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ENVR S320 Environmental Impact Assessment (Free Courseware)



香港公開大學
THE OPEN UNIVERSITY
OF HONG KONG



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Chapter 1 Environmental issues and sustainable development

1.1 About this module



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Welcome to this free courseware module 'Environmental issues and sustainable development'!

This module is taken from the OUHK course [ENVR S320 Environmental Impact Assessment](http://www.ouhk.edu.hk/wcsprd/Satellite?pagename=OUHK/tcGenericPage2010&c=C_ETPU&cid=191154032000&lang=eng) (http://www.ouhk.edu.hk/wcsprd/Satellite?pagename=OUHK/tcGenericPage2010&c=C_ETPU&cid=191154032000&lang=eng), a ten-credit and the final of the higher level courses that comprise the Environmental Studies stream within the Bachelor of Science or Bachelor of Science (Honours) degree offered by the [School of Science and Technology](http://www.ouhk.edu.hk/wcsprd/Satellite?pagename=OUHK/tcSubWeb&l=C_ST&lid=191133000200&lang=eng) (http://www.ouhk.edu.hk/wcsprd/Satellite?pagename=OUHK/tcSubWeb&l=C_ST&lid=191133000200&lang=eng) of the OUHK. This course is designed to help you develop your understanding of the process and components of EIA in both theory and practice, and in the context of Hong Kong.

ENVR S320 is mainly presented in printed format and comprises ten study units. Each unit contains study content, activities, self-tests, assigned readings, etc for students' self-learning. **This module (The materials for this module, taken from the print-based course ENVR S320, have been specially adapted to make them more suitable for studying online. In addition to this topic on 'Environmental issues and sustainable development', which is an extract from Unit 1 of the course, the original Unit 1 also includes the topics 'Definition and salient objectives of EIAs', 'Origins and historical development of EIA' and 'Strategic and regional environmental assessment'.) retains most of these elements, so you can have a taste of what an OUHK course is like.**

Please note that no credits can be earned on completion of this module. If you would like to pursue it further, you are welcome to enrol in [ENVR S320 Environmental Impact Assessment](http://www.ouhk.edu.hk/wcsprd/Satellite?pagename=OUHK/tcGenericPage2010&c=C_ETPU&cid=191154032000&lang=eng) (http://www.ouhk.edu.hk/wcsprd/Satellite?pagename=OUHK/tcGenericPage2010&c=C_ETPU&cid=191154032000&lang=eng).

This module will take you about eight hours to complete, including the time for completing the activities and self-tests (but not including the time for assigned readings).

Good luck, and enjoy your study!

1.2 Introduction



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Environmental impact assessment (EIA) is a widely used tool for assessing the environmental implications of projects, policies and plans. It is also an integral part of the decision-making processes involving environmental issues. With the growing importance of environmental protection and an awareness of pursuing sustainable development, applying EIA techniques has become more important and compelling.

