occur with the collusion of politicians and public officials.

Approaches to planning and regulation that fail to reflect the needs of many economic actors seeking land and accommodation, including households, service providers and businesses, force these actors to evade planning requirements, lest they fail to establish viable businesses, obtain suitably located and affordable premises, and provide services for which there is effective demand. Both the content of plans and regulations, and the procedures for obtaining development and operating permission may be inappropriate. Even if planning proposals, standards and regulations are appropriate, the procedures for registration and obtaining approval may be time consuming and costly, especially when unofficial payments are required to expedite decisions. Inappropriate or excessively bureaucratic regulatory requirements for formal-sector development directly increase housing costs and also increase prices by limiting supply, fuelling a vicious circle of informality.[68]

Public-sector agencies are, for a variety of reasons, often inefficient and ineffective providers of utilities and services. The favoured solution of the 1990s was large-scale private-sector participation. However, most urban service delivery is officially still the responsibility of public-sector agencies, especially local government. Improvements in efficiency, rehabilitation of existing systems and extension to reach unserved populations, especially the poor, have been limited in many urban centres, even where reform has been attempted and regardless of whether the public or large-scale private sector is responsible. In practice, much service delivery depends upon small-scale private-sector and informal operators, who replace or supplement formal transport, water and sanitation, waste management and energy supply systems. Their activities are particularly important in informal settlements, which are commonly neglected by the public authorities, but also extend into many formal business and residential areas.

INNOVATIVE PLANNING RESPONSES TO INFORMALITY

As discussed above, urban informality has generally been regarded as illegal and undesirable. Typical responses have been removal or neglect, sometimes accompanied by grudging accommodation, underlain by a desire to extend conventional approaches to spatial planning and regulation to all urban land and property development and economic activity. However, the feasibility and desirability of responding to the challenge of informality by extending conventional approaches to land administration, planning and regulation is uncertain in many countries. More useful pointers to appropriate ways forward in these circumstances can be identified by reviewing innovative approaches and assessing their transferability. Four groups of responses are discussed in this section: alternatives to eviction; regularization; strategic use of planning tools to influence development actors; and partnerships between public agencies and informal businesses to manage public space and provide services. In no case can spatial planning work in isolation from the rest of the land administration and urban management systems, particularly those concerned with the definition and regulation of tenure, political and participatory arrangements and processes, and revenue generation and financial planning.

Alternatives to eviction

Often, public agencies' preference is to halt and remove informal developments and economic activities that do not comply with plans, policies and regulations, as well as seeking to evict occupants of land required for public purposes. Private owners use the courts or strong-arm tactics to harass or evict squatters or unwanted tenants. Eviction has sometimes been used to achieve hidden intentions, such as settling political scores or 'ethnic cleansing'. Forced evictions disproportionately affect certain groups such as women, travellers, migrants and indigenous people.[69] Evictions are further associated with violence, especially towards women, which may include intimidation, coercion, rape and beatings.[70] Evictions also occur through market forces when the demand for well-located land increases. As some residents respond to rising prices by selling their rights to land and property, it may become increasingly difficult for others to resist pressure from purchasers to sell, sometimes at below market prices.

International law now regards forced eviction as a human rights violation and urges governments, first, to consider all feasible alternatives and, second, to adhere to good practice guidelines if eviction is necessary.[71] It essentially recognizes people's rights to decent work and security of tenure, including the right to housing, privacy and the peaceful enjoyment of their possessions. International agencies such as the World Bank and the Asian Development Bank, as well as UN-Habitat's Advisory Group on Forced Evictions, specify that the people affected should be:

- consulted before the decision to evict is taken;
- given adequate notice of when eviction will occur;
- provided with information on the purpose for which the land is required;
- provided with the legal right to appeal and legal aid where appropriate; and
- provided with fair and equitable compensation for lost assets, livelihoods and incomes.

Increasingly, international law is being incorporated into domestic law, protecting people against forced eviction and providing them with various rights if they are evicted.[72] Once governments improve domestic laws to protect informal occupiers, including landholders and entrepreneurs, their ability to ensure that private landowners adhere to the legal provisions regarding eviction and encourage dialogue between occupants and owners about alternatives is strengthened.

A growing acceptance of 'the informal city' has been detected in recent years. Sometimes this arises from recognition of the fact that informal economic activities are vital to the urban economy and the livelihoods of many urban residents, especially when governments cannot provide safety nets to sustain large numbers of households above the poverty line. At other times it arises from recognition of the fact that the supply of formal public and private plots and houses not only falls far short of demand, but is unaffordable for a large proportion of households, a gap that is filled by informal settlements.

Often the most feasible and appropriate action open to governments is to stop the most harmful ways in which they intervene, such as forced evictions.[73] For example, in Turkey, informal settlements, or *gecekondus*, are tolerated and have been subject to periodic amnesties.[74] Publicly calling a halt to harassment and eviction of informal occupants of land in public ownership immediately increases their security of tenure, encouraging them to invest in their houses and enterprises, and improving the prospects for dialogue about the future of the areas concerned.[75] However, although recognition of the status quo removes the threat of eviction, it is often politically motivated, easily overturned and rarely provides more than short-term security of tenure.

Inevitably, some settlements are in locations that are too unsafe for permanent residence, while other settlements and some informal economic activities are on land required for legitimate public purposes or compete with other users of public spaces, such as streets and squares. Announcement of a moratorium on evictions provides a window of opportunity during which a survey of all informal settlements and locations with significant concentrations of informal enterprises can be conducted. In this way, it is possible to identify those for which no alternative to eviction exists and to devise a programme for further action in those suitable for long-term use. Such a process is likely to be politically contentious because of the conflicting interests involved and the fear that tolerance of informal activities may encourage further informal development. Ultimately, political decision-makers may have to make unpopular decisions. However, consultation also provides opportunities for occupants to suggest alternatives to eviction.

International law now regards forced eviction as a human rights violation and urges governments … to consider all feasible alternatives

In Thailand, for example, most informal occupiers have rental agreements with private owners of undeveloped sites, with the result that when an owner wishes to redevelop a site, eviction is unacceptable. In some instances, on both publicly and privately owned land, land-sharing has been successfully negotiated as an alternative. Under this arrangement, the landowner leases or sells part of it to existing occupants, who redevelop their houses at higher densities, typically multi-storey apartments, and develops the rest. The result is that their occupation is formalized and living conditions improved. It may be necessary to modify standards to permit the owner to develop more intensively than permitted by the zoning provisions and to ensure that the replacement housing is affordable by existing residents.

A growing acceptance of 'the informal city' has been detected in recent years

Land-sharing is complex to negotiate and has been possible only with non-governmental organization (NGO) support in well-organized communities. In addition, some households may have to leave to make densification feasible and some may be unable to afford the newly built accommodation. An alternative is for the landowner to pay sufficient compensation that enables occupiers to vacate the land and buy land elsewhere.[76] In the Philippines, those who have to be evicted are offered five resettlement sites from which to choose.[77] Other alternatives to eviction will be explored further below.

Regularization and upgrading of informally developed areas

Regularization and upgrading of informally developed areas is preferable to neglect or demolition. Regularization implies recognition and provision of secure tenure, while upgrading generally focuses on the provision or improvement of basic services, although it may also involve replanning and redevelopment to ensure compliance with planning and building regulations. Formalization of tenure is generally taken to involve the provision of title to individual plots – the strongest legal form tenure rights can take. Titles give landowners rights and political voice, are guaranteed by the state, may enable owners to borrow using the property as collateral, and therefore are expected to encourage investment. In addition, title registration accompanied by a cadastre is expected to facilitate planning by providing decision-makers with relevant information and accurate maps.

Regularization and upgrading of informally developed areas is preferable to neglect or demolition

However, the merits of titling have been widely contested for various reasons.[78] It is also the most complex and costly form of tenure to institute, requiring a formal plot survey and checks on all rival claims to the land. While some countries have succeeded in adopting a universal system of titling registration (e.g. Australia), in many the complexities of a centuries-old landownership system mean that titling is accompanied by deeds registration and provisions for resolving conflicting claims over land.[79]

In addition, titling can lead to overt conflict over overlapping forms of rights and the dispossession of the less influential, including tenants, new occupiers and women. Many countries have limited legal protection for women's property rights and, where it does exist, it is not always acted upon due to weak enforcement and an unquestioning acceptance of patriarchal power.[80] Some of the supposed benefits of titling are also not necessarily relevant to low-income households, who seldom wish to mortgage their sole asset and to whom financial institutions are reluctant to lend, in any case. This is demonstrated in regularization processes where occupants are content with intermediate forms of tenure and do not transform these into titles even when they are entitled and expected to do so (e.g. in Dakar, Senegal).[81] As a result, remarkably little progress has been made globally with large-scale titling.[82]

Remarkably little progress has been made globally with large-scale titling

The main purposes, means of registration and bundles of rights allocated may all vary. Evidence shows that low-income landholders prioritize 'good enough security' that protects them from eviction, enables them to improve their houses when they can afford to do so, enables them to bequeath their property with confidence to their heirs and provides them with access to affordable and accessible channels for resolving conflicts when necessary. Public agencies may be primarily interested in providing services to enhance health and safety, knowing the identity of occupants to improve security and enable cost recovery, and bringing informal settlements into the revenue-generation net. Both occupants and public agencies are interested in safeguarding access and providing sites for public facilities, such as schools or markets, improving drainage and services, and a registration system that is relatively streamlined, affordable and easily updated. These purposes may be achieved by recognizing and registering previous land transactions in a deeds registration system and current occupancy in a financial cadastre or street addressing system, although care must be taken to recognize the rights of both men and women, depending upon their position in the family.[83]

Where landholders in informal areas are squatters, the basis for registration can be usufruct or adverse possession. In the Philippines, for example, occupation and use can be a basis for a group tenure claim.[84] Adverse possession entitles a person or community in possession of land owned by another to acquire rights. Certain legal requirements need to be satisfied in this case – for example, that the claimant does not own any other land and that the occupier has been in possession continuously, without challenge from the legal owners, for a specified term. There are provisions for adverse possession in the laws of many, but not all, countries. For example, it has been incorporated into the 2001 City Statute in Brazil. Because of the provision for continuous occupancy and use, speculators and land hoarders are excluded.[85] Many informal settlements, however, have developed on land informally subdivided by landholders with legal ownership rights in the form of either title or customary tenure, in which case registration can be based on a combination of the written evidence of transactions (which is almost always available) and the testimony of witnesses, such as village elders or local officials.[86]

A 2001 to 2003 review of 30 years of upgrading informal settlements in African cities found that early upgrading projects were ambitious in their scale and scope, seeking to regularize tenure, invest in infrastructure and improve housing. Over time, in recognition of the complexity of tenure regularization, interventions have become more modest, focusing on infrastructure improvements as a means of enhancing tenure security and encouraging investment in housing, rather than tenure security being regarded as a necessary precursor to other improvements. Within this general pattern, programmes have varied widely, especially with respect to infrastructure standards, cost recovery and the extent to which they were demand driven and participatory.[87] Contemporary programmes that have proved capable of implementation at a large scale include those in Thailand[88] and Argentina. Even in China, increasing attention is being paid to upgrading existing housing and living environments, both in inner-city areas and in peripheral villages that have now become part of the city.[89] Brazil's legislative framework is rights based and incorporates provision for regularization and upgrading of *favelas*, alongside increased roles and responsibilities for municipal governments with respect to spatial planning and participatory budgeting.

A flexible approach to planning for regularization and upgrading is an essential tool for improving the liveability of informal settlements. Experience has demonstrated that modest and incremental approaches developed in conjunction with residents, local decision-makers and land market actors can be implemented at scale and need not result in gentrification. However, the processes are complex and it may be costly to retrofit infrastructure and to provide facili-

ties if sites have not been set aside for this purpose. Often low-income tenants and owners are forced to move out as a result of increased costs arising from liability for user charges and/or property tax. Regularization may also conflict with other planning objectives, such as conserving ecologically important areas. Upgrading of informal settlements is not, therefore, the whole answer. A twin-track approach is needed, in which regularization is accompanied by a programme of new land development at a sufficient scale to ensure affordability and inhibit new illegal settlement.

Influencing development actors by strategic use of planning tools

During the 1970s a number of developing countries nationalized land and attempted to meet the need for urban land through administrative allocation in order to ensure that development occurred in accordance with a master plan. Experience demonstrated the limitations of this model and today promising approaches concentrate on using public planning and financial resources strategically to guide development. This implies working with private actors, including informal subdividers, developers and operators within a policy and legislative framework. It includes the use of public investment in trunk infrastructure to influence patterns of development, guided land development using strategic/outline planning, land pooling or readjustment and the gradual extension of detailed planning and development control.

■ Construction of trunk infrastructure

This can be used to attract investment to preferred locations – for example, increasing the attraction of secondary centres within extended metropolitan regions in order to reduce congestion in the core city by improving links between them (see Chapter 8). For example, New Mumbai was established in 1972 around the port of Nava Sheva, with rail and road links with the city of Mumbai. By 2001 it had a population of 1.5 million.[90] Currently, there are 24 rail-based rapid transit systems under construction and 10 more in the planning stages in Asian cities. Although such plans often reflect world city aspirations rather than being based on realistic assessments of the costs of construction, operation and maintenance, or the fares that users can pay, such investment can be used to encourage development in planned directions and to generate revenue for public investment, as in the well-known example of Curitiba in Brazil. However, without proper planning of new development and complementary policies, the outcomes may primarily benefit large-scale investors and developers and high-income households, as shown by the example of Jakarta, Indonesia (see Box 7.1).

■ Guided land development

Planning in advance of development is preferable and more efficient than regularization.[91] Where planning capacity and resources are limited, attempts have been made to ensure an adequate supply of land for expansion by guided land development. This requires an outline strategic plan that identifies the main areas for phased urban expansion, including industrial areas and the location of urban commercial centres; reserves sites for major public facilities such as universities or secondary schools; protects the areas of greatest environmental significance; and is linked to a programme of major infrastructure investment, especially main roads, drainage and water supply. For example, it has been suggested that expansion areas sufficient for 20 to 30 years ahead should be identified and defined by a grid of secondary roads 1km apart, or within a ten-minute walk of every location for access, public transport and main infrastructure provision. Adaptations to the grid can be used to accommodate topography and steer development away from unsuitable areas. Phased construction of roads and water supply will, it is further proposed, guide developers to appropriate grid superblocks, within which detailed planning regulation may not be necessary. An experiment with the approach is under way in Ecuador.[92] Provision for Urban Reference Plans has been made in a number of Francophone African countries, based on an urban grid of main roads intended to protect areas for public use, provide a basis for more detailed planning and prevent the emergence of informal settlements. Plans are based on five-year population

Box 7.5 Innovative responses to informality in Brazil

Since the mid 1980s, at national and subsequently at local level, based on previous experience and progressive practices, Brazil has institutionalized processes of deliberative democracy and introduced constitutional and legal innovations. First, according to Article 182 of the constitution, the objective of urban policy is 'to organize the full development of the social function of the city'. The same article established that urban property has a social function, allocating the responsibility for promoting desirable land use through expropriation, forced subdivision and progressive taxation to local governments. Second, Article 183 created a form of adverse possession available to residents of five years' standing without challenge from the landowner. Based on the principles of 'rights to the city' and the social function of property, in 2001, the City Statute defined the framework and instruments for registering and using land for social purposes. This involved recognition of the informal sector as part of the city and the subject of rights, democratic participation in urban management and empowerment of municipalities as the main agents entitled to regulate land use and occupation. It incorporated a number of innovative approaches to informality, including the use of planning as a tool for addressing social disparities, provision for local governments to recover a proportion of public investment that results in increased real estate values, and provision for regularization of informal settlements.

