



TUNZA

for young people • by young people • about young people



WHERE the WILD THINGS are...

GREEN CITIES: Plan for the planet!

SUPERSIZE ME...

...the growth of cities...

PRIUS test drive...

ESSENTIAL ELEMENTS...

WASTE NOT...

...WANT NOT

Green KAISER...



TUNZA

TUNZA

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photo: K. Songuattana/UNEP/Topham



photo: Nigel Young/Foster and Partners



photo: Wolfgang Schmidt/Still Pictures

UNEP and Bayer, the German-based international enterprise involved in health care, crop science and material science, are working together to strengthen young people's environmental awareness and engage children and youth in environmental issues worldwide.

A partnership agreement lays down a basis for UNEP and Bayer, who have collaborated on projects in the Asia and Pacific region for nearly ten years, to step

up current projects, transfer successful initiatives to other countries and develop new youth programmes. Projects include: TUNZA Magazine; the International Children's Painting Competition on the Environment; the Bayer Young Environmental Envoy in Partnership with UNEP; the UNEP TUNZA International Youth Conference; youth environmental networks in Asia Pacific; the Asia-Pacific Eco-Minds Forum; the Eco Forum in Poland; and a photo competition, 'Ecology in Focus', in eastern Europe.



Partners for Youth and the Environment



**Green cities:
Plan for the planet!**

Planning for an urban planet



photo: Tjyawatchalapong/UNEP/Topham

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photo: Sean Sprague/Still Pictures

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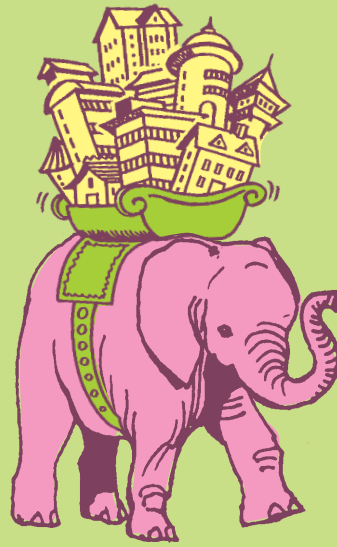
photo: <http://www.hrt.msue.edu/greenroof/>

21



photo: Stephan Brameisen, University of Applied Sciences, Wädenswil

22



Our generation is about to notch up an extraordinary record: we will be the first in the entire history of humankind to live mainly in towns and cities. Soon, more than half the people on earth will live in urban rather than rural areas – after millions of years, humanity will have become a predominantly urban species.

And the trend will not stop there. By 2030 – when our children will probably be much the same age as we are now – two thirds of the world's people will be in the ever-expanding towns and cities. Already more of us – 3 billion – live in them than inhabited the entire globe just 50 years ago, and their numbers are swelling by more than a million every week.

Cities present great economic, cultural and social opportunities. But many of the world's environment and development crises are concentrated in them. They suck in resources from all over their countries and the rest of the world, creating enormous 'environmental footprints' that can be bigger than entire nations. The wastes they emit are responsible for most of the worst pollution of land, air and water. And, though poverty is often worse in rural areas, it is more concentrated – and therefore more politically explosive – in urban ones.

It's quite an inheritance. Fortunately something is being done to get to grips with it. This year's World Environment Day, on 5 June, is focusing on Green Cities. Mayors from all over the world will converge on San Francisco for the day's main celebrations.

The mayors will share ideas and experiences of tackling problems – and work out solutions. The day's theme is, after all, 'Plan for the Planet!' They plan to adopt the world's first ever set of environmental agreements to be made between municipal governments. These San Francisco Urban Environmental Accords – which will be signed on the 60th anniversary of the founding of the United Nations in the city – will lay down measures to reduce climate change, waste and pollution, and increase wildlife and public transport.

It is good that the mayors will be setting goals for our new urban planet. But it will be up to us to see that they are met, for cities have a vital part to play in delivering a more environmentally sustainable world.

Editorial

We want to hear from you – your views, your news and your ideas. E-mail us at: tunza@ourplanet.com.

Essential elements

Asphalt, steel, plastic and petrol may be more familiar elements to city dwellers than the traditional water, fire, earth and air. But like everyone else urbanites depend on the natural world, just the same.

Here's how.

photo: Topfoto/Image Works

▼ Air

Half of the world's city dwellers – men, women and children – have to breathe potentially dangerous air every day. Many hundreds of thousands die from outdoor air pollution; many more become ill from asthma, bronchitis, lung and heart diseases.

Mexico City's air pollution is amongst the worst in the world – in the past, birds have fallen dead out of the sky over its central square. Ozone levels exceed international standards 300 hours a year, mainly due to the city's 4 million ageing motor vehicles and more than 30,000 factories.

But there are solutions. Los Angeles was once a byword for

smog. But southern California has done much to clean up its air and has introduced measures to green the car. Most cities in developed countries have phased out leaded petrol, which can damage children's brains. Switching to unleaded petrol saves money too – the United States saved \$10 for every \$1 invested in the switch, through reduced health costs, low engine maintenance and improved fuel efficiency.



photo: Topfoto/R. Roberts

▲ Food

The world's towns and cities grow by another million people each week, and as they swell to take in the newcomers, there is less land to feed urban dwellers. Food has to travel further to reach them: up to a third of it is spoilt in transit.

Farming the city helps solve this. Around the world, 850 million city dwellers (a quarter of the world's urban population) are fed by some 200 million urban farmers cultivating plots ranging from community gardens and commercial farms to domestic yards and rented municipal land in public allotments. Some supply local



photo: Shihua Zhao/UNEP/Topham

markets and businesses; others just eat what they grow. Farming the city provides jobs, as well as vital nutrition.

But high pollution rates and inadequate waste disposal can contaminate crops; poor animal husbandry can hasten the spread of diseases to humans; and using urban land for farming can increase sprawl, as displaced people and businesses seek space nearby. Sometimes it makes economic sense to rely on fertile rural lands and use metropolitan space to yield a higher financial return.

But in cities as varied as Jerusalem, Dakar and St Petersburg (where more than half the city's 5 million residents cultivate produce), urban farming is improving people's lives.



photo: Dale Hinman/UNEP/Topham

▲ Water

Poor children in city slums die more often of waterborne diseases than their counterparts in the countryside, even though urban areas are better supplied with water and sanitation than rural ones. Infections and viruses flourish in the concentrated waste produced by high densities of people.

In Latin America 120 million urban people are estimated to have no easy access to clean water: in Africa this rises to 150 million and in Asia 700 million. Even more lack sanitation: 150 million in Latin America, 180 million in Africa and 800 million in Asia.

Meanwhile cities from Phoenix to Johannesburg, Lima to Madrid

have to bring in water from hundreds of kilometres away, as rains fail and they use up their groundwater supplies.

The world's leaders have pledged to halve the number of people without clean water and sanitation by 2015. Progress is mixed, but some countries – like South Africa – are well ahead of the target, showing what can be done. Meanwhile conserving water and planting trees on watersheds can protect precious supplies.

▼ Parks

Humans have long recognized the value of urban green spaces – from the 6th century Hanging Gardens of Babylon and the palatial horticulture of Renaissance Florence to planned garden cities in Victorian England and today's Central Park in New York.

Parks and natural settings have been shown to improve the physical, mental and emotional health of people as varied as cancer patients, schoolgirls and occupants of tenement housing. Public greenery can strengthen civic pride, create jobs, engage youth and the elderly, and improve public health and safety.

Citizens know the worth of parks and other green spaces, and have often rallied to save them when they have been threatened by development.

Indeed one of the world's great cities owes its existence to a park. In 1652, Jan van Riebeeck of the Dutch East India Trading Company planted what is now called Company's Garden to provide fresh vegetables to Dutch sailors sailing round the tip of Africa. The city of Cape Town then grew up around the grounds – which today house public paths, fountains, pools, a botanical garden, museums and the South African parliament.



photo: KGH

Essential elements

Rooms with a view ● ● ● ● ● ● ● ● ● ● (of the future)

In today's concrete jungles, sustainable architecture is – literally – breaking new ground. Green building principles – which seek to provide both the best structural performance and to conserve water, land and energy – are changing the way buildings are designed, built and run.