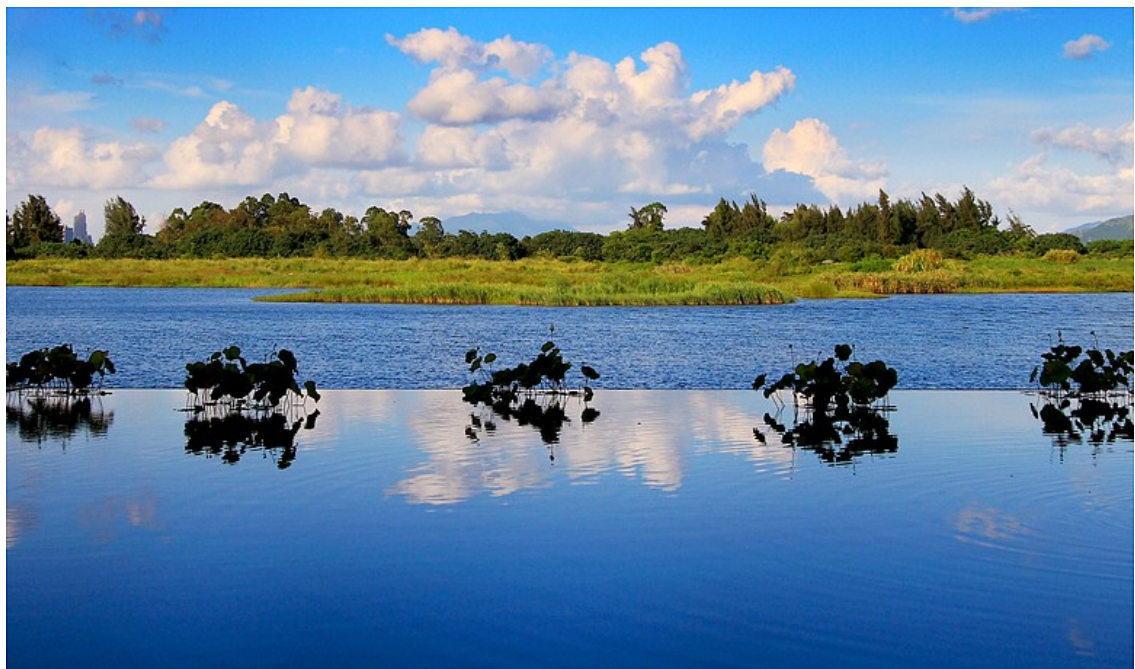
We will start this free courseware module by introducing some of the current environmental issues facing Hong Kong, China and the world as a whole. Following on from this, we will introduce the concept of sustainable development. These background issues illustrate why environmental impact assessments are necessary in the first place, and what role they play in sustainable development.

1.3 Environmental issues in Hong Kong, China and around the world



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To set the scene for why environmental impact assessment exists, we need a basic understanding of some of the major environmental issues facing us both globally and at a local level. We will start with a global perspective as we look at climate change, the loss of habitat/biodiversity, and the depletion of resources. We will then come closer to home as we examine the issues facing China, in particular the rapid increase in urbanization. Finally in this section, we will take a closer look at issues specific to Hong Kong, such as its dense population which creates the need for sensible land use planning.



1.3.1 Global environmental issues



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You have probably read or heard about climate change in the newspapers or on television, perhaps in reference to the meetings in Copenhagen in late 2009, etc. Climate change is the consequence of our neglect of and damage to the environment since the [industrial revolution](http://en.wikipedia.org/wiki/Industrial_Revolution) (http://en.wikipedia.org/wiki/Industrial_Revolution) and our relentless and increasing appetite for [fossil-fuel based energy](http://en.wikipedia.org/wiki/Fossil_fuel) (http://en.wikipedia.org/wiki/Fossil_fuel). It is an imminent global environmental issue that not only affects us now, but will likely continue to affect us throughout the 21st century. Climate change is caused by [global warming](http://wwf.panda.org/about_our_earth/aboutcc/) (http://wwf.panda.org/about_our_earth/aboutcc/), which is caused by the emission of [greenhouse gases](http://wwf.panda.org/about_our_earth/teacher_resources/project_ideas/greenhouse_effect/) (http://wwf.panda.org/about_our_earth/teacher_resources/project_ideas/greenhouse_effect/). We will discuss climate change as an emerging environmental crisis later in Unit 10 so we won't go into detail on this issue here.

In this section, we focus on two critical issues: [habitat/biodiversity loss](http://wwf.panda.org/about_our_earth/species/problems/habitat_loss_degradation/) (http://wwf.panda.org/about_our_earth/species/problems/habitat_loss_degradation/) and depletion/over-exploitation of resources. These are caused directly by human activities such as the [clearance of rain forests](http://www.savetherainforest.org/savetherainforest_006.htm) (http://www.savetherainforest.org/savetherainforest_006.htm) for land and timber, and [over-extraction of ground water for potable use](http://wwf.panda.org/about_our_earth/about_freshwater/freshwater_problems/river_decline/10_rivers_risk/ganges/ganges_threats/) (http://wwf.panda.org/about_our_earth/about_freshwater/freshwater_problems/river_decline/10_rivers_risk/ganges/ganges_threats/); as well as indirectly as a result of pollution from human activities, such as air pollution resulting from acid rain causing deforestation and discharge of chemicals into the ocean destroying coral habitats.