During the 1980s, the proportion of the urban population living in *favelas* increased to about one fifth. The new legislation provided for them to be designated as special social interest zones in municipal zoning schemes as a basis for infrastructure installation, service provision and construction of social facilities, with a view to integrating them spatially and socially within the city. *Favela* residents are generally opposed to titling because they are not interested in mortgaging their homes and do not wish to be liable for property tax or enforced compliance with the building code. The *favela barrio* programme therefore concentrated on the right to adequate and affordable housing rather than absolute property rights, especially when regularizing settlements on public land. A form of leasehold, the concession of the real right to use, was adopted. It is typically 30 years, inheritable and registered in the names of both partners where appropriate. Specific planning regulations appropriate for the existing low-income population can be adopted (e.g. plot size, land use and construction standards) and annual expenditure programmes are decided through the city-wide participatory budgeting process. Although city programmes (e.g. in Rio de Janeiro, Belo Horizonte, São Paulo, Porto Alegre and Recife) were backed up in 2003 by a national regularization policy, progress on the ground lags behind innovative legislation and policies.

Source: Fernandes, 2001; Caldeira and Holston, 2005; UN-Habitat, 2007a; Irazábal, 2008a

Today promising approaches concentrate on using public planning and financial resources strategically to guide development

Planning in advance of development is preferable and more efficient than regularization

estimates for each district within a city, including extension zones and improvement options for existing areas.[93] A recent study agrees that blocking out areas for new settlement in advance and the installation of basic street layouts and sanitation is more efficient than regularization and upgrading.[94] This strategic approach to planning can be supported by tools such as geographic information systems (GIS) and satellite imaging, as in the case of the 2020 master plans for Karachi and other Pakistani cities, as well as utility mapping in Delhi.[95]

Land readjustment

If development is to occur within the blocks defined by a strategic plan, a series of supporting activities and instruments that provide both sticks and carrots to developers are required. The first challenge for public authorities is to assemble the land and finance for infrastructure investment and acquisition of sites for major public facilities. In many cities, there are no longer extensive areas in public ownership and public agencies must work with private or customary owners and private developers, both formal and informal, to ensure that phased development occurs.

Partnerships with informal or low-income landowners or groups are unlikely to work if unrealistic standards and cumbersome procedures are imposed

There have been thorough reviews of experience in Japan and other countries which show that certain conditions must be present for land pooling to be successful: recognition by landowners that they cannot act independently to service, subdivide and sell their land at good prices; a large difference between rural and urban land prices, enabling owners to realize a profit that gives them sufficient incentive to participate after contributing the required share of their land; landownership that is clear or easily clarified and documented; and a responsible agency with the necessary skills and expertise. The land pooling approach has been less successful elsewhere (e.g. in India).[96] An evaluation of the progress and outcomes of a land pooling initiative in the Kathmandu Valley during the 1990s acknowledges that many problems remain to be resolved, but expresses optimism about its potential.[97]

Limited planning and financial resources are best used by concentrating efforts … on areas where development has major environmental and safety implications

Land readjustment is a market-led approach that provides plots for middle- and upper-income housing – it rarely provides low-income housing. A few examples of public–private partnerships for subdivision to produce low-cost plots are available, although much more experimentation is needed. For example, the Social Urbaniser is a new public initiative in Brazil that attempts to provide incentives to private developers to comply with planning regulations by adjusting standards in return for issuing development permission. The first successful case was negotiated in 2008 in São Leopoldo, where a developer was given permission to subdivide into smaller lots than specified in the regulations, in order to reduce the cost of the houses produced, in return for investment in on-site infrastructure and services.

One innovative way of financing infrastructure is through transferable development rights, in which a certificate is issued to the owner who cedes land, which can be traded for a roughly equivalent land area or floor space in the new building, or sold to a developer who may be able to use it to build additional floor area above the standard floor-space index (see Chapter 6).[98]

Group or communal arrangements may also provide a way forward. For example, in Colombia, there is provision for community land trusts involving the landowner, an association of prospective owner-occupiers that will hold intermediate tenure, and low-income families, who will eventually be issued with individual titles. Unlike private developers or individual families, such associations qualify for a subsidy, provided that they are non-profit and the units produced are cheaper than those built by private developers.[99] In Mexico, partnerships between public or private developers and agrarian communities who own between 20 and 70 per cent of land around cities are encouraged in order to generate large numbers of low-income plots. Reservations have been expressed about the prospects of informal settlements being displaced, although there is recognition that in the first tranche of projects implemented since reforms in 1991, efforts were made to tackle the problems.[100]

Partnerships with informal or low-income landowners or groups are unlikely to work if unrealistic standards and cumbersome procedures are imposed. Flexible attitudes to standards and participatory approaches to decision-making by planners and other professionals are therefore essential. Emphasis should be on 'working with' those who provide large volumes of affordable land and housing, through advice and advocacy rather than heavy-handed regulation.

Gradually extending effective planning in defined areas

In low-income and many middle-income countries, limited governance capacity and lack of support for planning and regulation limit what conventional planning and development regulation can achieve. Before detailed planning and development control can be successfully applied to all development, there is a need to demonstrate that the benefits outweigh the costs to landowners and developers. It can be argued that limited planning and financial resources are best used by concentrating efforts on the public realm and areas where development has major environmental and safety implications, while limiting intervention, especially detailed development regulation, in other areas, particularly middle- and low-density residential areas. Areas of concentration include city and town centres, special economic zones, industrial estates, environmentally important or hazardous areas, and major buildings used by large numbers of people such as shopping malls, cinemas, meeting halls and schools. In urban expansion areas, much subdivision and construction would not be subject to detailed regulation. Planners can, however, work with developers in these areas when opportunities arise and resources permit, either through regulation or through advocacy and advisory work, to encourage good layout planning and compliance with basic standards. Not only does this selective response mean that planning resources are available for strategic planning for the city as a whole, but it can also be used to build developer and public support for planning. In the context of China and Viet Nam, the development of such areas demonstrates that governments are reasserting their control incrementally, following a period of informal development and rapid change

associated with the transition to a market-oriented economy, during which governments were forced to prioritize needs other than regulating development.[101] For selective planning to succeed and comply with overall planning objectives, it needs to fit within a strategic framework.

Working with informal economic actors to manage public space and provide services

Informal economic actors include those engaged in retail trade and related services, manufacturing and repair services, as well as providers of transport, water and other services. A variety of ways in which public-sector agencies are working, and can work, with these actors to improve the management of public space and the provision of services can be identified. Innovative approaches are based on an acknowledgement of, first, the important contribution that informal activities make to the urban economy and their vital role in household livelihoods, and, second, the right of informal entrepreneurs to operate in the city. This provides a basis for understanding the economics of their operations, the positive roles that they play in providing goods and services, the constraints under which they operate and any adverse effects of their operations. This, in turn, enables the development of policies and programmes that counter adverse effects and address constraints without undermining the viability of their enterprises. City governments rarely have coherent policies with respect to informal enterprises, whether they are operating in public spaces, mixed-use neighbourhoods or designated areas. The aim should be to develop coherent policies that can guide the planning, regulation and day-to-day management of informal economic enterprises and actors.

■ Recognition of informal entrepreneurs' property rights

As with informal land and housing development, public agencies all too often harass and evict enterprises to restore physical order, enforce health and safety regulations or serve the interests of formal entrepreneurs who regard informal operators as competitors. For example, most cities assign the handling of street traders to agencies that deal with law and order, such as the police, resulting in evictions that destroy or disrupt livelihoods and involve the excessive use of force. Even if, in practice, informal enterprises are tolerated, the illegality of their operations makes them vulnerable to harassment and demands for bribes by police, municipal officials and other vested interests.[102] As noted above, harassment and forced eviction should be avoided wherever possible. The right of entrepreneurs to operate in the city should be recognized, the property rights they already have respected, and improved property rights negotiated. This may be done through managing the use of urban space and an appropriate regulatory system, as discussed below.

■ Allocation of special purpose areas

City authorities which accept that forced eviction fails to recognize the positive contribution made by informal operators often attempt to remove them from areas zoned for other uses, land unsuitable for development or public spaces to sites designated for markets or industrial estates. Relocation to planned areas is frequently associated with enforced compliance with official licensing and other regulatory requirements.[103] This rarely works well.[104] Planned markets are often less well located and are unpopular with both vendors and customers, relocation disrupts established economic networks, and the increased costs associated with relocation to planned markets or industrial areas, or licensing and regulation may threaten the viability of informal businesses.

In some cases, however, it is desirable and feasible to provide dedicated spaces for informal economic activities in markets and industrial areas. Markets are successful where their location, the facilities provided and the management arrangements are agreed by trader organizations and the public authorities. Often historic market sites or markets developed informally on undeveloped land are the most economically viable and successful. Regularization and upgrading are the most appropriate approaches in these situations.

The right of entrepreneurs to operate in the city should be recognised, the property rights they already have respected, and improved property rights negotiated

When a site is needed for other uses or becomes too congested, relocation may be unavoidable. For example, when 2000 hawkers operating near the Red Fort in Delhi were evicted in August 2001, three associations negotiated over alternative sites, eventually agreeing on one, which opened in 2005. The businesses of those who tried to operate from the new market were, however, constantly undermined by traders operating on the streets around the Red Fort, necessitating periodic negotiations with the authorities for enforcement of the regulations.[105]

Traders are generally willing to pay licence fees or user charges if they feel that they are getting good value for money (e.g. in the form of security of tenure, access to water and sanitation facilities, and public transport access). Once markets are recognized, services may be provided by the market association independently or in collaboration with the municipal government.

■ Managing shared public spaces

Informal operators, especially vendors, commonly share public space with other users, especially vehicles, cyclists and pedestrians. Because of their dependence upon passing customer traffic, they are reluctant to relocate. Often, innovative solutions can be devised to ensure access to civic spaces by both traders and other social groups.[106] The aim should be to clarify the rights of users of public space in order to give vendors more security of operation, while safeguarding health and safety. Limited investment can reduce conflicts and produce dramatic improvements in circulation, hygiene and the operating environment for enterprises, as illustrated by the case of Warwick Junction in eThekwini, South Africa (see Box 7.6).

The absence of a regulatory environment can be as costly to informal operators as excessive regulation, so regulation is needed

The absence of a regulatory environment can be as costly to informal operators as excessive regulation, so regulation is needed; but it should be streamlined to increase the likelihood of compliance. The incentives to comply must at least balance the costs of doing so – for

Box 7.6 Supporting informal street traders, Durban, South Africa

The newly established metropolitan local government for the city of Durban and its surrounding areas adopted an informal sector policy in 2001, based on the premise that informal activities are an important source of employment and contribute to poverty reduction. The policy commits the city to provide support to micro-enterprises, including business skills training and legal advice, and to improve its management of informal economic activities. The latter includes both restrictions (e.g. prohibited and restricted trading zones in the inner city) and positive measures, including the demarcation of sites for market trade. The city has also been experimenting with area-based management in selected areas, including the inner-city site of Warwick Junction, where proposals for physical improvements have been developed and implemented and day-to-day management improved by cooperation between officials from various municipal departments and informal operators.

Warwick Junction is the main public transport interchange, with as many as 460,000 commuters passing through daily and 8000 street traders. During the late 1980s, previous prohibitions were lifted to enable traders to operate legally. However, by the mid 1990s, their number had grown to nearly 4000 and the area had become known as a 'crime and grime hotspot'. In 1997, the municipality set out to examine safety, cleanliness, trading and employment opportunities and the efficiency of the public transport interchange. Teams were established to deal with a variety of issues identified by the municipality and traders, including ablution facilities, street cleaning and street sleeping, leading to a variety of negotiated improvements. For example, a Herb Traders Market was designated, with shelter, water and toilets. Today it accommodates nearly 1000 traders, supporting 14,000 other businesses – for example, people who gather medicinal herbs. More hygienic facilities have also been provided for street food processors and sellers. For relatively modest investment, significant improvements in organization and management of the area have been achieved and the value of an area-based management team that can coordinate municipal departments and work with traders' organizations demonstrated.

Sources: Skinner and Dobson, 2007; Skinner, 2008

example, by simplifying procedures, reducing or differentiating fees, and linking compliance to access to services or other forms of support.[107] Enforcement of location and time restrictions on street trading is difficult because of the sheer size of the informal retail sector. Nevertheless, arrangements for sharing trading locations can include space and time zoning, including demarcation and provision of dedicated trading areas in pedestrian areas and temporary closure of streets for markets. Thus, licensing can be used as an enabling rather than restrictive tool that provides traders with rights to general or location-specific trading on a daily basis or for a specified period, and the municipality with resources to invest in improved facilities. If licences are tied to a particular location, traders have an incentive to promote good management of the area, while membership of an association provides traders with a means of expressing voice and negotiating with municipal councils.[108]

The provision of services to informal operators … can support their operations … and improve the working environment for the operators

Based on the work of the Sustainable Dar es Salaam Programme and its working group on micro-trade, guidelines for petty traders were produced in 1997.[109] These require traders to use markets or designated sites, form associations, adhere to regulations related to hygiene, etc. and refrain from trading outside certain buildings where heavy pedestrian traffic supposedly makes it unsafe. In the city centre, in particular, designated sites have been agreed upon and metal stands have been provided for street vendors to use. The latter facilitate sharing of space between traders and pedestrians and street cleaning. Thus, informal trade is well managed in the city centre and high-income areas and traders' associations have good relations with the city authorities.

■ Provision of basic services and support

Informal operators are both users and providers of basic services. Whether located in designated areas or shared public space, the provision of services to informal operators (e.g. electricity, water and sanitation) can support their operations, increase the likelihood of compliance with official hygiene standards, and improve the working environment for the operators themselves.

As providers, informal operators complement large-scale public or private agencies, especially in meeting the needs of households and businesses that cannot access formal services because of their absence, inadequacy or cost. Their contribution must be recognized while the weaknesses of the services they provide are addressed. For example, informal public transport operators provide a vital service in areas where official public transport is either not provided or too costly for residents, but their driving standards and safety record may be poor. Informal water vendors likewise fill gaps in the piped water supply network; but often the water they sell is costly and of inferior quality due to poor storage practices, even though it is usually sourced from the public supply. Informal pit latrine evacuators or refuse collection and recycling services assist in maintaining the environment in informal settlements, especially as densities increase; but the working conditions for operators are often unhealthy and waste disposal practices may be environmentally unsound.

An important element of a comprehensive approach to formal service provision is to work with informal operators through licensing, capacity-building, the enforcement of appropriate regulations and the development of alternatives when current livelihoods are damaged by policies. For example, when cycle rickshaws were banned in central Dhaka (Bangladesh), their continued operation in residential areas was permitted. In several Francophone West African countries, water resellers have formed associations to manage standpipes and extend the piped supply. In Côte d'Ivoire, the formal water provider, Société de Distribution d'Eau de Côte d'Ivoire, registers water resellers.[110] What is most important for planners is to be aware of the role played by informal service providers, to take their needs into account in land-use planning and development regulation, and to work with other agencies to address the constraints on their operation.