Green architecture is becoming more and more popular. Corporations and governments are increasingly signing on. Building green can reduce energy consumption (and thereby running costs), as well as increasing productivity, health and morale in the employees, students – or even shoppers – inside.

A **Condé Nast Building, New York.** Architects: Fox & Fowle, 1999

Right at 'the crossroads of the world' – New York City's famed Times Square – the Condé Nast Building (home to the publishers of Vogue, Glamour and GQ magazines) was one of the first-ever green skyscrapers. A massive network of recycling chutes services each of its towering 48 floors. Two fuel cells use natural gas instead of fossil fuels to supply the building with all its night-time electricity, and 5 per cent of its massive daytime needs. The exhaust gases are then used to heat the building and provide hot water, while specially glazed windows allow daylight in and filter out ultraviolet rays.

B **Swiss Re Tower, London.** Architects: Foster and Partners, 2004

Londoners have affectionately dubbed the Swiss Re Tower 'the Gherkin' for its uncanny resemblance to a giant pickle on the city skyline. The global reinsurance company – which has taken a lead in calling attention to the dangers of climate change – made its words concrete when building its offices. The 180-metre tapered glass tower, which rises above a ground-level plaza of restaurants, shops and cafes, is within easy walking distance of public transport and uses 50 per cent less energy than a conventional building of similar size. Upwardly spiralling light wells circulate fresh air and natural lighting throughout its 40 floors, and exterior weather sensors monitor outside temperature, wind speed and sunlight levels, closing blinds and opening window panels as needed.

photo: Fox & Fowle Architects/Andrew Gordon Photography



photo: Nigel Young/Foster and Partners





C

C Edificio Malecon, Buenos Aires.
Architects: Hok Sustainable Design, 1999

The 12-storey glass tower Edificio Malecon is one of the most technologically advanced office buildings in Buenos Aires. It stands on a reclaimed brownfield site of old industrial land: its parking garage is built within the foundations of a 19th century warehouse. Its long, narrow shape and orientation from east to west are designed to minimize the amount of solar heat trapped during the hottest times of the year, while mechanized sunshades and windows deflect excess sunlight and harness cooling breezes from a nearby river. High performance, lightweight exterior panelling forms a glass curtain wall to protect the building from the elements while providing wide views from every angle.

photo: Daniela MacAdden/Hok Sustainable Design



D

D Menara Boustead, Kuala Lumpur.
Architect: Ken Yeang of T. R. Hamzah & Yeang Sdn Bhd, 1986

Menara Boustead, the Kuala Lumpur headquarters of the international information and technology company IBM, is an energy-saving skyscraper that aims to make use of the tropical climate. Windows and glass curtain walls maximize natural lighting throughout its offices and meeting rooms, as well as lobbies, lifts, lavatories and stairwells. A specially glazed curtain wall prevents the building's 30 floors absorbing excessive solar heat, while external fins and adjustable slats provide shade from the sun. Skycourts, terraces and atriums house plants and other greenery, increasing the supply of oxygen and sending natural ventilation through the building's core.

photo: T. R. Hamzah & Yeang Sdn Bhd

E The Green Building, Cape Town.
Architect: Mike Schroeder of the Development Action Group, 2003

The low two-storey Green Building, in Cape Town's Westlake Business Park, is built from recycled, local concrete brick and sustainably harvested wood, and boasts a passive thermal design that eliminates the need for air conditioning. If needed, the building can be flushed with cool night air through two chimney ducts linked to concrete pipes running underneath the ground floor. Roof-mounted photovoltaic (solar cell) panels turn sunlight into electricity, while a separate solar power system heats water for kitchens and bathrooms – including showers for those who cycle to work. Drainage systems channel household 'grey' wastewater and rainfall into surrounding fruit and vegetable gardens.

Another innovative green building – the Reichstag in Berlin – is featured in the 7 City Wonders on page 22.



E

photo: Mike Schroeder, Cape Town

photo: Dylan Garcia/Still pictures



Think traffic, think jams. Cars in Washington DC spend the equivalent of almost three days a year stuck in traffic; vehicles in Bangkok, an astounding six weeks. So we can add wasted time (costing trillions of dollars), to air and noise pollution, and injuries and deaths from accidents – in assessing the price of city life.

And it's going to get worse as cities grow – and grow more prosperous. Car ownership rises as fortunes improve: on average, wealthy households make twice as many trips daily as lower income ones. Are there any answers?

High performance

Bogotá, Colombia – one of the world's highest capitals – has made extraordinary progress in switching from cars to public transport. It has set up a remarkably successful rapid transit bus system – the TransMilenio – which now carries more than a million people a day and is estimated to save each of them an average of 300 hours in commuting time every year. By 2020, 85 per cent of the city's 9 million people will live within 500 metres of a station. Meanwhile the city bans 40 per cent of its cars during rush hours, closes 120 kilometres of roads to traffic every Sunday, and has scrapped planned new highways and replaced them with cycle routes.

photo: Peter Danielsson



Pedal power

Cyclists in Vienna can hop on any of the city's 1,500 public bikes any time of the day or night free of charge, thanks to the municipal 'Viennabikes' programme launched in 2002. The pink and blue bikes – weighing about 17 kilos each to deter theft – can be picked up and dropped off at any one of 235 terminals throughout the central districts. Users insert a small deposit of 2 euros (\$2.60), refunded on return, and tourists are invited to take free maps of the city with them.



photo: http://www.wien.gv.at

JAMS



photo: C. Garroni Parisi/Still Pictures



photo: E. Hebenner, Flexcar

Pooled cars

Tens of thousands of people in Seattle, San Diego, Chicago and Boston enjoy the convenience of cars without the hassles of ownership by joining 'mobility clubs'. These operate fleets of shared vehicles for members, who pick them up at designated spots within walking distance of their homes and return them when they are finished, at a cost generally ranging, depending on the car, from \$8.50 to \$12.50 per hour.

For another example of cutting jams – and air pollution – see London's congestion charge in the 7 City Wonders on page 22.

TOMORROW?

Cleaner buses

Four years ago India's Supreme Court ordered the conversion of Delhi's public transport from diesel to compressed natural gas (CNG), citing the city's abysmal record on air pollution. During the 20 (sometimes chaotic) months that followed some 7,200 buses, 400 minibuses and 55,000 auto-rickshaws switched to cleaner fuel. Delhi's present fleet of 75,000 CNG vehicles is much the world's largest, with runners-up Beijing and Seoul operating 1,600 and 1,000 natural-gas-powered buses respectively. The city has also passed laws to discourage diesel vehicles, and requires all new private cars to meet European Union emissions standards.



photos: Wolfgang Schmidt/Still Pictures

TUNZA test drive

photo: Associated Press



Leonardo DiCaprio at the wheel of his Prius.

Tunza drove into the future when it visited Toyota's Tsutsumi factory in Toyota City, Japan, home of the Prius, the leader in a new age of hybrid vehicles.

The Prius is a hybrid between a petrol and an electric car – running on a combination of conventional fossil-fuel-based energy and battery power. It is self-charging as the car's motion is used to power the battery. It produces less than half the emissions of a normal car – helping create cleaner cities and combat global warming.

Of course, no one would want to drive around in something that feels like a child's toy or mad scientist's experiment. But owner surveys in the United States – where more than 50,000 Prius cars were sold last year – report over 90 per cent customer satisfaction.

And at this year's Oscars in Los Angeles, more than 20 stars – including Leonardo DiCaprio, Charlize Theron, Scarlett Johansson and Orlando Bloom – made their entrances in chauffeur-driven Prius cars rather than the traditional stretch limo.

What is it like? We tried one out under the helpful eye of 26-year-old Toyota employee Tomoko Imai. 'You won't find a key to start it,' she told us. 'Just press the power button on the dash.'

