An urban area is a geographical unit of land constituting a town or city. Urbanization is the process by which large numbers of people become permanently concentrated in relatively small areas to form towns or cities.

During the course of human history, urbanization has accelerated worldwide. Between 1975 and 2000, urban population increased from 1.5 billion people to over 2.8 billion, or about 45 per cent of the world’s population (UNEP 2002b). By 2020, it is estimated that 60 per cent of the world’s population will be urban (Anon 2003).

For many people, urban living represents a better lifestyle. On average, individuals living in urban areas have higher incomes and live healthier, easier lives than their rural counterparts. They have greater access to clean water and sanitation than those in rural areas. Concentrations of people also tend to strengthen infrastructures by consolidating transportation services, utilities, and roads.

It is also true that not all urban dwellers benefit from urban living. In 2001, 924 million people, or roughly 31.6 per cent of the global urban population, lived in slums (UN Habitat n.d.). A slum household is one in which a group of individuals living under the same roof lack one or more fundamental necessities, including access to clean water, access to sanitation, secure tenure, durability of housing, and sufficient living area (Warah 2003). In the next thirty years, as many as 2.0 billion people will be living in urban slums unless substantial policy changes are put in place.

Wherever people are concentrated in large numbers, as they are in urban areas, the risk of disease and other health concerns have the potential to become extremely urgent issues. Overcrowding fosters epidemics of tuberculosis, influenza, and many other communicable diseases (Myers and Kent 1995). Urban areas also tend to be polluted. According to some estimates, industrialized countries exhaust 3.146 kg (6.936 lbs) of fossil fuels and produce 200 kg (440 lbs) of air pollutants every year. Fossil fuel use adds both pollutants and greenhouse gases to the atmosphere, the latter of which contribute to global warming. Temperatures in heavily urbanized areas may be 0.6-1.3°C (1.1-2.3°F) warmer than
in rural areas. Higher temperatures, in turn, make cities incubators for smog (WRI 2000).

Urban populations are growing rapidly worldwide. As urban areas expand, they often encroach into agricultural lands. Urban expansion into agricultural areas in developing countries results in the conversion of nearly 500,000 hectares (1,235,526 acres) of arable land annually. However, urban and developed areas currently cover only about two to four per cent of the Earth’s land surface (Wiebe 2003). As a result, some researchers argue that land lost to urbanization will not threaten global food production in the foreseeable future (Rosegrant et al. 2001). Nevertheless, urban expansion frequently takes prime agricultural land out of production, making it increasingly necessary to use marginal lands for cropland and pastures.

Perhaps the greatest impact of urbanization is on the environment. Cities use some 75 per cent of the world’s resources and discharge similar amounts of waste, negatively impacting the health of local and global environments (Giradet 1995). By the end of the 1990s, people in developed countries produced from 300-800 kg (661-1,764 lbs) of waste per person per year (UN-HABITAT 2005). The growth of urban populations in most countries of the world has led to the creation of “super cities”—urban areas where the original core city has become part of an agglomeration that takes in neighboring towns, new suburbs, dormitory towns, or shanty settlements. Increasingly, super cities are becoming powerful economic, social, and cultural entities.

One positive aspect of urbanization is that urban dwellers tend to have fewer children and so help limit population growth. While badly run urban sectors can be serious problems for a country, a well-run urban sector can help ensure national prosperity. Well-planned cities can capitalize on high population densities to minimize resource use and energy consumption and CO₂ emissions—for example, by developing mass transit systems. Some cities are investing large sums in recycling and composting as part of ambitious waste-management programs. Many cities maintain large areas of productive agricultural land amid highways and high-rises (Harrison and Pearce 2001).
The Gambia is a small—11,295 km\(^2\) (4,361 square miles)—country in West Africa. It is surrounded by Senegal on all sides except on its coast. The capital city of Banjul lies at the end of a small peninsula that protrudes into the Atlantic Ocean.
The country’s population is increasing at a rate of about 4.2 per cent annually. For the past three decades, western Gambia has undergone considerable urban growth, particularly in Banjul and some of its neighboring cities, including Serekunda, Bakau, Sukuta, and Brikama. The population of the greater Banjul area, for example, more than tripled during this time. These two satellite images, taken in 1973 and 1999 respectively, show this urban sprawl and its impact. Urban growth and the accompanying expansion of cropland around urban areas have led to a significant decline in woodland areas (dark green). The Abuko Nature Reserve, located in the center of the images, was once surrounded by woodlands. It now stands out as an isolated patch of green in an otherwise developed landscape.
Beijing, the capital city of the People's Republic of China, is located in the country's northeastern corner, in the transition zone between the Inner Mongolia Plateau and the North China Plain. It is a city that has undergone tremendous change and explosive urban growth, since the start of economic reforms in 1979.
The left-hand satellite image shows Beijing in 1978, just prior to the reforms. The light blue-gray area in the center of the image is the urban landscape of the city. The hills to the west are covered with deciduous forest, which appears green. The agricultural lands that lie around the city appear as muted red, orange, and golden yellow, depending on the crop (rice, winter wheat, or vegetables) and its stage of development. Beijing’s explosive growth is very obvious in the 2000 image. The city has expanded from its original center in all directions. Prime agricultural lands that once lay outside the city are now suburbs dominated by institutional, industrial, and residential buildings. In 2000, Beijing’s population was 13 million.
Inaugurated on 21 April 1960, Brazil’s new capital of Brasilia began with a population of 140,000 and a master plan for carefully controlled growth and development that would limit the city to 500,000. Urban planner Lucio Costa and architect Oscar Niemeyer intended that every element—from the layout of the residential...
and administrative districts to the symmetry of the buildings themselves—should act in harmony with the city’s overall design. This consisted of a bird-shaped core with residential areas situated between the encircling “arms” of Lake Paranoá. The city was a landmark in town planning and was recognized as a World Heritage site in 1987.