The provision of business support technical assistance also needs to be considered when developing responses to informal economic activities. Such support services are likely to include savings and credit arrangements, and technical assistance to realize productivity gains. Thus, as well as an appropriate policy and regulatory framework, and planning policies that secure informal operators access to appropriate urban space, complementary development policies differentiated for different sectors of the informal economy are needed.

Mixed-use zoning

Many informal economic activities, especially those of women, occur within residential areas and buildings. Often, conventional plans are based on single-use zoning and mixed uses are forbidden. In many countries with effective planning systems, the limitations of single-use zoning have long been realized, and more emphasis is now placed on mixed uses to produce vibrant and convenient living environments. Planning legislation in many poorer countries has not caught up, despite the popularity of mixed uses evident in most cities where enforcement of single-use zoning is weak. However, planners are becoming more realistic and are incorporating mixed uses into plan provisions. For example, the 2007 Delhi Master Plan has accepted mixed-use zoning as a way of accommodating non-polluting industry, informal trade, retail shops, professional activities, clinics, etc. in residential areas. The plan provides for one informal shop or unit per 1000 residents in new housing areas, five to six units for informal enterprises for every 1000 formal employees, and permits for informal traders in approved locations.[111] The positive result of such changes to law and policy is that most informal activities in homes and residential areas are no longer illegal. However, extending effective planning and building control to home-based enterprises and mixed-use areas in low-income countries is unlikely to be feasible for some considerable time.

Organization of informal operators

Effective organization enables informal operators to interact effectively with public agencies and strengthens their own ability to solve problems. It provides a channel through which their needs and priorities can be identified and presented to public authorities and appropriate approaches negotiated. The potential of trader organization is illustrated by the Dar es Salaam and eThekwini examples and the achievements of the Self Employed Women's Association in India, which, in 2006, had nearly 1 million members in nine states and had enabled its members to address a variety of constraints on their operations, including access to space and services.[112] Effective organization is also illustrated by the prevalence and increasing size and professionalism of associations amongst informal transport operators in Thiaroye-sur-mer in Pikine, Dakar, Senegal.

In summary, it is clear that for approaches to work well, local governments need to develop a good understanding of the economics of informal enterprise operation, adopt a flexible approach to the management of urban space and regulation of operators, and be prepared to use participatory and collaborative approaches to policy formulation and day-to-day management. The key elements of policy to facilitate and manage informal enterprises include:[113]

- supportive regulation and licensing;
- modest financial contributions by operators to pay for regulation, space allocation and management and services;
- traffic, public transport and road management;
- planning and design of civic spaces;
- provision of sites for markets and small producers in appropriate locations;
- provision of basic infrastructure and services;
- encouragement of traders' associations;
- municipal capacity-building to improve understanding of the economics and operation of informal trade; and
- participatory approaches to policy-making and management.

RESPONDING TO INFORMALITY THROUGH PLANNING AND GOVERNANCE

On the basis of the debates and trends reviewed above, a process through which urban planning and governance can gradually increase the effectiveness of its responses to informality can be identified. This involves three basic steps:

The limitations of single-use zoning have long been realized, and more emphasis is now placed on mixed uses

- *Step 1:* recognize the positive role played by informal land and property development and economic activities, and halt official actions that hinder their operations. Responses to informality such as harassment and eviction adversely affect livelihoods, cause inconvenience to suppliers and customers, and hinder the ability of subdividers, builders, entrepreneurs and service providers to meet the needs of urban residents and businesses.
- *Step 2:* change policies, laws and regulations. Consider the need and potential for formalization and regularization of economic activities, land supply and housing development, while being aware of the possible disadvantages of doing this, especially for the poor and marginalized social groups, including women. Formalization and regularization need not imply that informal activities must comply with existing standards and requirements, especially if these are inappropriate and impossible to enforce. Instead, adaptation of standards and procedures is likely to be necessary, including recategorizing certain informal practices as legitimate. Justifiable motives for formalization and regularization include the desire to bring occupants and enterprises within the municipal tax net in order to generate revenue to improve services; to improve construction, health and safety standards; and to safeguard environmentally sensitive areas. Appropriate tactics can include strategic enforcement of regulations in areas where risks to the public are greatest and the adoption of differentiated regulations, which are appropriate to the income levels and needs of particular areas or sub-sectors of the informal economy. Interventions should be guided by the following basic principles:
  - interventions restricted to the minimum necessary to safeguard the public;
  - incremental improvements, through step-by-step changes in standards, tenure arrangements and

Effective organisation enables informal operators to interact effectively with public agencies

services, requiring a flexible approach on the part of official agencies;
  - methods for developing policy, preparing plans, and day-to-day management based on participation, mutual learning and cooperation between public agencies, NGOs and informal actors; and
  - formalization and regularization through a mixture of incentives and enforcement.
- *Step 3:* strengthen the reach and legitimacy of the planning system to reduce the extent of informality. For planning and regulation to be effective, it must gain widespread support from informal actors, politicians, residents and businesspeople. For such support to increase, each stakeholder must perceive the benefits of planning and regulation to outweigh the costs. This can be achieved through a combination of the selective use of limited planning resources to achieve impact, approaches that do not undermine the positive contribution made by informal activities, and strategies to educate citizens on the role and benefits of planning.

On a global scale, there are many countries in which informality is extensive and growing

CONCLUDING REMARKS

This chapter has shown that the prevalence of informality in cities varies. On a global scale, there are many countries in which informality is extensive and growing, and much fewer countries where informality is either limited or becoming less prevalent. It is limited in countries where there is effective regulation of development and enterprises, but extensive in countries where large businesses account for a limited proportion of all economic and urban development activity, and planning and regulation are ineffective.

There is no single planning model for responding effectively to the challenges arising from urban informality

There is no single planning model for responding effectively to the challenges arising from urban informality. First, the appropriate model varies according to the principles of the national legal system, the political culture and governance arrangements – the key is that the approach is appropriate for its context. Second, approaches to policy formulation and plan preparation have continued to evolve even in countries that have had effective planning and regulatory systems for half a century or more, as the shortcomings of conventional approaches have become evident and the need for participation recognized. The problem with many ineffective approaches is that they have failed to change. In many developing countries, technocratic blueprint approaches, high standards and strict regulatory requirements persist, despite their obvious ineffectiveness in the face of widespread informality, intense conflicts of interest and limited governance capacity. The challenge is to devise an approach to planning that is capable of tackling the undesirable outcomes of informality while recognizing the contribution of informal developers, entrepreneurs and service providers to the urban development process.

Innovative approaches to informality are not confined to the planning and regulatory systems, although this chapter has focused on the spatial and development regulation aspects of the approaches identified. The first group of responses are alternatives to eviction or, where eviction in the public interest cannot be avoided, adherence to good practice guidelines to avoid further impoverishment and informal development. The second group entails the recognition, regularization and upgrading of informal land and property development wherever this is feasible, modifying tenure arrangements and regulatory requirements as appropriate in order to ensure that low-income residents and small and micro-enterprises benefit. A third group of responses focuses on the strategic use of limited planning and public-sector resources to guide and steer new development, rather than micro-plan it. Working with private-sector actors, especially informal land subdividers and builders, the aim is to ensure that the supply of affordable serviced land in suitable locations meets demand. Affordability can be enhanced by the adoption of appropriate standards, streamlining complex registration and regulation procedures and the adoption of appropriate cost-recovery policies. Rather than requiring development to comply with ideal standards or a desirable sequence of planned development from the outset, once the large-scale infrastructure and basic services are in place, subdivision, improvements to infrastructure and services, and investment in housing can proceed incrementally.

In many countries, especially in the developing regions of the world, governments have limited resources and limited legitimacy. There is a need for smart targeting of such limited resources to improve effectiveness and to build public support for planning and regulation. Only when land administration is streamlined and there is general public acceptance of the need for restrictions on property rights in the public interest will the wide enforcement of development controls be feasible. What is needed, therefore, is a differentiated and incremental approach. Once internationally recognized rights to decent work and housing and protection from harassment and eviction are realized, changes to policy, laws and practices to permit regularization and other innovative approaches to informality can be considered. Through participatory and collaborative approaches, these can both contribute to the development of more effective approaches and build wider support for planning and regulation. Conflicting interests and priorities mean that responses to informality are as much political as technical. Not until the actors involved feel that they can both influence and benefit from the planning, urban management and regulatory systems, in ways that are transparent and fair, can their effectiveness be enhanced.

NOTES

1 Hart, 1973.
2 ILO, 1972.
3 See also Lipton, 1984; Guha-Khasnobis et al, 2006.
4 Meagher, 2005.
5 Guha-Khasnobis et al, 2006, p1.
6 UN-Habitat, 2006h.
7 Defined by Tripp as: 'Illicit activities that have no legal counterpart in the society in question … [including] drug dealing … extraction of rents, kickbacks and other forms of criminal activity' (Tripp, 2003, p303).
8 Bromley, 1978; Moser, 1978; Meagher, 2005; Leduka, 2006b; Rakodi, 2006.
9 Sindzingre, 2006.
10 de Soto, 2000; Guha-Khasnobis et al, 2006; UN-Habitat, 2006h.
11 Amis, 2004; UN-Habitat, 2006h.
12 UN-Habitat, 2006h, p11.
13 Ansari, 2008.
14 Ansari, 2008.
15 UN-Habitat, 2008b.
16 UN-Habitat, 2008b.
17 Webster and Muller, 2004 (see also Ansari, 2008).
18 Derived from the Bahasa words *desa* (village) and *kota* (town).
19 McGee, 1991.
20 McGee, 1991; Leaf, 2005b; Dupont, 2007; Schenk, 2002.
21 Ansari, 2008.
22 Ansari, 2008.
23 Douglass, 2008.
24 Ansari, 2008.
25 Ansari, 2008.
26 Yuen, 2008.
27 Ansari, 2008; Yuen, 2008.
28 Choe, 1998; Yeung and Lo, 1998; Laquian, 2007.
29 Leaf 1999, 2002, 2005b; Quang and Kammeier, 2002; Leaf and Hou, 2006; Liu and Wu, 2006; Waibel, 2008.
30 With a few exceptions, although the investment is often motivated by global ambitions related to economic development or mega-sports events, and concentrates on airports and limited transit routes that do not necessarily serve the poor (Yuen, 2008).
31 Ansari, 2008; Yuen, 2008.
32 Yuen, 2008.
33 Ansari, 2008.
34 Centre on Housing Rights and Evictions, 2006, pp74, 85; see also UN-Habitat, 2007a.
35 Yuen, 2008.
36 Perry, 2007, p29.
37 UN-Habitat, 2008b.
38 Magalhaes and Rojas, 2007.
39 Iracheta and Smolka, undated.
40 Gilbert, 1998.
41 Ferguson and Navarrete, 2003.
42 Phillips, 2006; Duffy, 2007.
43 Irazábal, 2008a.
44 Biderman et al, 2008; Iracheta and Smolka, undated.
45 Irazábal, 2008a.
46 Irazábal, 2008a.
47 Iracheta and Smolka, undated.
48 Irazábal, 2008a.
49 Irazábal, 2008a.
50 UN-Habitat, 2008b.
51 Kessides, 2006; UN-Habitat, 2006h, p11.
52 Potts, 2007, p10.
53 Hansen, 2004; Kamete, 2004; Kazimbaya-Senkwe, 2004; Lourenco-Lindell, 2004; Potts, 2007.
54 Kessides, 2006; Attahi et al, 2008.
55 Kessides, 2006.
56 Mbiba and Huchzermeyer, 2002.
57 Jenkins, 2000.
58 Briggs and Mwamfupe, 2000.
59 Lasserve et al, 2002; Durand-Gatabaki-Kamau and Karirah-Gitau, 2004; Ikejiofor, 2006; Jenkins, 2004; Kalabamu, 2006; Leduka, 2006a; Musyoka, 2006; Nkurunziza, 2006; Rakodi, 2006; Attahi et al, 2008.
60 Tempesta and Thiene, 1997.
61 Schneider, 2007.
62 Istituto Nazionale di Urbanistica, 2006.
63 Schneider, 2007, p19
64 In many Eastern and Central European cities, and cities in the former Soviet Union, high-income residents have also converted existing *dacha* settlements (temporary summer houses on small plots) into exclusive villa developments – for example, on the western edges of the metropolitan areas of Moscow and Budapest (Medvekov and Medvekov, 2007; Kovàcs and Tosics, forthcoming).
65 Informal settlements accommodating Roma minority populations existed during the centrally planned era in many Eastern European towns and cities (Hirt and Stanilov, 2008).
66 Nientied, 1998; Hirt, 2005; Vujovic and Petrovic, 2007; Hirt and Stanilov, 2008.
67 However, in some countries the share of the informal sector continues to be very large (e.g. between one third and one half of total economic output in Central Asia; basic planning and environmental legislation has not yet been updated; and outdated plans continue to be used, e.g. Azerbaijan, Armenia; Hirt and Stanilov, 2008).
68 Biderman et al, 2008.
69 Scholz, 2002; UN, 2006a.
70 Scholz, 2002.
71 ADB, 1998; World Bank, 2004; UN-Habitat, 2007a.
72 UN-Habitat, 2007a.
73 Amis, 2004.
74 UN-Habitat, 2007a, p141.
75 For example, in India; see Kundu, 2002.
76 Mohit, 2002; UN-Habitat, 2003.
77 ADB, 1998.
78 See, for example, de Soto, 2000; Payne, 2001; Gilbert, 2002; Payne et al, 2007; Varley, 2007.
79 Deeds are the written agreements that signify transactions in property rights. Until relatively recently, they were the only evidence of landownership in some countries (e.g. the UK). In a deeds registration system, a purchaser of land rights registers the claim without the state guaranteeing its validity.
80 National Commission for Women, 2005; UN, 2006a.
81 Payne et al, 2007.
82 Peru is an exception (Kagawa and Turkstra, 2002).
83 See, for example, UN-Habitat, 2007b; Varley, 2007.
84 Yuen, 2008.
85 UN-Habitat, 2007a.
86 Rakodi, 2006; UN-Habitat, 2007a.
87 Gulyani and Bassett, 2007.
88 Thailand's nationwide slum upgrading programme includes land-sharing, upgrading and relocation (Boonyabancha, 2005, 2008).
89 See Liu and Wu (2006) on Naning, PRC.
90 Laquian, 2007.
91 Sivam and Evans suggest a methodology for assessing how improvements to the supply of land for development through the formal land administration system might be identified by assembling examples from a range of cities and using local experts to assess their transferability to a new location in their example, Delhi, using a range of criteria by which to assess their potential effectiveness (Sivam and Evans, 2001).
92 Angel, 2008.
93 Attahi et al, 2008.
94 Kessides, 2006.
95 Ansari, 2008.
96 UN-Habitat, 2003.
97 Karki, 2004.
98 Ansari, 2008.
99 Aristizabal and Gomez, 2002.
100 Jones and Pisa, 2000.
101 Waibel, 2008.
102 Yuen, 2008.
103 Roever, 2005.
104 See Hansen (2004) on Lusaka, Zambia.
105 UN-Habitat, 2006h.
106 Brown and Rakodi, 2006; Douglass, 2008.
107 Neto et al, 2007.
108 Brown, 2006.
109 Nnkya, 2006b.
110 Attahi et al, 2008.
111 A. K. Jain, pers comm, 2008.
112 Jhabvala, 2007.
113 Brown and Rakodi, 2006; see also Lyons and Mbiba, 2003.