As befits a hybrid, the Prius combines the familiar and the strange. Apart from a few futuristic touches, such as intelligent hands-off parking, it feels like a normal car. But when it's at a standstill – for example in a traffic jam – it switches off. Instead of consuming fuel and polluting the city, it just sits and waits. Then, when you want to go, it goes – with a healthy acceleration of 0-100 km/hr in under 11 seconds and a top speed of 170 km/hr, above many national speed limits.

But it really shines in fuel economy and green credentials. It starts by using battery power and runs on that until the energy demand increases, when the petrol engine kicks in. So it's actually cheaper to run in heavy city traffic than on the open road, the opposite of conventional cars.

Nor is that its only green feature, as Tomoko pointed out. Its mats are made from recycled sugar cane waste and the soundproofing is made of shredder residue – minute particles of resin, fibre, glass and rubber. And, at the end of its life cycle, the Prius's battery can be returned to any Toyota outlet where it will be sent for recycling.

Toyota now sells 90 per cent of the world's hybrid vehicles. And rather than jealously guarding its green technology, it is licensing it to rival car manufacturers, starting with industry giants Nissan and Ford.

Fujio Cho, Toyota's President and Chairman of its Environment Committee, explains that the company wants to contribute to the sustainable development of society and the planet. 'Toyota places great importance on the idea of "good faith"... acting with sincerity and without betraying the confidence and expectations of others,' he says.

TUNZA ANSWERS YOUR QUESTIONS

Green Cities



What is the purpose of World Environment Day? Who is the target audience for its message, and who can participate? *Karen Jazmin Estrada Rivera, Peru*



World Environment Day is the day on which the United Nations seeks to stimulate awareness about the state of the environment and enhance political attention and action worldwide. It reminds all nations and peoples that a safer and more prosperous future relies on informed, empowered people who are active agents in protecting the environment – so that we can all cherish and enjoy living on this planet.



What are the most pressing environmental issues facing cities today? Do these differ significantly between the developed and the developing worlds? *Faid Souhaili, Mayotte, France*



Environmental issues in different cities and countries are affected by the level and scale of human activities and the resulting pressure on the environment. Pollution, energy and waste generation top the list in our congested urban areas affected by the expansion of transport and industry. Transport, for example, is the fastest growing source of carbon dioxide emissions from burning fossil fuels – the main cause of global warming.



Many cities draw natural resources from surrounding areas to support large populations. Is this desirable – or sustainable? *Tim Riley, United Kingdom*



We cannot avoid using natural resources. They provide us with goods and services to meet our needs, regulate life-support functions and enrich our social well-being. But we are not using this natural capital wisely, and our needs and demands are ever increasing. Sadly, we are also using nature as a dumping ground for wastes and emissions. The major challenge is to move towards using renewable forms of products and services to better the lives of every individual.



Given that cities have such a high demand for electricity, why don't more of them switch to renewable forms of energy? Wouldn't this make economic and environmental sense? *Alison Staat-Niederehe, United States*



Yes, it makes a lot of sense. However, citizens – both as consumers and producers – are not fully aware of the carrying capacity of the planet and of the impact of the intensive use of non-renewable natural resources on current and future generations. Public and private sector organizations need to invest in renewable forms of energy, infrastructure and facilities.



How can young people living in cities affect urban issues, which generally fall to politicians, architects and engineers to resolve? *Rongling You, China*



Politicians and engineers are there to make the best choices and create opportunities for healthier and more secure lives for their citizens. Young people can live by example by choosing environmentally friendly transport like walking, cycling, using public transport and sharing lifts, and by getting organized and making their voices heard about including environmental considerations in city planning. This will force the policy and decision makers to meet their demands.



Fifty years ago, less than one person in three lived in a town or city. Soon most of the world's people will do so. How will the natural environment cope as we become an increasingly urban species? *Joanna Freitas, Portugal*



If the current trend of increasing urbanization continues, it will have serious environmental and health implications including irreversible damage to ecosystems. This can be avoided if we adopt innovative ideas and actions. People mainly move to cities in search of better opportunities; if these were available for semi-urban and rural dwellers, the trend and its environmental implications could be reduced. This remains a major challenge.

Do you have questions on environment and development issues that you would like the experts at UNEP to answer? Please send them to cpinfo@unep.org, and we will try to answer them in future issues.

USEFUL WASTE

By Pablo Fernandez



photo: Pablo Fernandez

City dwellers create massive amounts of garbage every day, which are collected for disposal – if they're lucky. In many countries, rubbish is dumped in landfills or uncontrolled sites and covered with earth. This creates conditions under which fungi and bacteria produce methane gas as the waste breaks down, accelerating global warming.

I work with the NovaGerar project in Rio de Janeiro – where we capture the methane gas before it escapes from the ground, and burn it to power a generator. Begun in 2003, the project combats climate change – but that's not all. Burning the gas produces heat and electricity for the city. The generator is close to the urban centre, reducing losses suffered during long-distance transmissions of electricity, and increasing the city's amount of self-supplied energy. Last, but not least, we are creating electricity from resources that would otherwise be considered waste and discarded.

NovaGerar is one of the world's first ventures promoting sustainable development in developing countries under the Kyoto Protocol – the international agreement to mitigate climate change by reducing greenhouse gas emissions – that entered into force on 16 February 2005. It established the Clean Development Mechanism, a flexible economic mechanism that permits and encourages industrialized countries to invest

Green Cities: Plan for the Planet!



photo: Tiyawatchalapong/UNEP/Topham

in projects to reduce greenhouse gas emissions in the developing world, and claim the net savings achieved as 'carbon credits'. It lets them meet their emissions reduction targets without carrying out costly overhauls to their infrastructures, by helping developing countries to introduce green technologies.

Our project, which generates credits for the Dutch government, is expected to reduce greenhouse gas emissions by 12 million tonnes of carbon dioxide over 21 years – which is like taking 150,000 cars (travelling 15,000 kilometres each) off the road for a year. And, starting in 2006, it will also

generate up to 12 megawatts of electricity, enough to meet the daily power needs of 100,000 city dwellers.

Pablo Fernandez is a 2004 Bayer Young Environmental Envoy.