As these images reveal, unplanned urban developments arose at Brasilia’s fringes resulting in a collection of urban “satellites” around the city. Several new reservoirs have been constructed since Brasilia’s birth, but the National Park of Brasilia stands out as a densely vegetated expanse of dark green that has remained relatively unchanged. In 1970, the population of Brasilia and its satellites was roughly 500,000. The population now exceeds 2,000,000.
India occupies only two per cent of the world’s total landmass. Yet it is home to 15 per cent of the world’s total population. Urban growth is characteristic of most Indian cities, with that of Delhi being especially dramatic, as these satellite images from 1977 and 1999 clearly show.
In 1975, Delhi had a population of 4.4 million people or 3.3 per cent of India's entire urban population. In 2000, the city had 12.4 million inhabitants, or more than 4.5 per cent of the country's urban population. Of the world’s 30 largest urban agglomerations, Delhi ranked 24th in 1975 and tenth in 2000. By 2015, Delhi's population is expected to be 20.9 million.

In these images, urban areas appear in shades of gray and purple. Growth is especially noticeable in the suburbs and areas surrounding Delhi such as Ghaziabad, Faridabad, and Gurgaon. Rapid urbanization has placed tremendous pressure on land and water resources in and around Delhi.
Dhaka, the capital of Bangladesh, has undergone phenomenal growth since the country gained independence in 1971. It has grown from a city of 2.5 million inhabitants to one with a population of more than ten million. This increase represents an average population growth.

Vegetable vendor in Dhaka
Credit: Jim Welch/UNEP/NREL
growth rate of about eight per cent annually. Dhaka is one of the poorest and most densely populated cities on the planet, with 6,545 people per square kilometer.

Following independence, urban areas expanded rapidly as they sought to become hubs of production and modernization. In the process, land use changed dramatically, as these images from 1977 and 2000 reveal. Dhaka is visible in the central portion of each image along the Turag River. Green areas represent forests and agricultural lands. White spots are planned areas of infrastructure. Urban areas are light purple. The 2000 image shows how, over time, lowlands and agricultural lands have been converted to urban areas where Dhaka has expanded to the north.
Las Vegas is the fastest growing metropolitan area in the United States. Its growth was fairly slow during the first half of the 20th century, but as the gaming and tourism industry blossomed the population increased more rapidly. In 1950, Las Vegas was home to 24,624 people. Today, the population of the Las Vegas Valley...
tops one million, not including the tourists. According to one estimate, it may double by 2015. This population growth has put a strain on water supplies. Satellite imagery of Las Vegas provides a dramatic illustration of the spatial patterns and rates of change resulting from the city’s urban sprawl. Las Vegas is shown in the central portion of these images from 1973 and 2000. Note the profound modifications to the landscape—specifically the proliferation of asphalt and concrete roads and other infrastructure, along with the displacement of the few vegetated lands. By 2000, Las Vegas’ growth had sprawled in every direction, with the greatest expansion to the northwest and southeast. As the city expanded, several new transportation networks emerged to serve the city’s inhabitants.
Mexico City is one of the fastest growing megalopolis cities in the world. These satellite images show the transformation Mexico City underwent between 1973 and 2000. Areas of urban infrastructure appear as

The red fill shows the historical urban boundaries of Mexico City.

Mexico City is one of the fastest growing megalopolis cities in the world. These satellite images show the transformation Mexico City underwent between 1973 and 2000. Areas of urban infrastructure appear as
shades of purple while natural vegetation is shown in green. In 1973 Mexico City had a population of about 9 million. In the ensuing years, the city expanded into surrounding areas. The forests in the mountains west and south of the city suffered significant deforestation as the urban sprawl progressed.