CHAPTER 8

PLANNING, SPATIAL STRUCTURE OF CITIES AND PROVISION OF INFRASTRUCTURE

The provision of infrastructure such as transport networks, water, sewerage, electricity and telecommunications plays key roles in the development of efficient, healthy and sustainable cities. Other urban facilities and amenities such as schools, health services, social services, markets, and places for gathering, worship and recreation are also important to the development of liveable cities. Infrastructure, facilities and amenities of this sort are necessary to meet people's everyday needs and are acknowledged as critical in the Habitat Agenda.[1] Improvements in water and slum conditions are core commitments of the Millennium Development Goals.

The spatial structure and degree of densification of the built environment … has a major impact upon urban efficiency and sustainability

These elements of infrastructure and facility provision are important in shaping the spatial structure of cities, at a city-wide and more local scale, and can result in certain sections of the population becoming spatially marginalized and excluded from access to urban opportunities. The spatial structure and degree of densification of the built environment also has a major impact upon urban efficiency and sustainability. Thus, the compact, mixed-use and public transport-based city is increasingly seen as more environmentally sustainable, efficient and equitable.[2] Yet, the trends in many parts of the world are towards declining densities and increasing outward expansion,[3] often across municipal boundaries. Furthermore, the relevance of these ideas to the urban poor on the urban periphery is open to debate.

While planning potentially plays important roles in the way in which infrastructure and facilities are organized and in the spatial structuring of cities, its role has been relatively weak in many contexts

Earlier chapters have shown the complex dynamics through which urban growth occurs, and its variations across contexts. It has pointed to the important roles of entrepreneurs, individuals and consumers who make location decisions; providers of infrastructure and services; those who make undeveloped land available; and property developers. Informal land development processes are also critical in most developing countries. Municipal and government agencies are among a large number of actors shaping urban spatial organization, which is always evolving. While planning potentially plays important roles in the way in which infrastructure and facilities are organized and in the spatial structuring of cities, its role has been relatively weak in many contexts. Informal urban development processes, the growing importance of urban mega-projects and privately driven development with little relationship to urban spatial planning, institutional divides and the limitations of urban spatial planning have all been contributors. Yet, there is a need for a closer connection between spatial planning and both infrastructure provision and mega-projects, as these have significant urban impacts.

To address these issues, this chapter is divided into six sections. The first section provides a brief overview of contemporary urban spatial trends internationally, and their links to access to infrastructure and exclusion. The next section explores the way in which these trends are being shaped by the 'unbundling' of infrastructure development, disjointed from spatial planning through forms of privatization, developer-driven growth and urban mega-projects. The third section examines the links and interrelationships between forms of infrastructure provision, spatial organization and access.

The relationships between urban form, sustainability, efficiency and inclusiveness are considered in the fourth section, through a focus on the compact city debate and a discussion of the relevance of compaction ideas across contexts. There is some debate over whether planning can influence the spatial organization of cities; yet it does have important material effects. Linking spatial planning to major infrastructure development provides a potential avenue for shaping the future growth of cities, and the fifth section thus explores various contemporary initiatives to align spatial planning and infrastructure development. The chapter concludes by drawing out key findings and policy implications.

URBAN SPATIAL TRENDS, INFRASTRUCTURE AND EXCLUSION

Previous UN-Habitat reports[4] have provided extensive analysis of the changing spatial structure of cities and of levels of

infrastructure and service provision in the world's cities. This section provides just a brief recapitulation of these patterns as they relate to infrastructural developments and urban planning.

As noted in Chapter 2, more than one third of all urban residents in developing countries are currently living in slums, characterized by poor and crowded housing conditions, tenure insecurity, and without access to improved drinking water and sanitation. While many urban poor live in inner-city slums, the majority of the urban poor in developing countries are living in informal settlements on the urban periphery. These settlements are likely to have better housing than inner-city slums, but often have low levels of services, which can become problematic with densification. Access is also likely to be difficult since mass transit systems are often poorly developed, and areas accessible to the poor may not be located on main routes. Hence, considerable time (as much as three to four hours per day) and cost (up to 30 per cent of income) can be spent on accessing employment, markets, schools and other public services. These long distances are especially burdensome for women who travel to work and are also responsible for housework and childcare.[5]

The growth of peri-urban areas around cities, particularly as urban growth outpaces infrastructure development, is one of the most prominent current changes to urban structure. In Asia, this is occurring on a dramatic scale: in Jakarta and Bangkok, some 77 and 53 per cent of urban growth by 2025, respectively, is expected to be in peri-urban regions, while in China, some 40 per cent of urban growth by 2025 is expected to be in peri-urban areas as far as 150km to 300km from core cities. In Asian cities, lateral spread is occurring along transport corridors, creating a form of 'regional urbanization'.[6] Some cities, nevertheless, such as Bangkok, remain relatively centralized in terms of employment and labour markets, particularly for the poor.

The growth of small- and medium-sized towns and development along transport routes within the commutable distance of metropolitan agglomerations – as well as the development of peri-urban areas – are occurring in Latin America and the Caribbean and in the transitional countries.[7] Peri-urban informal development is a key pattern in sub-Saharan Africa, particularly on customary land.

The growth of city-regions, or 'metropolitanization', is occurring mainly through formal processes in developed countries, and is underpinned by the development of polycentric cities, the expansion of highway systems and increased reliance on cars. Such patterns are most prominent in the US, where central business districts retained only 10 to 20 per cent of employment by the late 1990s, as economic activity moved to suburbs and major nodes outside the core city. The decentralization of employment within cities has not reduced levels of commuting, as jobs and housing are not generally co-located.[8] In Europe, central cities have retained their importance to a greater extent, but trends towards sprawl are nevertheless evident.

Most recent studies of cities point to rising levels of class segregation, particularly with the growth of urban enclaves in the form of gated communities. Gated residential estates for middle- and high-income groups are emerging in places where fear of crime is a major concern, such as in Latin America, South Africa and in parts of the US. Nevertheless, this phenomenon is prevalent in most regions of the world, although it is less significant in Europe. In Asia and, to some extent, in Latin America, major complexes, including a range of services, facilities (including schools) and economic activities are also being developed.[9]

In Asia, and to a lesser extent in other parts of the world, there has been a significant emphasis on infrastructural upgrading to respond to growth to produce 'world-class cities': with high-quality transport, information and communication technologies, modern industrial parks, in association with suburban or high-rise housing and shopping complexes, such as the Pudong development in Shanghai (China) and the Madinat al-Hareer development in Kuwait.[10] The rapid growth of enclave development and rising levels of socio-spatial polarization reflect processes of globalization, economic restructuring and growing income inequality; but they are also the product of a neo-liberal era in which important elements of urban development have been privatized or driven by private developers in many countries. The following section explores these issues.

The majority of the urban poor in developing countries are living in informal settlements on the urban periphery

SPATIAL PLANNING, THE PRIVATIZATION OF INFRASTRUCTURE DEVELOPMENT AND MEGA-PROJECTS

As indicated in Chapter 3, traditional approaches to planning attempted to align land-use planning with infrastructure provision through a comprehensive master planning approach, and through the public provision of infrastructure. There were, however, many deficiencies in these processes, and from the 1980s, new urban development and infrastructure provision became far less a matter of planning, and far more dominated by private-sector interests. This section explores these issues and shows how this process of 'unbundling'[11] has, in part, underpinned the spatial trends discussed in Chapter 2 and the previous section. The first two sub-sections trace the history of the links between spatial planning and infrastructure development, and the impact of 'unbundling', while the third sub-section considers the contemporary focus on mega-projects.

The growth of city regions, or 'metropolitanization', is occurring mainly through formal processes in developed countries

Master planning and infrastructure

From the 1850s to the 1960s, the supply of infrastructure and services in cities shifted from fragmented and privately organized goods to centralized and standardized services provided by the public sector.[12] These large-scale systems underpinned much of the growth of cities after World War II and significantly shaped their spatial form.

One of the core functions of traditional master planning was to provide the basis for the integrated provision of transport, energy, water and communication with urban

development. Master plans provided projections and guidance for the location, extent and intensity of particular land uses in the city. Planners thus targeted densities and land uses in particular areas. In theory, this kind of planning enabled authorities responsible for transport, water, sewerage, energy and other public facilities to develop infrastructure and services on a 'predict and provide' basis. Thus, infrastructure provision was intended to follow spatial planning.

While this kind of planning might have been effective in some developed countries, there were problems in many others. Under communism in Eastern Europe and Central and Eastern Asia, master plans were driven by economic targets developed at the national level, without consideration of local needs.[13] In most colonial contexts, planning and infrastructure provided by the public sector was only for an elite, and projections anticipated a small population that was soon outstripped by growth in the post-colonial period.[14] For example, infrastructure developed in Lagos (Nigeria) provided for only 10 per cent of the eventual population.[15] Nor did patterns of development necessarily follow those anticipated, particularly with the rapid growth of high-density informal settlements. Even in developed countries, shifting social and economic patterns, such as declining household sizes, new patterns of economic activity and the like, meant that plans proved to be out of synchrony with actual needs for infrastructure. The accuracy of the 'predict and provide' approach was called into question.

In several countries, spatial planning occupied a marginal institutional position in relation to far more powerful departments responsible for various kinds of infrastructure planning and development.[16] Departments 'working in silos' developed their own plans, which did not necessarily link to one another or to the master plan. In these contexts, the provision of infrastructure has been far more powerful in shaping the spatial form of cities than planning.

From the late 1970s, the 'unbundling' of infrastructural development … has tended to drive patterns of fragmentation and spatial inequality in many countries

Private-sector led infrastructure development

Privatized provision of services … imposes considerable costs on the poor

From the late 1970s, the 'unbundling' of infrastructural development through forms of corporatization or privatization of urban infrastructure development and provision, and developer-driven urban development, has tended to drive patterns of fragmentation and spatial inequality in many countries. In several post-colonial contexts, such as Jakarta (Indonesia) and Mumbai (India), these processes overlaid an already fragmented and unequal system of infrastructure and service provision.[17] In many countries, a local government fiscal crisis underpinned a shift towards the privatization of service provision. These changes occurred in the context of the decline of the welfare state or the collapse of communism and a movement towards neoliberal economic and institutional policies, which have tended to promote the market and market principles. Some large, influential international agencies, have also promoted the idea of privatization of infrastructure and services.[18] Large multinational firms have emerged in the field of infrastructure provision, with a focus on project-by-project investment.[19]

In both transitional and developing countries, there seems to be a shift towards privatized provision of infrastructure in the context of local fiscal crises, which has underpinned new forms of sprawling and unequal development. By the 1990s, many cities in transitional countries had ageing infrastructures, which were not refurbished as a consequence of the economic crisis and the withdrawal of state subsidies. Instead, new development occurred on a privatized or non-legal basis. Particularly in Central and Eastern Europe, there has been extensive privatization and outsourcing of utilities. Similarly, in Latin America and the Caribbean, fiscal constraints have meant a reliance on privatized provision of services in many countries. In Eastern Asia, South-Eastern Asia and the Pacific, however, the bulk of infrastructure is still provided by the public sector, with only 20 to 25 per cent being developed by private finance institutions and through various arrangements with the private sector. Privatized, or even individualized, provision of infrastructure is also occurring in contexts where large-scale systems of infrastructure provision are inoperable or only serve a small part of cities, such as in some African cities.[20]

'Unbundling' has taken various forms and has occurred in both the provision of infrastructure and services, and in urban development projects. It includes leases and concessions; public–private partnerships of various kinds,[21] but also in major urban development projects; involvement of the private sector in building, financing and managing infrastructure;[22] and private concessions to build and run toll roads, for example. Small local entrepreneurs and systems of community management are also being used in solid waste collection, water, housing and sanitation in countries such as Cambodia, Thailand and the Philippines, and in parts of Latin America and Africa, amongst others.[23]

The private sector has tended to focus on more profitable aspects of infrastructure development: shopping centres, middle- and high-income residential enclaves, megaprojects and the like. Nevertheless, privatized provision of services has also occurred through contractor models in poorer communities. These processes have been controversial: while they sometimes extend services to areas that would not otherwise have them, they also impose considerable costs on the poor, and limit the use of resources that are necessary for healthy cities.[24] The privatization of public services has in some cases been resisted by communities – for example, in Latin America[25] and parts of South Africa.[26]

In the context of increasing global competitiveness, local governments in many parts of the world are also being driven to become more entrepreneurial, focusing on enabling and attracting private-sector development. This approach has sometimes led to a relatively *laissez faire* approach to development, where proposals by developers are accepted even when they are contrary to plans, such as in some Latin American countries.[27] In Durban, South Africa, a developer-driven approach has resulted in urban sprawl, contrary to the compaction principles of the city's spatial framework (see Box 8.5).

Mega-projects

The period since the 1980s has also seen a major growth of urban mega-projects linked to the new emphasis on urban competitiveness and urban entrepreneurialism. In many cases, particularly in Europe, mega-projects are linked to urban regeneration initiatives designed to reposition declining economies to capture new or growing economic niches. In several Asian cities, mega-projects are being developed *de novo*, not only as prestige projects, but also to lay the basis for new forms of economic development. Box 8.1 summarizes six common forms of mega-projects.

Projects of this type have varying relationships to the public sector. While some are completely privately driven and provided, in other cases, they are initiated and funded by the public sector in the hope of attracting private development, and are driven by special agencies. Private–public partnerships, or arrangements in which the public sector provides bulk infrastructure and connections while the private sector undertakes development within these parameters, are also common.

Although there are some examples where such projects work with spatial planning processes and inclusive visions of urban redevelopment – such as in Plaine Saint-Denis, Paris (see Box 8.6) – in many cases, mega-projects are in contradiction to spatial plans, and enable unequal development out of synchrony with the needs and aspirations of ordinary residents. In Europe where such projects are generally state led and often funded by government, they are frequently run by special agencies which compete with and supersede local and regional governments.[28] Frequently, existing plans and associated regulatory processes are bypassed, and the usual participatory processes are replaced by stakeholder participation. Methods of assessing impacts are changed, and research indicates that there tends to be pervasive misinformation on costs, benefits and risks.[29]

In Indonesia, mega-projects in the greater Jabotabek mega-urban region (centred on Jakarta), have involved public development of large-scale infrastructure, including a new airport, toll highways linking key axes of development, as well as major private housing, shopping malls, industrial areas, tall buildings and gated residential developments. While aspects of the development were consistent with the Jakarta master plan, which included an industrial corridor, various controls have been reduced, and development has occurred on land which was intended to be protected from urban development for environmental reasons. Development is taking place on prime agricultural land and green spaces in the region's principal area of water supply and its main aquifer, thus undermining the region's water supplies.[30]

THE INFLUENCE OF INFRASTRUCTURE ON URBAN SPATIAL STRUCTURE AND ACCESS

Previous sections of this chapter have provided an overview of key spatial trends and contemporary drivers of urban form. This section shifts the focus towards considering the way in which urban infrastructure shapes the spatial organization of cities, and how this, in turn, affects access and liveability from the perspective of different groups of people. The focus is particularly on transport networks and systems since these are generally acknowledged to be the most powerful in shaping urban spatial structure;[31] but other elements of infrastructure provision and inclusive spatial and infrastructure planning at a local level are also considered.