photos: NovaGerar Database



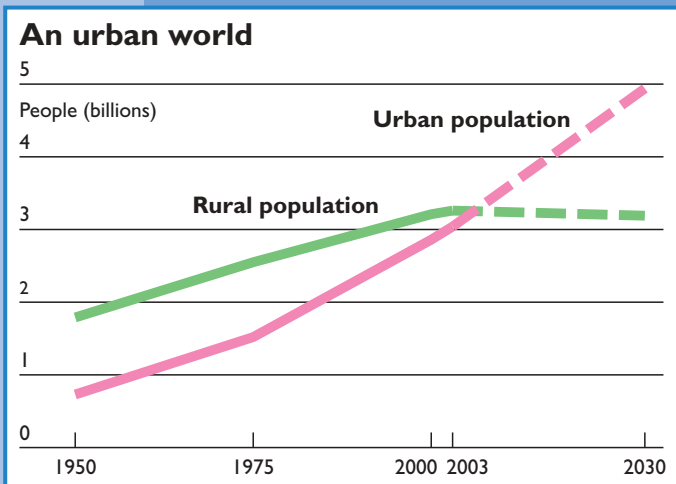
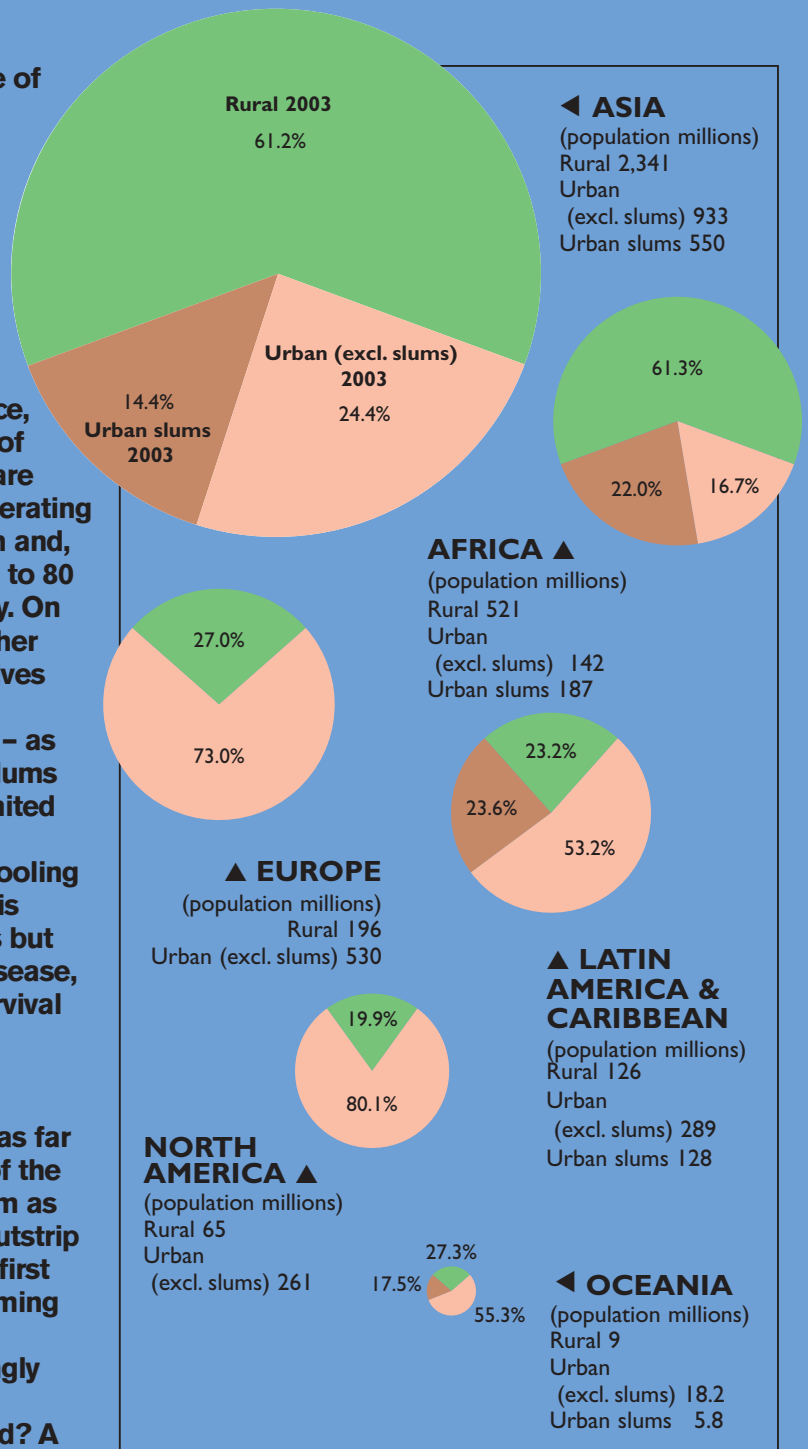
Supersize me

Cities have long held the promise of 'streets paved with gold'. Today, nearly half of us live in urban areas; by 2030, two thirds of us will. The world's cities are currently home to more than 3 billion people and are growing by 1 million people a week – 100 new residents every minute.

Although cities occupy just 2 per cent of the earth's land surface, their inhabitants use 75 per cent of the world's resources. But cities are economic powerhouses, too, generating more than half the world's wealth and, in some developing countries, up to 80 per cent of their economic activity. On average, urban dwellers earn higher wages and live healthier, easier lives than their rural counterparts.

The benefits are not universal – as many as 1 billion people live in slums and squatter settlements with limited access to clean water, sanitation, adequate housing, transport, schooling or health care. For them, city life is marked not only by opportunities but also by poverty, overcrowding, disease, violence and uncertainty, with survival depending on their astonishing personal resilience and resourcefulness.

The growth of modern cities has far surpassed the mass migrations of the past. People will still flock to them as long as urban living conditions outstrip those in the countryside. For the first time in history, humans are becoming predominantly urban. Might our mindsets and lifestyles decreasingly comprehend the values and vital services provided by natural world? A challenge for us all, as – from towns to mega-metropolises – the urban revolution is here to stay.



Spreading cities

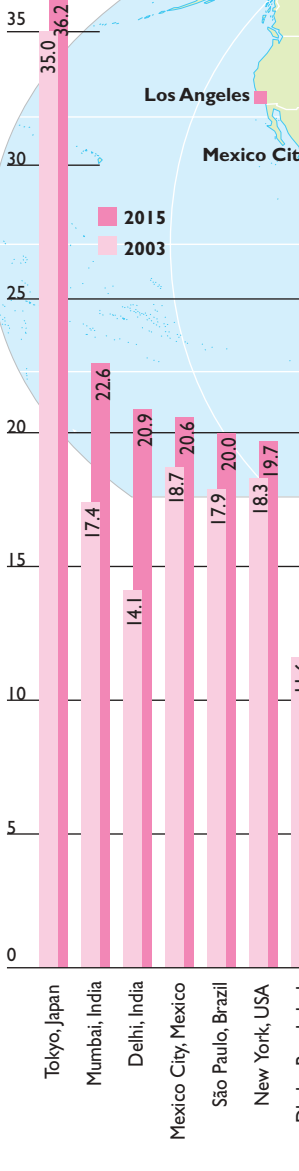
Cities under pressure from rising populations can expand upwards, outwards or underground – and many do all three. After all, new city dwellers – and the homes, workplaces, transport and public places they require – need to go somewhere. As skyscrapers, subway systems and high-rise buildings alone cannot absorb this rapid growth, city planners have looked increasingly to urban peripheries to accept population and commercial overflow (often termed 'sprawl').

Urban expansion has often led to higher city revenues through additional tax sources and business activities, and provided families with space to live and work, but it also can increase congestion and pollution, destroy greenery and wildlife and encourage wasteful use of land and natural resources.

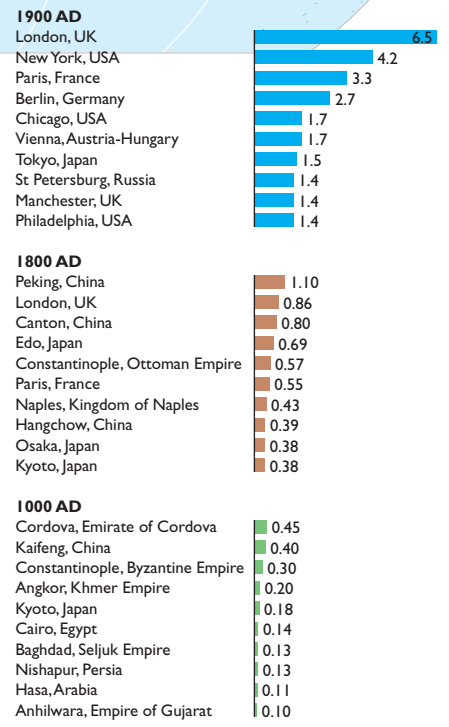
Solutions for the future will be likely to come from 'smart growth' initiatives – constructing well-connected street networks, accessible public transport, mixed-use buildings, civic squares and public green spaces – that blend social, economic and environmental concerns to improve the quality of urban living. ►

Current and projected mega-cities (millions)

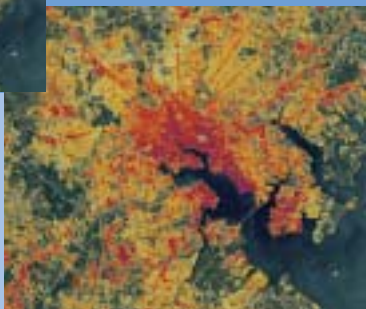
(millions)



World's ten largest cities at different dates (millions)



◀ BALTIMORE 1986



▼ BALTIMORE 2000

photos: Earth Sciences and Image Analysis Laboratory at Johnson Space Center



▶ CAIRO 1998



▼ CAIRO 1965

photos: <http://www.whrc.org>

Green KAISER

Football legend Franz Beckenbauer is determined to score a 'Green Goal' at next year's 2006 FIFA World Cup. 'The whole world will be watching Germany, so we also want to be a role model for the environment,' he says.