By 1986, Mexico City's population had soared to 14 million. In 1999, Mexico City had a population of 17.9 million, making it the second largest metropolitan area in the world behind Tokyo, Japan. The Mexican megalopolis is expected to reach 20 million in the next few years.
Midrand is located approximately halfway between the major urban centers of Johannesburg and Pretoria in South Africa. The major highway that connects these two large cities dissects the city of Midrand into east...
and west halves. Since 1978, the city has been rapidly transformed as a result of population growth, agriculture, mining, and industry.

In the 1978 image, the area surrounding Midrand consists largely of agricultural lands and rural residential zones, with some evidence of commercial development. The 2002 image reveals high-density urban development throughout. Rapid growth of Midrand’s economy is expected to continue. Current development trends and population growth rates indicate that if effective environmental management strategies are not adopted soon, significant deterioration in the quality of the environment can be expected.

Downtown Johannesburg
Credit: Stephan Volz/UNEP/Africa Focus
Moskva—Russia’s capital city and its political and economic heart—sits on the far eastern end of Europe, roughly 1,300 km (815 miles) west of the Ural Mountains and the Asian continent. The Moskva (Moscow) River winds through the city, and the Kremlin, the seat
of the Russian government, lies at its center. With a population close to 9 million and an area of 1,035 km² (405 square miles), Moskva is believed to be the largest of all European cities.

These two images show the urban expansion Moskva experienced during the last 25 years of the 20th century. The blue-gray patches are urban areas. The light green areas surrounding the city are farms while the brown areas are regions of sparse vegetation.
France is a large country with relatively few large metropolitan areas. Only 16 French towns and cities have populations of more than 150,000 people. Paris, the capital city of France, is the largest of these and home...
to roughly 2 million inhabitants. The entire Paris metropolitan area, however, includes more than 11 million people.

Lying roughly 160 km (100 miles) southeast of the English Channel in northern France, Paris is considered by many to be one of the most beautiful cities in the world. In the images above, the Seine River can be seen winding its way through the heart of the city. Urban areas appear gray and purple. The patchwork of green, brown, tan and yellow around the city is primarily farmland. Note how the city has expanded in the years between 1987 and 2001, reaching ever-further into the surrounding rural areas.
Santiago, the capital of Chile, is home to more than one-third of the country’s total population of 15 million. Santiago’s rapid growth is part of a national trend, but it is also a reflection of the large numbers of immigrants who are moving into the city.
Santiago’s population growth has led to a horizontal expansion of the city, principally towards the south and southeast. Chilean urban scholars speak of this expansion as the “urban stain” that continually exceeds and expands the limits of the Metropolitan Region of Santiago (MRS) while incorporating previously rural areas into it. Characteristics of Santiago’s urban sprawl are haphazard growth, low-density housing, poor transportation, and air pollution. In the time frame illustrated by these images, Santiago’s population has nearly doubled.
Australia is the sixth largest country in the world. It is roughly the same size as the conterminous United States and 50 per cent larger than Europe. Yet Australia has the lowest population density of any country in the world. With 4 million inhabitants, Sydney is

Sydney Opera House is one of the architectural wonders of the world, with its design and construction involving countless innovative design ideas and construction techniques.

Credit: DTCreations/UNEP/Morguefile

Urban Areas
Sydney, Australia
Australia's largest city. It is also the capital of New South Wales, the country's most densely populated state. Sydney is bounded by the Pacific Ocean to the east, national parks and deep-water inlets to the north and south, and the spectacular Blue Mountains far to the west. These natural boundaries have influenced Sydney's urban growth patterns. Over the past several decades, the city's expansion has been largely westward toward the Blue Mountains, as can be seen in these two satellite images. As suburbs sprawl into bushland, they become vulnerable to summer bush fires.
Tripoli, the capital city of Libya, is located on the country’s Mediterranean coast along a narrow band of fertile lowlands that quickly give way to a vast interior of arid, rocky plains and seas of sand. Tripoli has undergone steady urban growth over the past thirty years.

In this image from 1989, urban areas have replaced agricultural zones along the coast. The results of center pivot irrigation can be seen in the center of the image, where dark green areas show progress from a project called the “Great Man-Made River,” which delivers water from underground aquifers in central and southern Libya to the coastal regions.
These three satellite images, from 1976, 1989, and 2002, document some of the major changes.

Urban areas appear as shades of grey. Darker patches south of the city, visible in both the 1976 and 1989 images, represent grasslands that have been converted to agricultural fields. Bright green areas are planted croplands. In the 2002 image, urban expansion is especially notable. The irregular brown patch in the upper far right of this image, south of Al Hamidiyan, is perhaps the last remaining vestige of natural vegetation in the Tripoli region.