In many cases, mega-projects are in contradiction to spatial plans

Transport systems and networks

At the heart of the transport/land-use relationship is the importance of accessibility for both the development of housing and for economic activity. As recognized in classical urban economic models, the significance of access translates into higher land values around nodes and routes offering high access. Thus, economic activities requiring high levels of accessibility cluster around rail stations and tram routes, along main roads or in nodes close to major intersections of

Transport networks and systems … are generally acknowledged to be the most powerful in shaping urban spatial structure

Box 8.1 Common forms of mega-projects

The six common forms of mega-projects are as follows:

1. Developments linked to event tourism, such as conference centres, exhibition sites and sports stadia.
2. Redevelopment of old industrial areas and ports towards a new service, leisure and tourist economy.
3. Development of new areas linked to high-tech industries and economic activities, such as Malaysia's super-corridor between the capital and the airport (Yuen, 2008). These developments can include residential, commercial and industrial space and may be linked by premium transport infrastructure, both road and rail. In Uttar Pradesh (India), the provincial government has instituted a policy to enable 'high-tech cities' as new enclaves within cities (Ansari, 2008).
4. Major new satellite cities with international standard facilities, such as Muang Thong Thani, which is planned for a population of a million, 40km from Bangkok (Thailand) (Yuen, 2008). Significant new towns of this sort are also being planned and built in Western Asia. For example, Saudi Arabia is planning to complete some five megacities by 2020 (Nassar, 2008).
5. Major enclave developments taking the form of gated communities containing a variety of retail, school, entertainment and other facilities for the wealthy, linked by privatized transport routes.
6. Enterprise zones or special economic zones set up by national or local governments to attract new investment, sometimes linked to major airports and other developments. In transitional countries, these are occurring on municipal peripheries. Such zones are often duty-free enclaves where local laws and revenue regulations do not apply.

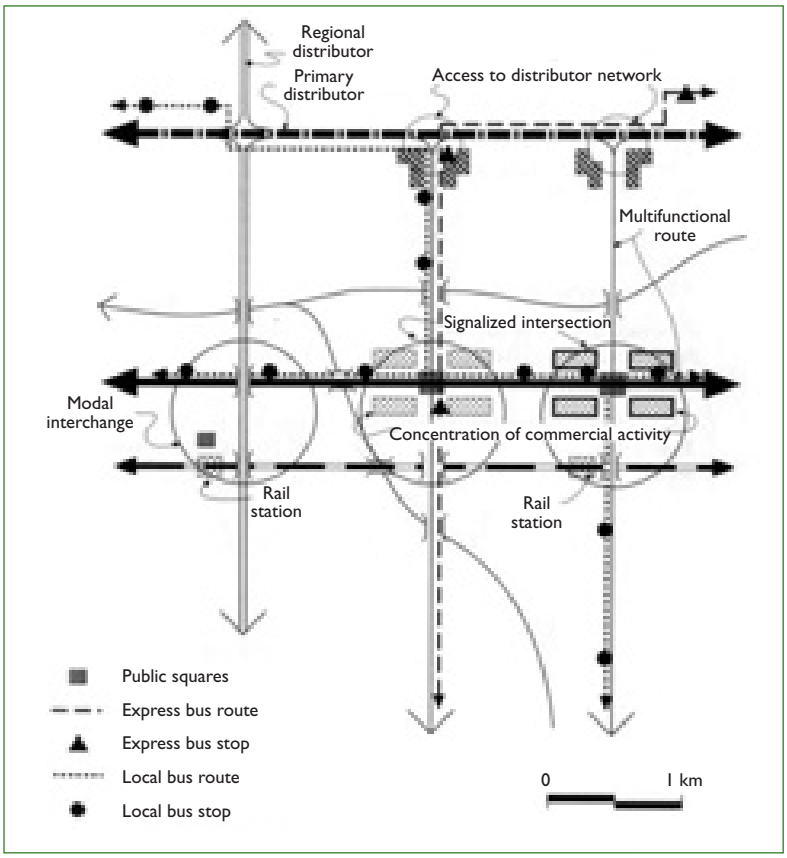

Figure 8.1

Designing for accessibility

Source: Behrens and Watson, 1996

highway systems. Firms that favour a particular transport mode will cluster near points of high access for that mode.[32] Residential developments similarly seek accessibility; thus the development of new routes and transport systems provides important ways of structuring cities over the long term. The accessibility–value relationship, however, means that high-income groups are more able to pay for access and, thus, to locate close to good transport routes that suit the transport mode which they use, although they may also choose more distant locations and longer travel times.

Much has been made of the role of highways in facilitating the suburban form of development, and in encouraging urban sprawl.[33] Detractors in the US – where much of the debate has occurred – point to the role of other factors, such as rising car ownership and incomes, cheap credit, mortgage loans, family formation, taxation, a desire to escape congested inner cities, an attraction for suburban life, and the suburbanization of employment. The growth of car-oriented suburban development has also been dependent upon an era of cheap oil, which may be drawing to a close. Clearly, the spatial form of cities is not a simple effect of transport routes, and will be the outcome of a range of social, political, institutional and regulatory conditions in various contexts. Nevertheless, studies suggest that highways play powerful roles as conduits for development in particular parts of cities.[34]

Accommodating the motor car has been an important theme of 'modern' planning in many parts of the world. High levels of dependence upon the motor car, and the low densities associated with car-dominated cities, however, make access difficult for those without this form of transport: the elderly, disabled, youth, women in families with single cars, and low-income workers in suburban office locations and homes, such as cleaners, domestic workers, and clerks.[35] Furthermore, the emphasis on planning for mobility in cities neglects the significance of pedestrian and non-motorized forms of transport in cities in developing countries.[36] In most cities, little attention is paid to the needs of pedestrians, cyclists and other users of non-motorized transport for road space, crossings and other amenities, resulting in high levels of accidents.

Several influential design approaches treated residential areas as introverted cells linked to highway systems,[37] and focused on central facilities, with the expectation that pedestrian movement is internal to the cell. These forms of local design can result in very inconvenient conditions for those without cars who need to access facilities and employment outside the area, such as the aged, disabled and women. In low-income areas, car ownership is low and planned central areas are likely to be poorly developed, requiring movement outside of the area, often on foot. For working women who have to travel to work as well, these types of design may compound the difficulties of negotiating everyday life.[38]

The emphasis on accommodating the motor car in the design of local areas has also been criticized. Much greater attention is now being paid to 'traffic calming' (i.e. slowing traffic through various devices, and the accommodation of pedestrians and cyclists in local planning).[39] UN-Habitat's Bicycle Transport Project in Kibera (Kenya), for example, combines the introduction of modified bicycle transport with improved road access for their use.[40] Arguments for moving away from introverted neighbourhoods to areas with permeable boundaries, joined by centres and strips containing commercial activities and public facilities, linked to public transport, are also made by those advocating a greater focus on planning for accessibility rather than purely for mobility (see Figure 8.1).[41] Amsterdam provides an example of where sustainable accessibility has been created through a combination of appropriate land-use and transport policies, as indicated in Box 8.2.

Box 8.2 Sustainable accessibility in Amsterdam, The Netherlands

In Amsterdam, a combination of evolving policies, shaped at times by contestation, has helped to create a city which is highly accessible to those without cars. Some 35 per cent of commuting is by non-motorized transport – a world high – as a consequence of the importance of the bicycle. During the 1960s, a policy of 'concentrated decentralization' of population and employment in growth centres, which were well linked by both public transport and car, enabled the development of an accessible polycentric city. The compact city policy of the 1980s promoted transport modes other than the car, particularly walking and cycling, and encouraged concentrated mixed-use developments, providing services close to homes. The city centre has been preserved and is mainly accessible by public transport, while the edge of the city with its subcentres offers good access to both the inner city and to places elsewhere. These policies have been reinforced by transport policies: rail, motorways and good linkages between modes, particularly rail and bicycle. Policies did not always work as intended – for example, people do not live and work locally as expected, and there are still problem areas (e.g. the city still lacks a comprehensive integrated urban-regional public transport system), but a form of sustainable accessibility has been created.

Sources: Le Clercq and Bertolini, 2003; Bertolini, 2007; Bertolini et al, undated

The structure of public transport systems can also shape the spatial organization of cities in important ways, and has been a crucial element of attempts to restructure cities spatially – for example, in Curitiba (Brazil) and Portland (US).[42] Heavy rail systems in large, dense cities (often taking the form of underground systems in central areas) are critical in supporting both good interconnections in central areas, as well as links between central and outlying areas. Commuter rail systems mainly link outer areas to the centre, while light rail and tram systems provide good connections within central areas, and between these and secondary nodes and suburban corridors. Rail and train stations provide potential points for the growth of nodes and more intensive development; but potentials are contingent upon the way in which these services are used, as well as how stations are regulated and developed.[43]

Buses are more adaptive, and require lower densities to operate, but are also slower and less efficient, and are likely to have less impact upon spatial organization. The use of dedicated bus-ways, however, increases speed and capacity and, thus, usage, and creates more structured routes around which more intense development can occur.[44] In many developing countries, the provision of public transport is poor; thus, private forms of public transport – such as minibus taxis, *jeepneys*, *jitneys*, *matatus* and the like – have emerged. These forms of transport, termed 'paratransit' by some authors,[45] can operate in highly congested conditions, but also emerge in sprawling low-density cities. These systems are reactive to an existing spatial context; but in developing countries, important paratransit collection points can become significant places for informal trade, markets and the like as a consequence of high passenger volumes.

Water, sewerage, electricity and telecommunications

Major infrastructural systems for water, sewerage, electricity and telecommunications have also structured cities spatially in important ways, although their direct impact is less obvious than is the case for transport systems. All of these systems involve the establishment of major bulk elements which require large fixed investments and, thus, provide capacity for growth in particular areas. Such bulk elements include dams and water treatment works, reservoirs, pump stations, sewerage treatment facilities, power sub-stations, mobile phone masts and fibre-optic cables. Water and sewerage pipelines and electricity transmission lines distribute services to local areas and within them. Water and electricity can easily be led to different parts of the city and the bulk infrastructure required to open up new areas is not especially costly; but investment in these facilities enables new development there, and reduces its cost, until a particular threshold is reached. It thus influences the spatial direction of development. The impact of sewerage treatment plants is more significant since they are much more costly and serve much larger areas.[46]

The availability of trunk lines for water, sewerage and transmission lines for electricity in particular areas reduces development costs and thus influences future patterns of growth. While bulk infrastructure does not usually feature high on planners' agendas, it can be crucial in shaping patterns of spatial development. The discussion later in this chapter shows how planning is attempting to link with infrastructure development in various contexts.

As stated in Chapter 6, stand-alone or small-scale distributed systems of water, sewerage and energy provision reduce dependence upon these major systems, improve efficiency and can have diverse spatial outcomes and affect access. Thus, sewerage package plants, the bucket system, the use of septic tanks and French drains, and various forms of ventilated pit latrines do not depend upon broader sewerage systems, but are generally more suitable for lower-density development. Water kiosks and water tankers can be used outside of areas connected to water pipelines, but are usually much more costly per unit than water received through reticulated systems. The use of solar energy at the household level also offers alternatives to connection to electricity grids; but installation charges are still high, although overall costs could be reduced, partly through the development of 'smart' grids. The alternative, especially in low-income communities, is more often the use of energy sources such as wood, coal, paraffin and candles, which may be both costly per unit, and can generate greater pollution. However, proximity to networks for water, energy and sewerage does not mean that households can afford access to them.

Major infrastructural systems for water, sewerage, electricity and telecommunications have also structured cities spatially in important ways

Studies during the early 1990s predicted that information and communication technologies, such as mobile phones and the internet, would lead to the 'death', or 'abolition', of distance and the declining importance of both cities and central places within them as people increasingly worked from home and communicated using information and communication technologies. Although the practice of working from home has increased, as has the use of information and communication technologies, both cities and central places within them remain important due to the significance of agglomeration economies, diverse labour markets, face-to-face contact and interpersonal relationships. While some substitution of electronic communication for physical movement may occur, the two work in complementary ways and the overall expansion of both forms of communication makes it difficult to detect. Instead of the death of distance, new forms of 'information districts' and high-tech centres are emerging within cities.[47] Nevertheless, other shifts may occur over the long term, particularly with rising energy costs.

Proximity to networks for water, energy and sewerage does not mean that households can afford access to them

Physical infrastructure to support information and communication technologies generally follows the lines of other forms of infrastructure, particularly roads, electricity transmission lines, sewerage and water pipelines. Combined with road infrastructure, 'smart corridors' have been important in structuring the development of new economic centres focused on high technology in some Asian cities.[48] For the most part, infrastructure to support new technologies is provided by the private sector and follows customers, privileging both business and higher-income consumers. Thus, studies show that a digital divide tends to overlay patterns of wealth and poverty in cities.[49] Unequal access, however, may

be more a matter of affordability than physical access to infrastructure. To some extent, 'smart city' approaches, extending networks through municipal connections and providing affordable internet access points in low-income areas can help in addressing this form of exclusion.[50]

Gender analysis and gender mainstreaming within planning is increasingly providing useful methodological tools and frameworks for assessing needs and potential responses

Infrastructure and inclusive local planning

The spatial form of cities – their liveability and inclusiveness – is also shaped by access to a broader range of infrastructural facilities and amenities, such as schools; clinics; crèches; community halls; libraries and learning facilities; safe spaces for recreation, ranging from playgrounds to gathering places for the elderly; spaces for religious and cultural practices; fresh food and other local markets and retail outlets; and appropriate spaces for economic activity.

Ideally, local planning should create places that meet the everyday requirements of diverse groups of people: men and women; old and young; the disabled; different cultural groups; and so on. Understanding and responding to these diverse needs is an important part of planning.[51] The tradition of gender analysis and gender mainstreaming within planning is increasingly providing useful methodological tools and frameworks for assessing needs and potential responses, as does the more recent emphasis on planning for diversity.[52] Box 8.3 provides the example of the safer city audits used in UN-Habitat's Safer Cities Programme approaches.

Spatial planning needs to work much more closely with the planning of infrastructure … if it is to have an impact upon the way in which cities develop

The Safer Cities Programme represents a form of local inclusive urban regeneration. This kind of planning for local infrastructure improvement is likely to be important in many parts of the world, and particularly in slums. There are also many examples of participatory approaches to slum upgrading, including improvements in social services and facilities, as shown in Chapter 5.

UN-Habitat's planning initiatives in post-conflict and post-disaster situations provide examples of inclusive local planning that addresses a range of infrastructure and facilities according to diverse local needs. For example, in post-tsunami reconstruction in Xaafun (Somalia), UN-Habitat designed housing that enabled home-based economic activities, developed a women's centre close to the market, and created safe public spaces with playgrounds and water points.[53]

The creation of appropriate spaces and infrastructure for economic activities is also critical as it influences viability and, hence, livelihoods. Informal trading activities are highly sensitive to pedestrian movement and need to be accommodated in places of high access (such as major commuter stations, transport interchanges and main roads). Strategies to displace these activities to less intense spaces are rarely effective. The complex interests involved in planning for appropriate infrastructure for markets requires a participatory approach, as demonstrated in planning for the reconstruction of markets in post-conflict Galkaio (Somalia)[54] and the Warwick Triangle in Durban (South Africa).[55]

From these experiences, it is clear that spatial planning needs to work much more closely with the planning of infrastructure at both a city-wide and more local level if it is to have an impact upon the way in which cities develop, and their sustainability, efficiency and inclusiveness.