Beckenbauer, the only person ever to have won the World Cup as both a player (he made 103 career appearances for his country) and a manager, now serves as president of Germany's World Cup organizing committee. So when 'Der Kaiser' – as he became known for his dominance on the field – takes up an issue, he commands enormous respect.

He is working with Federal Government, football's governing body, FIFA, the German business community and UNEP to bring Germany and the world 'a sustainable World Cup'. As he puts it: 'Our "Green Goal" is to promote environmental management in four key areas: water, refuse, energy and transportation.'

More than 3.2 million spectators, 15,000 media representatives, 1,500 FIFA officials, 15,000 volunteers and a host of security, technical and service personnel – plus the 32 national squads and their coaches – are expected to descend on the 12 German World Cup host cities. Beckenbauer and his committee are working to reduce the 100,000 tonnes of greenhouse gas emissions likely to be generated as a result.

He says: 'Transport will play a vital role ... Not only the teams but fans will want to get to the games and back

home again afterwards speedily and smoothly.' Moving such vast numbers of people is expected to count for more than 80 per cent of the event's total emissions, so – for the first time – fans will be given combined tickets for both the game and for public transport to get to it, in an attempt to persuade them to leave their cars at home.

He explains: 'This represents a special incentive for them to use public transport. The combination ticket will not only let people get to the stadium free of charge, but will allow them to travel around the surrounding region for a whole day.'

'Fans are the defining factor at a World Cup. Our aim is to provide an optimal service, and we're hoping not just to sell all the tickets, but to fill the stadiums down to the very last seat.'

The committee is working to cut energy consumption in the stadiums by 20 per cent, promote renewable electricity and harvest rainwater. Refreshments will have minimal packaging and come in reusable containers to reduce rubbish – which will also be recycled.

Beckenbauer and his team are also planning to offset remaining emissions through climate protection schemes in developing countries. Possibilities include projects in South Africa, host nation for the 2010 World Cup, and in the Southeast Asian countries affected by last year's tsunami.

German Environment Minister Trittin says: 'This is teamwork and tactics at their best. We will set new standards in the environmental sphere via a series of concrete measures.'



photos: EMPICS



It may not be as densely populated as Bermuda, Bangladesh or Bahrain, but the Netherlands packs over 16 million people into an area only a little smaller than Bhutan, with 470 Dutch per square kilometre.

Another 2 million people will have to fit into the same space by 2030 and, to help house them, some planners are proposing to combine four of the country's major cities and an area known as the Randstad into a single megacity. Enter Deltametropolis.

Roughly bounded by Amsterdam, Utrecht, Rotterdam and The Hague, the Randstad is now home to more than 6 million people, scattered amongst a loose collection of urban centres, satellite towns, small villages and farms encircling a 'green heart' of lakes, meadows and marshes. Individually, all four cities face increasingly strained resources and congestion as their populations rise. Yet re-conceptualized as a single cohesive unit they do not seem so crowded. In fact, Deltametropolis's projected population density of 890 people per square kilometre pales compared to those of London (4,500) or Shanghai (8,265).

It would, of course, take more than a name change and image overhaul to turn the Randstad into a thriving megacity. It would not be easy to integrate the municipal services of four cities into one enormous, well-oiled system, or to connect and expand existing water and transport

Getting it together?

infrastructures. Planners propose a network of canals and reservoirs to provide both water and recreation. And they are devising ways of merging roads, railways and bus lines to provide fast and efficient connections both within the new megacity and with the rest of Europe.

Not everyone is enthusiastic at the prospect, however. Some think the whole idea unnecessary. Many favour restricting future development in the Randstad and encouraging people to migrate elsewhere. Others worry that, despite zoning, urban sprawl will encroach into the green heart of the city at the expense of fields, woods, wildlife and dairy farmers.

As the debate gathers steam, city planners, architects and engineers around the world will watch to see whether the Dutch – who long ago plucked their land from the sea – have found a way of coping with the rising tide of the world's city dwellers.



photo: Andrea Buck/Still Pictures



photo: Argus/Still Pictures



photo: Markus Droughy/Still Pictures



photo: Ben Deiman Fotografie

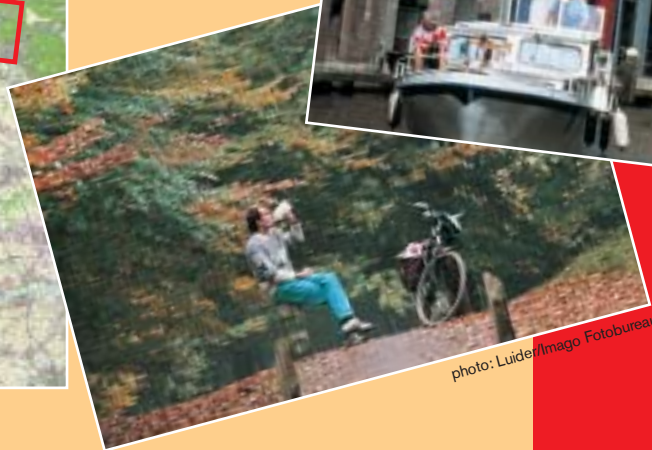


photo: Luider/Imago Fotobureau



Map: Topografische Dienst Kadaster

Waste not, Want not

The city of Fort Worth in the United States produces 2,278 tonnes of waste (the weight of 380 elephants) each day. Jakarta's daily waste would fill a full-sized soccer pitch 3.5 metres deep - while the people of Asia's towns and cities would together bury the same pitch under 3,780 metres of rubbish every day (the equivalent of 12.5 Eiffel Towers, stacked one on top of each other).

City dwellers generate two to three times more trash than their rural counterparts, mainly due to increased consumption of pre-packaged goods. In a world expecting to see more than 5 billion - two out of every three people - living in urban areas by 2030, already strained municipal waste management systems will be hard pressed to cope.

Developed countries are running out of space to contain growing volumes of consumer discards, while developing countries lack appropriate systems and infrastructure to service their populations. In many parts of Africa, Asia and Latin America, informal garbage collectors clear more refuse than do municipal employees.

Historically, cities have dumped, burned or buried their waste. Dumping and burning are widespread in places with poor collection and sanitation services, particularly in slums and squatter settlements. Lacking proper facilities, residents have no other option but to dispose of their waste as best they can: usually burning flammables and

tossing the rest into rivers, ditches or streets. Uncontrolled decomposition of food and human waste helps spread diseases like diarrhoea, typhoid, cholera, dysentery, tuberculosis and malaria, while fumes from open fires damage lungs and release harmful pollutants into the air.

In wealthier areas, residents pay for garbage removal to landfills and incinerators, both of which can cause human and environmental damage through groundwater contaminants, emissions of methane (a greenhouse gas) and cancer-causing dioxins. And while conscientious citizens often choose to recycle, public apathy and high operational costs can diminish the effectiveness of these programmes.

In 2000, the world's people produced 12.6 billion tonnes of waste, more than 2 tonnes for every one of us; by 2050, we will face a projected 26.7 billion tonnes each year, nearly 3 tonnes per person. Unprecedented volumes of paper, plastics,

textiles, cardboard, glass, metals and organic mass - just to name a few - will need to be got rid of somehow.

Fortunately, scientific advances and the application of common sense can help to reduce and reuse the messes we create.

Clean power plants already operate in Brazil, Argentina, Chile and Venezuela, turning biomass (plant and organic matter) into



photo: Yuen Kok Leng/UNEP/Topham



photo: E. Senjobe/UNEP/Topham



photo: J. Strenahan/UNEP/Topham



photo: Cherry Muir/UNEP/Topham



Santa Clarita in California, USA, that separate and sanitize the plastics, wood fibres and super absorbent polymers contained in them. These raw materials are then sold to manufacturers for reincarnation as shoe insoles, roof shingles, oil filters and wallpaper.

From state-of-the-art procedures to simple innovations, solutions for waste management exist. A

few have been adopted quickly, while others may take some getting used to – as Ethiopian Almaz Terrefe can attest. Her home-grown vegetables certainly are tasty, yet in seven years she has only attracted about 300 other people to try her organization's system of food production through ecological sanitation – using treated human waste as fertilizer.

electricity for over 5 million customers.

In the United States, more than 6,000 cities have adopted Pay-As-You-Throw programmes that charge residents based on the number and sizes of trash containers collected. By increasing the cost of garbage disposal and keeping recycling fees low or free, cities like Falmouth, Maine and Mount Vernon, Iowa, have seen solid waste decrease by more than 35 per cent. Dover, New Hampshire, reduced annual waste by over 7,000 tonnes for eight years running after switching to the scheme, and increased recycling levels more than 50 per cent.

Even soiled nappies can be remade into useful items through clever technology. Knowaste, a New York-based company, runs two processing facilities in Arnhem in the Netherlands and

Green Cities: Plan for the Planet!

LIFE on the tip

Cuts, bruises, infections and fights with wild pigs and dogs are daily occupational hazards for 13-year-old Yashoda and 10-year-old Rukrnini. Along with their mother, aunt, grandmother and 12,000 other women and children from their slum in Pune, India, the sisters set off early each morning for nearby rubbish dumps, where they earn their living recycling others' trash.

Up to 2 per cent of the developing world's urban population survives by scavenging. They come from the most disadvantaged and vulnerable segments of society. Each day 20,000 waste pickers scour every square metre of Calcutta's municipal dumps, sorting and collecting bottles, cardboard, plastic, metal and other materials for reuse and resale. This scene is recreated each day in rubbish sites from Cairo and Manila to Lagos, Lima and Baghdad.

Work-related disease, injury and social stigma all take their toll – in Mexico City, dumpsite pickers have a life expectancy of 39 years, compared with 67 years for the general populace. Pay generally varies but rarely rises above \$2 a day (one notable exception is Beijing, where rubbish pickers make three times the salary of university professors).

Encouragingly, scavenger cooperatives are springing up across Latin America and Asia to empower the poor, combat exploitation and reward entrepreneurial initiative. Once organized, many groups are able to negotiate reasonable prices for their goods from middlemen and even win contracts from local governments. In Colombia, a non-governmental organization called the Fundación Social helps rubbish pickers to form cooperatives and provides grants, loans and legal and business advice to newly formed ventures. Similar networks are in place in Argentina, Brazil, India, Indonesia, Mexico and the Philippines.



photo: Thomas Aledro/UNEP/Topham

Funky, but functional

By Camila Godinho

Brazilian slums – favelas in Portuguese – are notorious for violence, disease and desperation. Much has been written about their poor living conditions – ranging from unsafe drinking water and inadequate sanitation to drug-related crimes and murders. But despite facing such enormous daily difficulties, young people growing up in them often display remarkable spirit and determination, fighting to restore dignity to their lives.

Across Brazil's *favelas*, programmes to promote the arts, environmentally friendly practices and information technology are blossoming, engaging young people in recycling campaigns, computer classes, plays and musicals. Many were started by organizations working with local community associations.

Young designers are turning discarded plastic bottles and other rubbish into funky but functional pieces of furniture. Encouraged and trained by an organization called OndAzul, their eco-designs are selling well – and, as Brazilians throw away nearly 5.9 billion bottles a year, they are unlikely to run short of raw materials!

Web-browsers from the *favelas* can find



photo: Sean Sprague/Still Pictures



photo: Sean Sprague/Still Pictures

information on the Ecopop website – www.ecopop.com.br – about recycling, gardening, and do-it-yourself sanitation and waste disposal for when public services fail to deliver. Set up and run by young people from the Viva Rio group, it discusses environmental issues, features local projects and best practices and runs weekly articles by a well-known Brazilian journalist André Trigueiro. Ecopop grew out of a previous Viva Rio project, 'Portal Viva Favela', that introduced *favela* youth to information and communication

technologies. Today the organization's base team has 30 members – half of them young people from Rio's slums.

Did you see the internationally acclaimed movie *City of God*, which chronicled gang warfare in an impoverished housing project in Rio? Many of those taking part in it came from Vidigal's youth theatre company Nos do Morro ('We from the Hillside'), which puts on productions for aspiring actors. Another initiative, 'Favela's Culture', in Andaraí, Rio de Janeiro has helped more than 300 talented youth to discover the stage as a serious profession.

Projects such as these – many created for young people, by young people – are bringing new hope of health, happiness and personal development to slum dwellers. Amid hunger, uncertainty, illiteracy and open sewers, restoring human dignity does wonders to lift people's spirits and harness their creative potential. In *favelas* throughout Brazil, young people have started thinking differently about their future prospects and realizing that they do have the power to change their lives for the better.

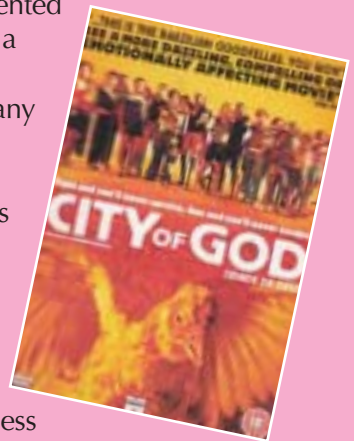


photo: World Bank

Camila Godinho is the Tunza Youth Advisor for Brazil.

A sporting chance

BY WU YANG



I remember the moment that heralded a new Beijing. On 13 July 2001 – the day of the announcement that Beijing had been chosen to host the 2008 Olympic Games – I was a senior high school student from southwestern China.

That day millions of Chinese citizens flooded city streets and village squares across the country, singing, dancing, laughing and crying tears of joy.

I had heard that our capital suffered from severe sandstorms, perpetually congested traffic and massive air pollution. But when I started living here two years ago, I was pleasantly surprised. For the slogan ‘New Beijing, Great Olympics’ is becoming a reality.

A new Beijing is indeed emerging, blending 3,000-year-old cultural traditions with modern technology and environmentally friendly innovations. Greening and beautification projects are being carried out all around the city: recently Chinese leaders joined with more than 2 million people (including me) to plant trees in Beijing’s Olympic Forest Park. Over the past two decades, millions of ordinary citizens have planted billions of trees across the country. Some 7,400 hectares of green belt now encircle Beijing, shielding us from sandstorms like a present-day version of the Great Wall that protected citizens from invading armies so long ago. And inside the city, green zones and corridors provide peaceful, natural oases.

Beijing’s commitment to ‘Delivering a Green Olympics and Building an Ecological City’ has led to dramatic improvements. The installation of central heating networks has led residents to stop burning coal in their homes and convert coal-fuelled boilers to run on cleaner forms of energy. Municipal regulations have reduced the amount of soot, vehicle exhaust, dust and industrial pollution in the air. And public transportation is gaining popularity now that buses running on natural gas and a refurbished subway system connect every part of the city.

Enthusiasm for ‘Sports for Sustainable Development’ is running high. Beijing is aiming to run a zero-net emissions Green Olympics – as Salt Lake City did in 2002 – by incorporating green building and urban planning principles and accepting carbon credit ‘donations’ from companies to offset the city’s greenhouse gas emissions. We believe that a clean environment, sustainable development and healthy living through sport go hand in hand.

Across China, university students like myself have formed ‘Green Families’ devoted to environmental protection for public welfare – my chapter at Beijing Jiaotong University has over 200 members. We organize lectures, screen educational films and facilitate the intercollegiate exchange of information and technology. Recently we staged a used battery recycling campaign on campus, which was featured on the Beijing People’s Broadcasting Corporation News Channel.

Like many others in my city, I am excited about the Olympic Games coming in 2008. Beijing is a vibrant community of millions of friendly people who appreciate nature and love meeting visitors from around the world. We believe that the 2008 Games will both enhance harmony between different cultures, and strengthen the relationship between man and nature.