Box 8.3 The safer city audit in Dar es Salaam, Tanzania

Manzese is a densely populated middle- and low-income area containing some informal settlements. It accounts for about one quarter of recorded crime within Dar es Salaam, and levels of violence against women are high. The safety audit was intended to help find ways to enhance safety through planning and design and to increase community awareness of the environment. The audit included a walk through the area with local women and officials and a discussion of findings and possible solutions. The following suggestions emerged, amongst others:

- widening streets to ease vehicular circulation;
- refurbishing abandoned buildings that have become criminal hideouts;
- improving street lighting;
- using the spaces between houses for allotments, playgrounds and other community activities;
- improving drainage channels, sewer systems and pit latrines;
- addressing the lack of well-designed secure public open space; and
- improving the accessibility and visibility of certain areas, such as narrow, blocked-off and unlit streets.

Source: UNCHS, 2001b; Mtani, 2002; Todes et al, 2008; see also UN-Habitat, 2009

THE COMPACT CITY DEBATE: SUSTAINABILITY, EFFICIENCY AND INCLUSIVENESS

While previous sections have shown that the predominant spatial trend in most cities is towards sprawl, many analysts argue for promoting more compact cities.[56] These arguments have been adopted as policy in various contexts. The 1992 United Nations Conference on Environment and Development (UNCED), held in Rio de Janeiro (Brazil), accepted arguments that low-density cities promote excessive use of energy, while the 1990 European Green Paper had earlier promoted the idea of compact cities.[57] Some countries, such as South Africa, and cities such as Curitiba (Brazil), and those linked to the 'smart growth' movement in the US, have adopted these ideas as policy, although implementation often falls short of intentions. This section explores the compact city debate in various contexts, and considers the implications of this debate for planning and managing urban change.

The compact city debate

Arguments in favour of compact cities revolve around claims that they are more efficient, inclusive and sustainable. The costs of providing infrastructure are lower, there is better access to services and facilities since thresholds are higher, the livelihoods of the urban poor are promoted and social segregation is reduced.[58] The time and cost spent travelling is also lower. Compact cities are less reliant on cars and minimize distances travelled and, hence, fuel use, and have less impact upon farmlands and environmental resources. As a consequence, they are theoretically more resilient in the

context of climate change and have, generally, fewer harmful impacts.[59] Critics, however, question several of these claimed benefits, and argue that compaction is contrary to market forces towards sprawl, the decentralization of work and residents' desires, and, hence, is not politically feasible – or even desirable. Higher density, they argue, is associated with congestion and pollution, higher crime rates, and puts greater pressure on natural resources.[60] Containment policies push up land costs and also encourage development beyond restricted zones.

Much of the debate has focused on cities in developed countries, where high car ownership rates in an era of low fuel costs have propelled low-density sprawl. Although research showing that higher-density cities use less fuel[61] has had its detractors,[62] the relationships established are remarkably robust,[63] and there seems to be a clear association between higher densities and public transport, and between low density and reliance on cars.[64] Nevertheless, higher densities only provide the conditions for public transport; they do not guarantee it. Nor do they prevent rising car ownership and use, even where public transport systems are relatively good, as, for example, in Japan.[65] Some research has found that higher densities are associated with less usage of the motor car for some trips, but not for all,[66] and that households in places designed along new urbanist lines may nevertheless drive elsewhere to work, shop and use facilities.[67] The complexity of these relationships (and of urban forms) means that many attempts to prove the benefits of compaction statistically are weaker and more equivocal than expected. Nevertheless, if oil prices rise over the long term, as they did so dramatically in 2007/2008, these relationships may change. One of the greatest critics of compaction during the late 1990s, for example, spoke of the irrelevance of compaction ideas given the energy glut at the time and the availability of surplus farmland.[68] These conditions have changed significantly since then.

Cities built on low-density lines may, however, find adaptation or change towards greater compaction difficult to achieve. Cities are 'path dependent' in that their spatial structures are largely set in place and change slowly. Research indicates that it is difficult to provide efficient public transport in cities with lower densities than 30 people per hectare; but the actual threshold varies by transport type[69] as well as in terms of contextual factors such as spatial organization and topography. Table 8.1 shows the effect of densities on access to public transport in the case of sprawling Atlanta (US) and denser Barcelona (Spain).

Movements towards smart growth and transit-oriented development are seen as ways of shifting cities in these directions; but critics argue that without very significant redevelopment, changes are likely to be marginal.[70] Major changes require well-coordinated and consistent policy and implementation over a long period of time on infrastructure development, taxation and land-use regulation, and there are few cases where this has been possible – Curitiba (Brazil) being a notable exception.[71] The regeneration of Plaine Saint-Denis on the periphery of Paris (France), however, provides an example of development along lines favoured by compact city advocates (see Box 8.6).

	Atlanta	Barcelona
Area (km^2)	137	37
Population (millions, 1990)	2.5	2.8
Density (people per hectare)	6	171
Population close to metro	4% within 800m	60% within 600m
Trips undertaken by public transport	4.5%	30%

Table 8.1

Density and public transport access: Comparing Atlanta (US) and Barcelona (Spain)

Source: Bertaud, 2004

The relevance of compaction ideas to developing countries

Pre-existing conditions for compaction vary between contexts. On the whole, urban densities are much higher in developing than developed countries, but there are also variations within these categories, with the highest densities in Asian cities, somewhat lower densities in Latin American, African and European cities, and lowest in North American and Australian cities. Critics question whether the concept has relevance in the cities of developing countries, which already contain many elements of urban compaction: mixed use largely as a consequence of the lack of regulation, very high densities (at least at the centre) and a reliance on public transport, largely as a consequence of low incomes.[72] Densification processes are often occurring in informal settlements through processes of autonomous consolidation. The role of public policy or planning in this context is thus questioned.[73]

Cities are 'path dependent' in that their spatial structures are largely set in place and change slowly

Yet, the benefits of urban densification, at least for the inner-city poor, are apparent: while housing costs are high and they have less space, they have greater livelihood opportunities (particularly in the informal sector) and access to employment. Transport costs are low and they are able to rely to a greater extent on non-motorized transport.[74] In many respects, dense areas in cities of developing countries, including informal settlements, are living versions of compact city ideas – and they arguably have greater relevance in this context. Planning and public policy might most appropriately work with these processes of change to consolidate the position of the inner-city poor and to support existing processes of informal upgrading, and improvement of infrastructure and services. Avoiding displacement or forced relocation of slums, as has often occurred through modernist planning in the past, is also important. In Mumbai (India), for example, floor space bonuses were rewarded to developers who made provision for low-income housing in commercial developments.[75] In Brazil, participatory informal settlement upgrading – including the provision of a range of social services and facilities – has helped to improve living conditions in Rio de Janeiro's *favelas*.[76]

In many respects, dense areas in cities of developing countries, including informal settlements, are living versions of compact city ideas

Nevertheless, dense inner-city areas in developing countries are often very congested and polluted.[77] Some cities combine high densities with poor public transport and a reliance on paratransit, thus increasing levels of congestion and air pollution. Rising levels of car ownership as incomes increase are placing considerable pressure on these cities. Wealthy dense Asian cities, such as Singapore, Hong Kong and Tokyo, however, have been able to constrain the use of motor cars, provide good public transport and manage environmental conditions; but they are also places with

considerable capacity and few alternatives to accepting compact development.[78]

Do compaction ideas have value for development on the periphery of cities in developing countries or for managing urban growth? The urban periphery has, in some cases, provided space for households willing to trade lower housing costs and more space for longer travel distances to economic activities. Where there are local economic opportunities or few commuters in a household, peripheral location is likely to be attractive. The opportunity to rent housing or to combine incomes from rural and urban economic activities are some of the livelihood opportunities for households located on the periphery in many developing countries, suggesting that the needs and livelihood strategies of poor households are diverse and generally logical.[79] The increasingly polycentric form of cities has meant that accessibility is more complex than simply distance to urban centres.[80] But in other contexts, as previous sections showed, distance from work and transport costs are major concerns. Improving infrastructure, services and facilities in sprawling developments on the periphery, and promoting employment and economic development there is critical.

Strategic spatial planning that is able to give direction to major infrastructure development is an important part of the new approach to planning

It is clear that satellite city policies have had little value in either developed or developing countries: there is no necessary match between those employed and those living in these areas. Cities are major labour markets and people move in multiple ways across the city.[81] In several instances, satellites have not proved particularly attractive to economic activities, resulting in large concentrations of poorly located housing and long commuting distances.[82] The notion of concentrating and intensifying development along major transport routes, and of promoting nodal development of economic activities and public services[83] in peripheral areas has greater merit; but obviously potentials and possibilities are contextually defined. While it is unlikely that the public sector is in a position to provide urban services to all in most developing countries, planning can seek to shape the infrastructural framework of major roads, rail lines and bulk services, as the following section argues.

Smart growth supports the intensification of urban development and attempts to limit growth beyond the urban edge

Cost efficiency and compaction

The cost efficiency of providing infrastructure and services to higher-density developments, and to existing areas – and, thus, of 'compact' rather than 'sprawling' development – is perhaps the least contested of the compact city claims. However, research shows that relationships are far more complex.[84] The study which originally made these claims[85] based its arguments on conceptual models rather than on actual development. In reality, however, unit costs vary considerably between types of infrastructure, topography and geotechnical conditions, and on the basis of available capacity and service thresholds.[86] Hence, there is no necessary relationship between compaction, cost and efficiency: rather, such relationships are highly contextual.

CONTEMPORARY APPROACHES TO LINKING SPATIAL PLANNING TO URBAN INFRASTRUCTURE

Previous sections of this chapter have shown that urban infrastructure developments have shaped the spatial form of cities, but in ways that intersect with social, economic, political and institutional dynamics. While the detailed and static land-use planning associated with traditional master planning has generally been discredited, and there are questions as to the relevance, feasibility and possible influence of large-scale city-wide spatial planning, strategic spatial planning that is able to give direction to major infrastructure development is an important part of the new approach to planning. Conversely, it is also important to link and tie the development of mega-projects to strategic spatial plans for cities.[87] This section explores various contemporary initiatives to link spatial planning to urban infrastructure development, and to use major elements of urban infrastructure, such as transport routes and systems, to influence spatial form. Table 8.2 provides a simplified summary of the discussion below.

Smart growth and transit-oriented development

As discussed in the previous section, the 'smart growth' movement has gained support in North America and has promoted the creation of more compact and integrated urban development. Smart growth supports the intensification of urban development and attempts to limit growth beyond the urban edge. It encourages increases in density; mixed-use and cluster developments; a variety of housing types beyond detached units; protection of open space, agricultural lands and ecologically sensitive areas; the reduction in use of private and motorized forms of transport; the promotion of public transport systems; and the design and redesign of areas to support such use.[88] Mechanisms to promote such growth include both regulations and tax incentives, but also rely on urban plans linking land use, transport and other aspects of infrastructure development. In Maryland (US), where smart growth legislation was adopted in 1997, subsidies for new roads, sewers, schools and other elements of infrastructure are limited outside of areas designated for growth, and funding is instead channelled to priority growth areas and in ways that do not encourage sprawl. Several states which have adopted smart growth ideas require consistency between local plans and the planning and programming of capital facilities.[89]

Transit-oriented development occupies an important place within the smart growth movement.[90] It posits the restructuring of regions towards greater use of public transport by improving or creating light rail or rapid bus transport systems, and generating dense mixed-use nodes around transit stations. Retail, public facilities and office and other work spaces are created around these stations, along with relatively high-density residential development, within a radius of 400m to 800m. The intention is to create human-

Table 8.2

Approaches linking spatial planning to urban infrastructure

Broad approach	Important terms and approaches	Strengths	Weaknesses and contingencies
Smart growth and transit-oriented development	Smart growth Compact development Integrated development Mixed-use development Intensification Coordination Transit-oriented development	Encourages inter-sectoral and inter-agency links Encourages links between planning and implementation Improves sustainability Improves public transport Strong transport–land-use links Can slow urban sprawl	These good links are difficult to achieve Assumes significant capacity and organization Poor or narrow implementation undermines prospects Popular support difficult to achieve due to conflicting views and lifestyles Claimed benefits contested
Integrating land use and transport	Bus rapid transit (BRT) Corridors and axes Integrated rail redevelopment Linking economic activities to transport type New transport/land-use models	Improves public transport Improved usage of public transport Reduces energy and improves efficiency Better transport–land-use links New models enable better understanding of patterns	Heightened property prices on transport axes can marginalize the poor Required integration can be difficult to achieve Needs good understanding of social and economic dynamics and space – difficult to achieve Land use–transport links undermined by different logics, institutional divides New models still data hungry, aggregated, distant
Strategic spatial planning and infrastructure planning	Strategic plans Infrastructure plans Transport–land use links	Can give long-term direction to development Can avoid inequitable and unsustainable development Avoids fragmented development	Conditions required to work are demanding/difficult to achieve Credible analysis Inter-sectoral coordination Stakeholder involvement and buy-in Regular review Internal champions Special agencies
Integrated urban development and management plans	Multi-sectoral investment plans (MSIPs) plans (PEDPs) Physical and environmental development	More flexible, less data demanding, and easier to prepare than master plans Participatory Helps to manage urban growth in context of scarce resources/capacity Can be used iteratively in decision-making process	Problematic if seen in static or narrow way Required inter-sectoral cooperation hard to achieve Can be countered by political decision-making
Strategic structure planning	Integrative framework Long-term vision	More flexible, less data demanding and easier to prepare than master plans Participatory Multifaceted approach Combines short-term actions with long-term planning	Required political and stakeholder buy-in may be difficult to achieve May still be relatively technocratic May not provide detail necessary for some decisions
Linking spatial planning to infrastructure planning	Integrated development plans Spatial frameworks	More flexible, less data demanding and easier to prepare than master plans Participatory Gives direction to infrastructure planning GIS-based models can be used as an input	Required consistency in policy and coordination between agencies difficult to achieve Can be too broad to be useful May be contradicted by the market
Linking mega-projects to infrastructure development	Urban regeneration Multifunctional	Powerful driver in urban form Evolving approaches allow linking to planning over the long term Building cooperation between various sectors and agencies	Mega-projects often politically driven and one-off: approach is hard to achieve Level of integration and cooperation difficult to achieve

Smart growth and transit-oriented development … need to be carefully adapted to local contexts

scaled, walkable spaces, encouraging the use of public transport (see Figure 8.2). In Portland (US), where the transit-oriented development idea has been adopted, light rail is combined with a feeder system of bus networks and three types of centres of different sizes and intensities. Proponents argue that smart growth and the transit-oriented development system is enabling Portland to become more compact, is encouraging greater use of public transport, and is reducing traffic congestion.[91]

There are considerable debates over the impact of these ideas and their requirements for success. Research shows that smart growth has slowed urban sprawl and declining densities in Maryland (US), although, overall, the dominant trend is still towards sprawl and car usage.[92] While proponents claim that Portland's urban growth boundaries have contained growth, others argue that growth has spilled over into adjacent areas.[93] Successful implementation therefore requires consistent policies between plans at various levels, and the coordination of various methods and agencies.[94] Critics argue that while many cities have adopted forms of transit-oriented development, it is often implemented in narrow and partial ways.[95] In Vancouver (Canada), metropolitan planning was based on compaction ideas; but they were not shared by suburban communities and municipalities, whose ideas of liveability were very different – thus, development there did not follow the plan.[96] Whether these concepts have purchase in developing country contexts is open to debate: both smart growth and transit-oriented development depend upon high levels of coordination and integration, as well as consistent programmes and policies. These conditions may be difficult to achieve in contexts where administrative capacity and finances are scarce, and there is a dominance of political decision-making. Concepts of smart growth and transit-oriented development also need to be carefully adapted to local contexts and to be based on an understanding of conditions there.[97]

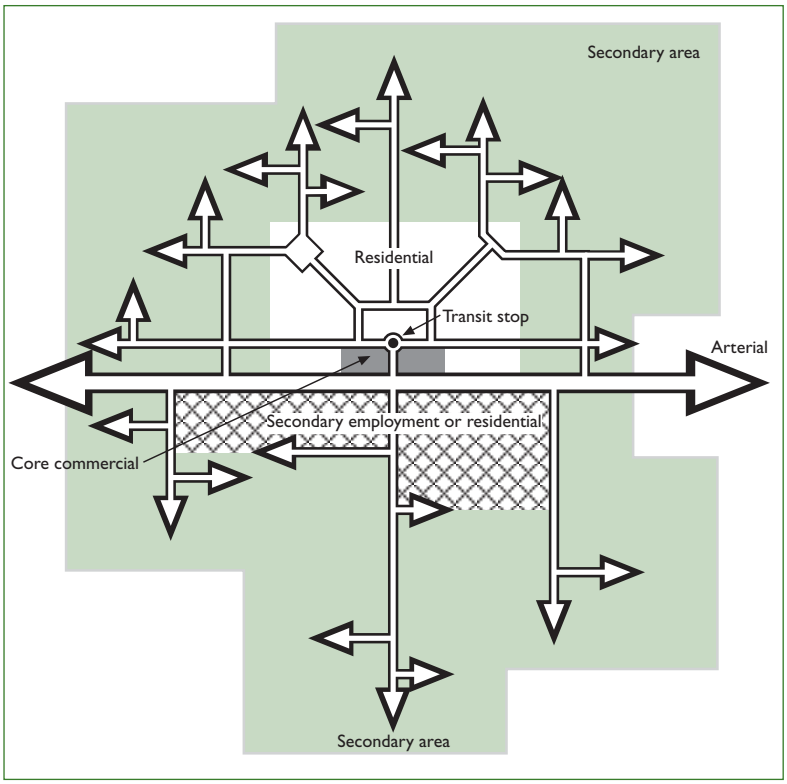

Figure 8.2

Transit-oriented development: Development around a transit stop

Source: Calthorpe, 1993

Integrating land use and transportation

Core to the transit-oriented development idea is the integration of transportation and land use

Core to the transit-oriented development idea is the integration of transportation and land use; but there are several ways in which this has occurred internationally. The case of Curitiba (Brazil) represents a well-known example where ideas of this sort have had a real impact (see Box 8.4). Curitiba's model of rapid bus transport has been emulated and elements have been adopted (and adapted) by other Brazilian and Latin American cities (most famously the *Transmilenio* system in Bogotá, Colombia), as well as by cities elsewhere in the world.[98] The *Transantiago* system in Santiago (Chile), however, provides an example of 'failed implementation'[99] of this approach, partly as a consequence of the lack of integrated transport planning, poor links to urban planning, and the failure to understand the complex ways in which people use space and transport in the city.[100]

There are many other examples of linking transport and spatial planning in urban development. The redevelopment of rail stations in Naples (Italy), involved integrated consideration of timetables, service lines, stations, modal interchange facilities, urban renewal around rail stations, and the design of stations. These improved the quality and acceptability of services to the extent that usage increased by some 43 per cent over the 2001 to 2004 period.[101]

Sectoral and segmented planning and urban management practices result in haphazard and unplanned development

While transport is generally acknowledged to be the key element of infrastructure shaping urban form, and the importance of linking land-use and transportation planning is widely accepted,[102] the links between the two are often poor. In part, there are varying discourses and logics of these forms of planning[103] and institutional divides, and the traditional modelling approaches often used by transport planners were subject to many of the criticisms of large urban models: overly comprehensive and data hungry, too aggregated to be useful and too distant from actual behaviour.[104] More recent models, using more sophisticated technology, geographic information systems (GIS), and new theoretical approaches enable a better understanding of transport–land-use relationships, but remain very data intensive, and are still moving towards usefulness in policy terms.[105]

Strategic spatial planning and infrastructure planning

In response to the problems associated with master planning, there has been experimentation with new forms of strategic spatial planning. In Europe and North America, strategic planning based on developing a consensus on the main directions for development has been important and may include infrastructure development.

Several Australian cities are now including an infrastructure plan as a core element of strategic spatial planning since the previous focus on flexible market-driven approaches made it difficult to manage important outcomes and resulted in a lack of coordination. Integrated approaches linking land-use and infrastructure planning, funding and delivery are relatively recent; but early findings from these initiatives suggest the importance of a well-supported long-term strategic plan leading the process. The involvement of a wide range of stakeholders is key to the development of a shared and consistent approach; but the plan itself also needs to be based on credible analysis and understanding of trends and forces. The strategic plan identifies the expected economic base, drivers for change and major factors affecting the spatial distribution of population, employment and services. It considers the influence of technology and social change on patterns of development, and on the demand for services and infrastructure. Plans, however, cannot be old-fashioned master plans. They require regular review, consideration of sequencing, reinforcing funding and pricing, and institutional coordination. The importance of internal champions and special agencies for coordination are stressed. Although several plans attempt to coordinate across a range of sectors, it is argued that transport/land-use links are crucial, and that other forms of infrastructure can follow.[106]

Integrated urban management and development plans

While the approach adopted in Australian cities may, like master plans, require far more data and analysis than is generally available in many developing countries, there have similarly been initiatives to link strategic plans with infrastructure planning. A movement towards integrated urban management and development plans was based on the argument that 'unless an integrated and holistic approach to urban development and infrastructure development planning is applied, the current sectoral and segmented planning and urban management practices will continue to result in haphazard and unplanned development'.[107] Proponents argue that while the logical route is for govern-

ment to plan for future development, acquire land and provide bulk/mainline infrastructure, which then provides the framework for the private sector to subdivide and connect to services, this frequently does not occur in Asian countries.[108] Instead, fragmented private development occurs on fringe land in the absence of distributor/collector roads and utility lines, with government (sometimes) later 'catching up' and providing these services.

One influential approach arose from action planning and proposed the development of strategic structure plans focused on guiding urban infrastructure development in combination with multi-sectoral investment planning. This approach departs from master planning, both in the methodology used for spatial planning and in the strong link to planning for infrastructure investment. In contrast to master planning, which did not focus on financial and institutional aspects, and did not have an emphasis on implementation, the intention here is to move towards integrated investment packages for infrastructure linked to broader planning processes.[109] Considerable attention is also paid to institutional and capacity issues, and community consultation is included in the process. Multi-sectoral investment planning is preceded by a 'physical and environmental development plan', which includes a rapid analysis of key spatial and environmental profiles, problems and trends, and then develops scenarios and strategy, and a broad spatial framework for urban development. A long-term view is developed, coupled with a shorter five-year action plan, which links to the multi-sectoral investment planning. The physical and environmental development plan provides a phased programme for expansion of the city. This approach excludes detailed land use and zoning, and operates at a broad level associated with structure planning, but with a focus on infrastructure development.[110] Planning for infrastructure needs is linked to the spatial plan so that the multi-sectoral plan includes the location, timing and type of infrastructure development. The intention of spatial planning in this context is to help manage urban growth, particularly through improving the coordination of the supply of infrastructure and facilities in time and space.

The approach was supported by several international agencies, including UN-Habitat and the German aid agency Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), and was applied in Indonesia ('integrated urban infrastructure development planning'), Nepal and India during the 1990s. In Indonesia and Nepal, where evaluations were conducted in the late 1990s,[111] the impact of spatial planning was far less than anticipated. While the spatial plans produced were for the most part consistent with intentions (or overlaid other plans), there were limits to the way in which these were used and how they intersected with infrastructure planning. In Nepal, investment plans tended to be seen in a static way, rather than requiring annual revision as intended. In Indonesia, plans were seen as the responsibility of central government and were not integrated within municipal planning. At the same time, central government agencies did not properly participate in planning, nor follow its recommendations. Projects were often assessed on the basis of financial issues, and locational questions and broader impacts were ignored. Difficulties with land acquisition also impeded planned projects. Despite the participatory process, priorities did not necessarily follow the plan: projects favoured by the elite were supported, whether or not they were part of the plan, and decisions on priorities were made on a political basis. As a consequence of extensive service backlogs, there was a tendency to focus spending in addressing backlogs, rather than anticipating future development,[112] negating the significance of the plan.[113]

Box 8.4 Integrated land-use and transport system, Curitiba, Brazil

Curitiba's 1965 master plan structured its development around a set of transport axes with dedicated bus lanes, carrying express high-capacity articulated buses, flanked by high-density residential development, as well as offices, commerce and services, in areas adjacent to the route. Large bus terminals at the ends of these express bus routes permit transport between routes, as do medium-sized terminals along the routes. Passengers may transfer to inter-district and local buses using a single ticket. Proponents claim that residents spend a comparatively low 10 per cent of their income on transport, and that fuel consumption is 25 per cent lower than in comparable Brazilian cities. And while there is a high rate of car ownership, more than 1.3 million passengers a day take the bus, with 85 per cent of residents using it. The success of this model has been attributed to a planning process that strongly integrated land-use and transport planning, and to persistent long-term implementation of the plan. While a master plan was used, its focus was on a strategic vision and principles to guide development, and on the use of appropriate systems and incentives.

Despite the many benefits of the Curitiba planning and development approach, it has not escaped the realities of urban spatial inequalities. Curitiba sits within a broader metropolitan context in which the poor live on the periphery with limited services, amenities and an absence of public transport. In addition, although the transport axes within Curitiba were meant to house middle- and low-income people, the supply of good infrastructure has pushed up property prices to the extent that this is no longer possible, and the poor are forced to live on the periphery.

Source: Rabinovitch and Leitman, 2004; Irazábal, 2008a

Despite these difficulties, the approach is still seen as valuable by its proponents. The methodology for developing a spatial plan has proved to be robust, and is now the basis for more widespread training on developing alternatives to master planning.[114] The spatial plan itself and its value is also seen in a different way. Recognizing that it is unrealistic to expect spatial plans to replace political decision-making, or to expect a simple movement from plan to implementation, it is argued that the plan nevertheless can be brought into decision-making at various stages. It is not therefore conceived as a single driver or a static plan, but rather provides information and approaches that can be used throughout the development process.[115] Similar conclusions arise from initiatives linking spatial planning to infrastructure planning in Durban (South Africa) (see Box 8.5).

The development of strategic structure plans focused on guiding urban infrastructure development in combination with multi-sectoral investment planning

Despite the participatory process, priorities did not necessarily follow the plan: projects favoured by the elite were supported … and decisions on priorities were made on a political basis

Strategic structure planning

The idea of strategic structure planning has been used in several projects undertaken by UN-Habitat in post-disaster, post-conflict and other areas.[116] These plans provide an integrative framework and a long-term vision of development, based on analysis and engagement with stakeholders and communities, but also a focus on key strategic projects

Box 8.5 Linking spatial planning and infrastructure planning in Durban, South Africa

Under apartheid, the Greater Durban metropolitan area was run by fragmented and racially based local government. The city was divided on racial lines, and low-income African people were forced to commute long distances from peripheral locations to more centrally located areas of employment. In the post-apartheid period after 1994, the region was consolidated under a single municipality, eThekwini, through two phases of local government reorganization, and a spatial framework intended to achieve 'compact' 'integrated' development was put in place.

However, development trends did not follow the spatial framework and patterns of relatively low-density urban sprawl and the peripheral location of the urban poor continued. Significant growth has occurred in the northern area of the city, driven, in part, by large landowners in the area and by the provincial government, which is developing a new airport there. This growth is largely taking the form of upmarket development of gated communities, shopping and office development, with little provision for the urban poor. Some of this development is the consequence of earlier divided local government, but is also the result of a concern to support economic growth. In addition, the way in which the South African housing subsidy system is designed makes it difficult to support the development of low-cost housing in areas where land costs are high. The spatial framework was largely ignored in decision-making on land development applications, and was too broad to provide a basis for infrastructure planning. Instead, a developer-led approach predominated.

In recent years, however, the limits of earlier spatial planning have been recognized, and there are initiatives to link infrastructure planning and spatial planning more closely. Geographic information systems (GIS) and urban modelling have been used to highlight key interrelationships between forms of urban development and infrastructure costs, and to feed into decision-making. A set of scenarios was developed to model the impacts of various spatial development patterns on the requirements for infrastructure and its cost, as well as to identify key patterns. This assisted in choices over long-term development directions. A cost surface model was developed to predict the cost of providing bulk services to new housing developments, highlighting the costs of peripheral location and enabling arguments for greater expenditure on development in better located areas. An accessibility model was used to assess the need for facilities in new housing developments. These models have not determined development directions. Rather, they are an input into development decision-making, and by presenting information and choices in a clear way, they allow more informed discussion between various groups of officials, and between councillors and communities. These approaches have suggested the value of the use of harder data and GIS-based models; but they also point to the need for a clear long-term spatial development vision, based on engagement and agreement between various stakeholders, councillors and officials, and amongst municipal departments.

Source: Breetzke, 2008

to address immediate problems. Enabling conditions to facilitate long-term success are addressed. This kind of planning does not only focus on infrastructure – rather, it deals with problems in a multifaceted way, but will generally also include infrastructure development and service delivery within localized projects.

Similarly, the Dar es Salaam Strategic Urban Development Planning Framework combined stakeholder participation with spatial analysis, issue assessment and development of a framework for urban expansion, an identification of prioritized areas for redevelopment, densification and investment, as well as a set of environmental concerns to be addressed. Action plans focused on immediate strategic issues to be addressed.[117]

Linking spatial planning to infrastructure planning

The idea of integrated urban infrastructure development was influential in the formulation of South Africa's 'integrated development plans',[118] strategic municipal plans intended to provide a five-year development plan and programme of action for both the municipality and other agencies operating in the area, as explained in Chapter 3. Spatial development frameworks, which provide the spatial component of integrated development plans, are also cast as broad-ranging strategic spatial visions. In reaction to critiques of master planning and blueprint planning, they have tended to focus on indicating the main areas for growth and development, the major 'corridors and nodes' that are intended to structure the city, major areas for intervention, and spaces for conservation. Compact city ideas have been influential, with the intention of concentrating development around nodes and corridors, and containing growth, often through the use of an urban edge.