Wu Yang is a 2005 Bayer Young Environmental Envoy.



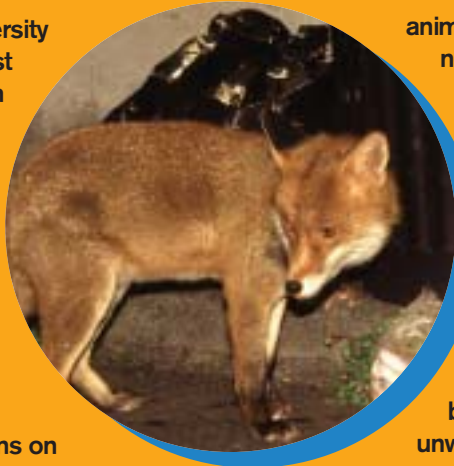
Where the wild things are

Stroll through the streets of Bangkok and you might fall in step with an elephant. Peer into a storm drain in Melbourne and you could find a metre-long eastern water dragon staring back. Scan the Chicago skyline and you may spot peregrine falcons perched atop church steeples.

Astonishing biodiversity can be found almost everywhere, even in the heart of densely populated cities. Mention urban wildlife and people generally think of mice, thrushes nesting in parks, cockroaches scuttling behind cabinets and pigeons on statues. Yet cities often contain greater biodiversity than the countryside around them.

Many species – as if to ignore zoning regulations – move from the countryside into town. As intensive agriculture and other developments shrink their natural habitats, resourceful animals seek shelter where they can. While at first glance modern cities with their crowds, congestion and concrete pavements might seem hostile places for animals to live, they are in fact peppered with little known wildlife havens – backyards, creeks, rivers, rooftop gardens and vacant lots – hosting miniature ecosystems, as well as officially designated parks, nature trails and lakes.

Just as with humans, there are some



animals we like as neighbours, and others we wish would move away. Many city dwellers encourage wildlife to live alongside them by providing birdfeeders and brush piles. Others unwittingly invite unwanted guests by leaving out trash and pet food. Urban encounters with coyotes, panthers, mountain lions and other large carnivores are growing more common every year – but the biggest killers are deer, which cause vehicle collisions when they run into the streets.

Highly adaptable urban specialists, such as rats and squirrels, increase dramatically with abundant food and cover – often at the expense of less mobile, less amorous species like amphibians and reptiles. According to Stanford University biologist Stephen Palumbi, they 'travel around on our coat-tails' and as repeated success trains their behaviour, some come to depend so much on humans that they are no longer truly wild.

Sites for sore eyes

Like oases in asphalt deserts, city parks and gardens shine as green beacons for wildlife. Yet increasingly urban biodiversity hotspots are coming in shades of brown and grey.



Brownfield sites – underused or abandoned and reclaimed by nature – are seen as ripe for redevelopment: indeed some environmentalists urge developers to concentrate on them and leave the countryside unspoiled. Cluttered though they may be by industrial remnants and haphazard foliage, they are often important reserves for wildlife.

Fortuitously free from human intervention, unattended brownfields

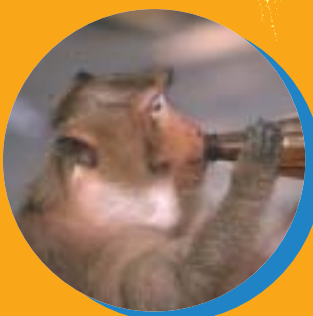


photo: Cyril Ruoso/Still Pictures

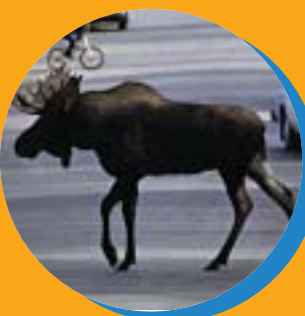


photo: Anchorage Daily News/Still Pictures



photo: Ralph Ginzburg/Still Pictures



photo: Fritz Polking/Still Pictures

often provide niche habitats for flora and fauna declining elsewhere. Many contain complex ecosystems replete with wildflowers, ferns, goldfinches, skylarks, butterflies, bats, bumblebees and beetles. Some boast a startling array of biodiversity that rivals even famous botanical gardens, public parks and waterways. One in every four wildlife sites in London (home to Kew Gardens, Hyde Park and the River Thames) are partly or wholly brownfield.



Not all brownfields are equally valuable. Some are indeed ideal for redevelopment in cities pressed for building space. But in other cases, rehabilitating these undisturbed, derelict areas – even into green spaces meant to restore biodiversity – may be missing the forest for the trees.



photo: Topfoto

Gardens in the sky



photo: <http://www.sentex.net/edc/VerticalGardens/>

The roofs over our heads could soon become the grounds beneath our feet. As urban development claims greenery and brownfields below, conservationists are increasingly looking up.

Green roofs – from one-storey buildings to skyscrapers – can bring greenery and wildlife into the heart of downtown cities. They also save energy by providing insulation, absorb air and noise pollution, protect buildings from harsh weather, absorb rain and decrease storm water runoff, and combat rising temperatures in urban areas

Popular throughout Europe – there are roughly 1,300 hectares of rooftop greenery in Germany alone – and catching on in North America and Asia, green roofs range in size and function. They are as diverse as the birds, animals, insects and humans they attract.

Ten years ago, three young Canadians – Jonathan Woods, Tracey Loverock and Lauren Baker – founded Annex Organics and decided to farm the roof of a Toronto warehouse. Their first crop yielded 230 kilograms of organic tomatoes, which they sold to local restaurants and shops. They have since expanded into alfalfa, lentils, peppers, aubergines and cape gooseberries. Hoping to increase local food production, the city partially funded the venture and has invested in research into similar projects.

Pedestrians in downtown Tokyo can glimpse cherry blossoms atop the crane maker Komatsu's 10-storey office building. For almost 40 years the company's 1,300 square metre garden has provided a pleasant respite to workers who spend their breaks among 1,000 different varieties of flowers and plants. In 2001, the city mandated that all roofs over 1,000 square metres on new buildings be partially covered in vegetation. To date 16.3 hectares of green area have been created, a similar size to the city's Hibiya Park.

photo: <http://www.habitat.net/green-roofs/photos.html>



7 Seven city



photo: Topfoto

1 Slap on the equator, Singapore - with 4 million people crowded onto just 647 square kilometres - has become a model city by encouraging home (rather than car) owners. Over 90 per cent of its people own their own homes - a world record - giving them a stake in the city. Only one in ten has a car, keeping air pollution down, with most people relying on excellent public transport. Waste is disposed of meticulously and the city has 2,340 hectares of parks, just under 3,000 hectares of nature reserves and 2,158 hectares of protected watershed, with perhaps the world's only urban tropical rainforest trapping and filtering rainfall to meet half Singapore's water needs.