While the expectation was that these spatial frameworks should give direction to infrastructure planning and to low-cost housing development sponsored by government (with the intention of integrating it within the city), spatial frameworks have not been effective in doing so. In part, housing policy has tended to encourage detached units in peripheral locations, in contradiction to plans, and transport policy has not been able to give effect to public transport systems supporting corridors. Although spatial frameworks avoided the detailed land-use zoning associated with master planning, this nevertheless exists – in many cases untransformed since the apartheid era. Decisions on site-level developments – often dominated by the demands of the market, and in many cases in contradiction to spatial plans – exert a powerful influence on spatial form. Housing and private developments have tended to lead, while infrastructure development and spatial planning have followed. Spatial planning has also been too broad and conceptual to give direction to infrastructure planning, which has taken its cues from elsewhere. Box 8.5 presents the example of Durban (South Africa), which demonstrates these points, but also points to new initiatives to link spatial and infrastructure planning.

Linking mega-projects and major infrastructural developments to spatial planning

Finally, it is critical to link mega-projects and major infrastructural developments to spatial planning. Previous sections have shown how these are often contrary to spatial plans and are frequently contributing to fragmented and sprawling developments. Yet, in many instances, mega-projects provide support for long-term planning, and they have proved a powerful driver of urban form in many cities. Such success is often linked with their ability to build cooperation between various sectors and agencies. Plaine Saint-Denis in Paris, discussed in Box 8.6, provides a positive example where a major regeneration initiative worked with spatial planning and was consistent with its ideas.

One major problem with mega-projects is that they are often politically driven and one-off

One major problem with mega-projects is that they are often politically driven and one-off. If political interests

take centre stage, these may obstruct cooperation between the various stakeholders. The case of the Rotterdam Central Station project in The Netherlands is a case at hand. During the 1990s, this project was identified as one of six 'strategic' projects that would enhance the city's international profile. The project involved the redevelopment of the central railway station and the surrounding area. A foreign company was selected to redesign the area and two private developers played a central role in the plans, which were projected to be implemented over an 18-year period. However, during municipal elections in 2002, a new political party – calling itself Liveable Rotterdam – garnered 30 per cent of the vote and thus fundamentally changed power relations in the city. The majority of the reconstituted city council represented the interests of small (and local) businesspeople, and were opposed to the 'corporate' approach of the Rotterdam Central Station mega-project, which had been spearheaded by the social democratic party. The new council placed a higher emphasis on safety in the streets, and the mega-project was downsized, to be redesigned by a 'home-grown' architect.[119]

Box 8.6 Linking mega-project development to spatial planning: Plaine Saint-Denis, France

Plaine Saint-Denis is an area north of Paris, located on the axis linking the metropolitan centre to the Roissy-Charles de Gaulle International Airport. Between 1840 and 1960 it had been one of Europe's largest industrial zones, and provided some 50,000 jobs in 1940. However, industrial restructuring in the 1970s affected the area badly, and by 1990, the number of jobs had fallen to 27,000.

Urban regeneration began as a partnership between the three local authorities in the area, which set up an urban project to regenerate the area. The project envisaged the development of a multifunctional and diverse area, housing a range of groups of people, consistent with broader ideas about sustainable development in Paris. Some 23,000 jobs and 10,000 dwelling units were to be established. This vision of a 'city for all' – an intense mixed-use, pedestrian-oriented city – focused on maintaining industrial activities and low-income households in the heart of the Paris region, while creating new development around a network of transport and social infrastructure in the broader region.

The project developed slowly at first, but picked up momentum with several rounds of development. During the early 1990s, the Regional Structure Plan designated the area as an 'urban redevelopment centre', giving it priority for investment in infrastructure. The location of the 1998 Soccer World Cup gave the area a further boost, and drew private developers into the area. In contrast to many other examples of urban redevelopment associated with event tourism, the developments associated with the World Cup were consistent with the planning and vision for the area. Private-sector development has accelerated in what was once a depressed area, but has not displaced business and local residents. The area has become an important location for a range of new economic activities, and is seen as a strategic area for development within the region. Nevertheless, there are some mismatches between local skills and jobs, and old and new residents. Housing renovation and environmental improvement in some areas is still wanting.

On the whole, however, Plaine Saint-Denis represents a successful regeneration initiative. Rather than a single large flagship project, the development of the area evolved over time, using various instruments, and linked to both broader strategic planning processes and to opportunities created by event-led development, but always with the idea of supporting the planning intentions for the area. Importantly, the success of the development is linked to the building of cooperation between levels of government, different parts of the public sector, various private-sector interests and local communities.

Source: Lecroart, 2008

CONCLUDING REMARKS

This chapter has shown the role of infrastructure and the way in which it intersects with a range of social, political and economic dynamics to shape the spatial structure of cities, and their impact upon access and inclusion. The 'unbundling' of urban development, and a weakened role for the public sector and for planning, has, in part, underpinned strong trends towards socio-spatial polarization and growing urban sprawl. Yet, there is a growing recognition of the problems associated with these patterns, and a search for new approaches to spatial planning that link more closely with infrastructure development in this context.

Planning has important roles to play in managing urban growth and in creating more inclusive cities and spaces. At a local scale, planning should recognize the diversity of needs in an area and create environments offering a range of services, facilities and amenities which meet these needs, and which support the livelihoods of the urban poor. The significance of pedestrian movement, particularly for lower-income groups, also requires recognition. Understanding these needs requires analysis of diversity, including, *inter alia*, gender, disability and age, and a strong participatory approach.

International studies of urban growth show a massive expansion in the spatial footprint of cities over the past decades, and suggest that these trends can be expected to continue. Attempts to develop more compact urban forms play a role in managing this growth: the importance of inner-city development, the usefulness of some smart growth principles and the role of transit-oriented development and related systems have been noted. Planning should seek to promote compaction in ways that are appropriate to the local context. Yet, most future development is likely to continue to involve further expansion on the periphery. If planning is to be effective, it must seek ways to direct, support and structure this growth, and to reinforce informal processes of upgrading and consolidation. Enabling the expansion of economic activity and of the livelihoods of the poor, and improving infrastructure, services and facilities on the periphery is also important.

Linking spatial planning to infrastructure development is critical in this context. The public sector should provide the main routes and infrastructure trunk lines in advance of development, allowing the private sector, NGOs, other agencies and communities to connect to these main lines as they are able.[120] One study suggests that if the public sector cannot afford to pay for infrastructure, they should purchase rights of way to enable later infrastructure improvements.[121] Yet, there is also a growing movement that supports small-scale, neighbourhood-based distributed infrastructure systems, especially for water and power supply. Clearly, what is possible varies across contexts: in many countries, much more ambitious planning is feasible, and strategic spatial plans linking to infrastructure development might, for example, promote more compact forms of urban expansion focused around public transport, and attempt to improve urban services, environmental conditions, economic opportunities and livelihoods on the existing

The public sector should provide the main routes and infrastructure trunk lines in advance of development

urban periphery, as well as in relation to new development. Linking major infrastructure investment projects and mega-projects to strategic planning is also critical; but the real prospects for doing so are likely to vary considerably.

Planning of this sort will require a good understanding of trends, development directions and market forces; but it will also need to be based on collaborative processes that draw together various public-sector agencies and departments with a range of other stakeholders from civil society and business. Building a common spatial vision of urban development, and a common discourse or storyline, is important to these processes; but it is unlikely that planning of this sort will be a single event. Rather, the examples of Durban (Box 8.5) and Plaine Saint-Denis (Box 8.6) point to iterative processes building on agreements, past developments or bringing to bear new information and approaches. Harder analytical, modelling and GIS-based approaches may be useful in this context, as an input into discussion and decision-making, but are unlikely on their own to determine outcomes.

NOTES

1 UNCHS, 1997 (see, for example, paragraph 90).
2 See Chapter 6.
3 Angel et al, 2005.
4 UNCHS, 2001a; UN-Habitat, 2003, 2004a, 2006f, 2008b.
5 UN-Habitat, 2003.
6 UN-Habitat, 2004a, p63.
7 Irazábal, 2008a; Hirt and Stanilov, 2008.
8 UNCHS, 2001a; UN-Habitat, 2004a; Bertaud, 2004.
9 Irazábal, 2008a; Yuen, 2008; Ansari, 2008.
10 Yuen, 2008; Nassar, 2008.
11 Graham and Marvin, 2001.
12 Graham and Marvin, 2001.
13 Hirt and Stanilov, 2008; Yuen, 2008.
14 Harris, 1983.
15 Gandy, 2006.
16 See Sivaramakrishan and Green (1986) on Asian countries.
17 Kooy and Bakker, 2008; Zérah, 2008.
18 Such as the World Bank and the Asian Development Bank; Yuen, 2008.
19 Graham and Marvin, 2001.
20 Hirt and Stanilov, 2008; Irazábal, 2008a; Yuen, 2008, p98.
21 For example, in water and sanitation projects.
22 For example, the build–operate–transfer (BOT) projects for major transport works, such as the rapid bus transport systems in Latin America.
23 Irazábal, 2008a; Yuen, 2008.
24 Batley, 1996.
25 Irazábal, 2008a.
26 McDonald and Pape, 2002.
27 Irazábal, 2008a.
28 Swyngedouw et al, 2002.
29 Flyvberg, 2007.
30 Goldblum and Wong, 2000; Douglass, 2005.
31 Thomson, 1977; Newman and Kenworthy, 1996; Bertaud, 2002.
32 Boarnet and Haughwout, 2000.
33 See Boarnet and Haughwout (2000) for a summary.
34 Boarnet and Haughwout, 2000.
35 Newman and Kenworthy, 1996; Gounden, 1999.
36 Rao and Sharma, 1990; Behrens, 2005.
37 Such as the neighbourhood principle, Radburn; see Behrens and Watson, 1996; Behrens, 2005.
38 See, for example, Posselthwyte (1986) on Mitchell's Plain in Cape Town.
39 See Chapter 6.
40 Candiracci, undated.
41 Behrens and Watson, 1996; Behrens, 2005; Curtis, 2005. There are obvious links here to new urbanism and neo-traditional design.
42 See section on 'Contemporary approaches to linking spatial planning to urban infrastructure'.
43 Cervero, 2004. For instance in the US, commuter rail is only used at peak hours and land around stations is used to accommodate parking.
44 Cervero, 2004. See also Chapter 6.
45 Cervero, 2004.
46 For instance, in Durban (South Africa), a major strategic decision concerned whether a further sewerage treatment plant should be developed in the west, where large numbers of informal settlements and low-income housing developments had developed, or the north, where major economic projects and upmarket housing developments were being promoted by private developers and provincial authorities. The decision to provide bulk infrastructure in the north will shape the future spatial direction of growth. See Breetzke, 2008.
47 Graham and Marvin, 1999. See also the section on 'Urban spatial trends, infrastructure and exclusion'.
48 Rutherford, 2005; Odendaal and Duminy, 2008. See also section on 'Urban spatial trends, infrastructure and exclusion'.
49 Graham, 2002; Baum et al, 2004; Odendaal and Duminy, 2008.
50 See Odendaal and Duminy, 2008.
51 See the discussion of various forms of participatory planning approaches in Chapter 5 for more details.
52 See, for example, Moser, 1993; Reeves, 2003; Office of the Deputy Prime Minister, 2005.
53 UN-Habitat, 2006e.
54 See UN-Habitat, 2006c.
55 See Skinner and Dobson, 2007.
56 See, for example, texts by Jenks et al (1996), Jenks and Burgess (2000) and Williams et al (2000), which bring together much of the literature assessing the compact city idea. See also Chapter 6.
57 Mindali et al, 2004.
58 Feminists have also been critical of cities built around land-use separations since they isolate women at home, and make it difficult for working women to negotiate various spatial demands. See, for example, Mackenzie and Rose, 1983.
59 See Chen et al (2008) for a summary of arguments; Ewing, 1997; Newman and Kenworthy, 2000. See also Chapter 6.
60 See Chen et al (2008) for a summary; Breheny, 1995; Gordon and Richardson, 1997.
61 Newman and Kenworthy, 2000.
62 See, for example, Gordon and Richardson, 1997; Simmonds and Coombe, 2000; Mindali et al, 2004.
63 Breheny (1995), generally a critic of compaction arguments, confirms it.
64 Bertaud, 2004.
65 Taniguchi and Ikeda, 2005.
66 Simmonds and Coombe, 2000.
67 Handy, 2005.
68 Gordon and Richardson, 1997.
69 See Bertaud, 2004, Table 1. Drawing from the US Institute for Transport Engineers, Bertaud cities the following minimum residential densities for different forms of transport: 1 bus per hour (30 people per hectare); 1 bus per half hour (44 people per hectare); light rail and feeder traffic (53 people per hectare).
70 Bertaud, 2004.
71 Irazábal, 2008a. See also Box 8.4.
72 Richardson et al, 2000.
73 Zillman, 2000.
74 Brown and Lloyd-Jones, 2002.
75 Richardson et al, 2000.
76 UN-Habitat, 2003.
77 Barter, 2000.
78 Zhang, 2000.
79 Todes, 2003; Schoonraad, 2000; Cross et al, 1996.
80 See Biermann et al (2004) on Diepsloot in Johannesburg, which is relatively close to emerging new nodes in the city.
81 Bertaud, 2004.
82 See the case of Atlantis, in Cape Town (South Africa). See also Lloyd Jones, 2000; and Brown and Lloyd-Jones, 2002.
83 Jenks, 2000.
84 Biermann, 2000.
85 RERC, 1974.
86 See also Breetzke (2008) on Durban.
87 See also the earlier sub-section on 'Mega-projects'.
88 Burchell et al, 2000.
89 Burchell et al, 2000.
90 See Chapter 6.
91 Dieleman and Wegener, 2004.
92 Burchell et al, 2000; Shen et al, 2007.
93 Jun, 2004.
94 Godschalk, 2000.
95 Belzer and Autler, 2002.
96 Owens, 2008.
97 Wilkinson, 2006.
98 These systems generally involve public–private partnerships, with the public sector developing infrastructure and regulating system, while the private sector runs the vehicles.
99 Jiron, 2008.
100 A system of trunks and feeders with poor cross-routes replaced the previous more chaotic bus system, but in the

process made it difficult to move across the city outside of these parameters. Nor did planners understand the way in which various modes of transport were used by people and how patterns of movement were socially constructed. In addition, the number of buses and, hence, frequency was cut, reducing convenience. See Jiron, 2008.

101 Cascetta and Pagliara, 2008.

102 See, for example, Auckland Regional Council, 2006.

103 Wilkinson, 2002. The links between other forms of infrastructure planning and spatial planning are also not automatically made as a consequence of differences in methodology, scale and time, although there are potentials to link them. See Ramnath, 2007.

104 Lee, 1973; Kane and Behrens, 2002.

105 Iacono et al, 2007.

106 Auckland Regional Council, 2006.

107 Singh and Steinberg, 1996, p17.

108 Archer, 1996.

109 See Chapter 3.

110 Singh and Steinberg, 1996.

111 Mattingly and Winarso, 2000; Mattingly, 2001.

112 Mattingly and Winarso, 2000.

113 Ansari, 2008. Similar problems occurred in Nepal.

114 Mattingly, 2001.

115 Mattingly, 2001.

116 UN-Habitat, 2006d. See also UN-Habitat, 2006a, 2006c.

117 UN-Habitat, 2006g.

118 Harrison, 2001.

119 For more details, see UN-Habitat, 2004a, pp167–168.

120 Archer, 1996; Angel et al, 2005. Where project finance is available for communities to undertake development projects, support around project preparation (such as feasibility studies, basic planning, land availability, business plan) can help to bridge the gap between planning and implementation. The Project Preparation Trust, a South African NGO, has developed successful methodologies for a range of development projects.

121 Angel et al, 2005.