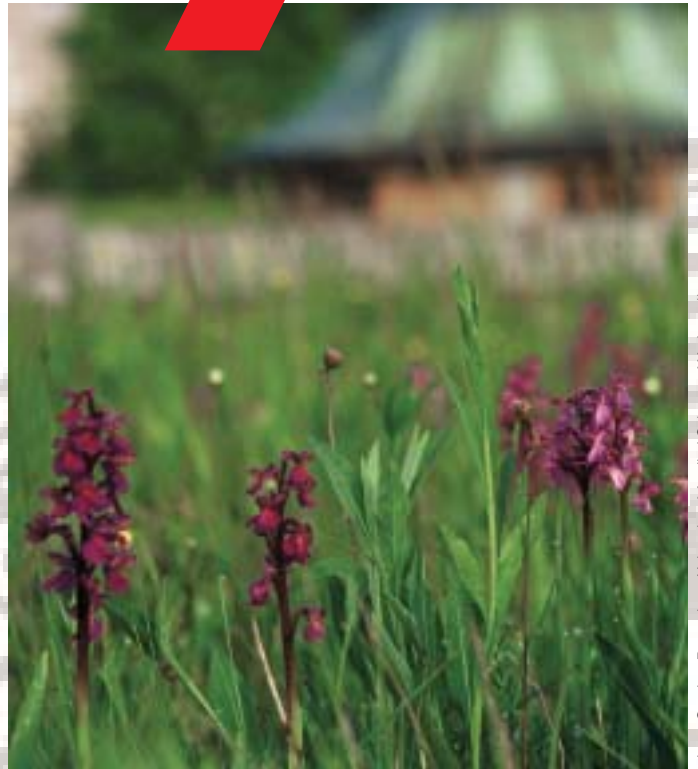


photo: Stephan Brenneisen, University of Applied Sciences, Wädenswil

3 Water filtration plants are generally pretty boring places - but not the Moos plant in Zurich, even though it was one of the first ferroconcrete buildings to be erected in the Swiss city. When it was put up in 1914, planners gave it a green roof of soil and gravel, to keep the water inside cool. But it is now one of the last remaining examples of the Swiss grasslands left to grow undisturbed, rich in flowers that were typical at the start of the 20th century. Over 175 species - including nine orchids - grow on its three hectares of roofs, and there are even proposals to classify them as a national park.

4 Right in the middle of North America's most famous city is one of its most important wildlife sites. Central Park, a vast green oasis amid Manhattan's concrete stalagmites, was purposely laid out in the mid 19th century - when New York had only half a million inhabitants - to allow the power of nature to lift citizens' spirits. And how! It is today one of the United States' best birdwatching sites, and was designated an Important Bird Area in 1998. In all, 275 bird species have been recorded there - 192 of them live there all the year round, or are regular visitors - and monarch butterflies stop off there on their long migration south to Mexico. ▶

photo: Sylvia Pollex/Still Pictures



photo: VIEW/Dennis Gilbert

2 Berlin's Reichstag, the seat of the German Parliament, is now a beacon of sustainability as well as of democracy. The historic building, more than a century old, was restored in the 1990s as a herald of the new millennium. It is heated and lit by vegetable oil, burned onsite - reducing carbon dioxide emissions by 94 per cent - and uses energy so sparingly that it acts as a power station for the new government quarter nearby. Its glass cupola - a new landmark for the city - reflects light into the chamber: during the day a moveable shield blocks glare from the sun, but at night it allows light to shine out like a beacon.

wonders



5 Damascus, continuously inhabited since before the time of Abraham, is the world's oldest city, and is still culturally one of its richest. Founded in the 3rd century BC, making it more than 4,000 years old, it has had a dramatic history. It witnessed St Paul's conversion and later escape by being lowered down its walls in a basket, and resisted several failed attempts to take it during the Crusades. It boasts 125 ancient monuments, and in 1979 was inscribed on the list of the planet's most precious places - the UN's World Heritage Sites.

photo: Topfoto



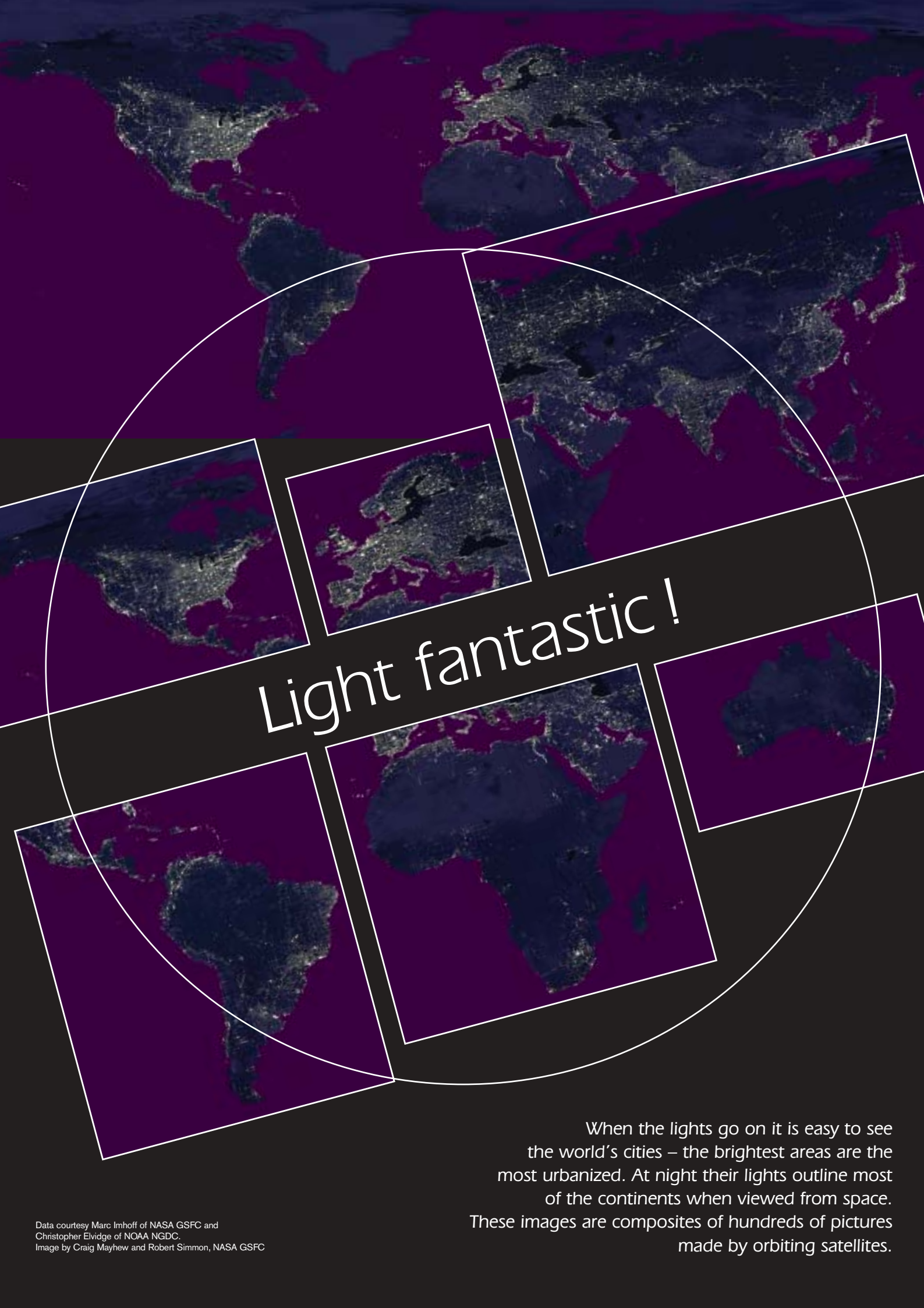
photo: Ecosan

6 Beijing is planning something else to show the world when people flock to the city for the Olympics. By 2006 an entire newly built suburb of the Chinese capital, called Yang Song, will be using a new waste treatment system. Ecosan can separate faeces, urine and wastewater from washing and recycles them all. The water can be reused, the faeces composted for fertilizer or used to produce biogas, and the urine can be tapped for its rich nutrient content: corn grown with urine fertilizer in the United States has grown 50 per cent bigger than normal. China hopes that visitors to the Olympics will spread this new answer to the sanitation crisis around the world.

7 Critics predicted pandemonium when London first introduced its hotly contested congestion fee in 2003 to control gridlock. Yet soon after the city began charging motorists £5 (\$8) to enter central zones on weekdays between 7 am and 6:30 pm, congestion decreased by almost one third and average journey times halved. (Hybrid cars like the Toyota Prius, described on page 9, are exempted). Air pollution is down by 12 per cent, and more than half of Londoners now support the charge. The city now plans to ban the most polluting coaches and lorries altogether, and has started to clean up emissions from its 20,000 famous black cabs.

photo: Mark Edwards/Still Pictures





Light fantastic!

When the lights go on it is easy to see the world's cities – the brightest areas are the most urbanized. At night their lights outline most of the continents when viewed from space. These images are composites of hundreds of pictures made by orbiting satellites.