Do you know the driver behind these critical issues? The driver is the exponential world population growth. Let's examine the chart shown below.

United Nation's forecast on world population growth

United Nation's forecast on world population growth

Click this link to watch the video:

<http://www.opentextbooks.org.hk/system/files/resource/10/10004/10009/media/Flash%201.1%20United%20Nations%20forecast%20on%20world%20population%20growth.mp4>

Figure 1.1 shows the United Nation's forecast on world population growth. You can see from Figure 1.1 that the world population reached its first billion around 1815. The first billion population increase took 112 years, reaching 2 billion in 1927. Yet it only took 33 years, in 1960 to reach 3 billion; 14 years, in 1974, to reach 4 billion; 13 years, in 1987, to reach 5 billion; and 12 years, in 1999, to reach 6 billion. The world population at the end of 2008 was about 6.6 billion, and it is forecast to reach 9.2 billion in 2050, a 40% increase in about 40 years.

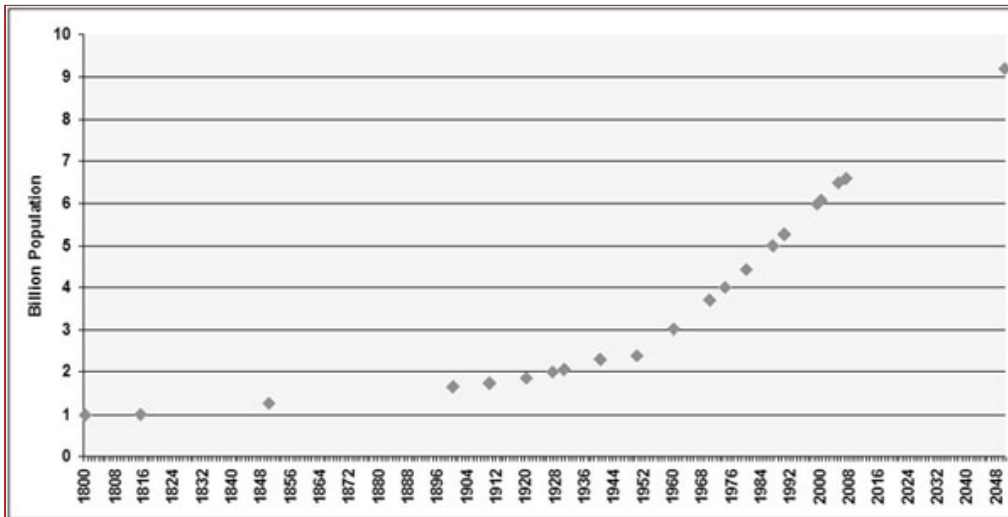


Fig. 1.1: World population

You may ask: what does population growth have to do with our environment? Please see the answer here.

What does population growth have to do with our environment?

To answer your question: such population growth creates land use conflicts in the need to feed and house substantially more people. How many people can our earth support? Are we over-exploiting our resources? A recent concept is the 'Ecological Footprint' pioneered by Rees and Wackernagel in 1996, which measures a population's demand in nature in a single metric: area of global biocapacity. It represents human demand on nature. If our global ecological footprint is greater than the global biocapacity, we are using up more than what is affordable. In other words, we are over-drafting our bank account, and we are borrowing against the future, leaving nothing for future generations.

The WWF's Living Planet Report 2008 (http://assets.panda.org/downloads/living_planet_report_2008.pdf) gives a global ecological footprint in 2005 of **17.5 billion global hectares (gha)**, or **2.7 gha per person** (a global hectare is a hectare with world-average ability to produce resources and absorb waste). On the supply side, the total productive area, or biocapacity, was 13.6 billion gha, or 2.1 gha per person. That means that we had already over-exploited mother nature by 0.7 gha per person in 2005. If we continue at such a pace with a business-as-usual-attitude, we will need two planets by 2030 to meet our needs.

The following figure shows the cause and effect relationships among **biodiversity loss** (http://wwf.panda.org/about_our_earth/species/problems/habitat_loss_degradation/), human pressure and **ecological footprint** (http://www.footprintnetwork.org/en/index.php/GFN/page/footprint_basics_overview/).

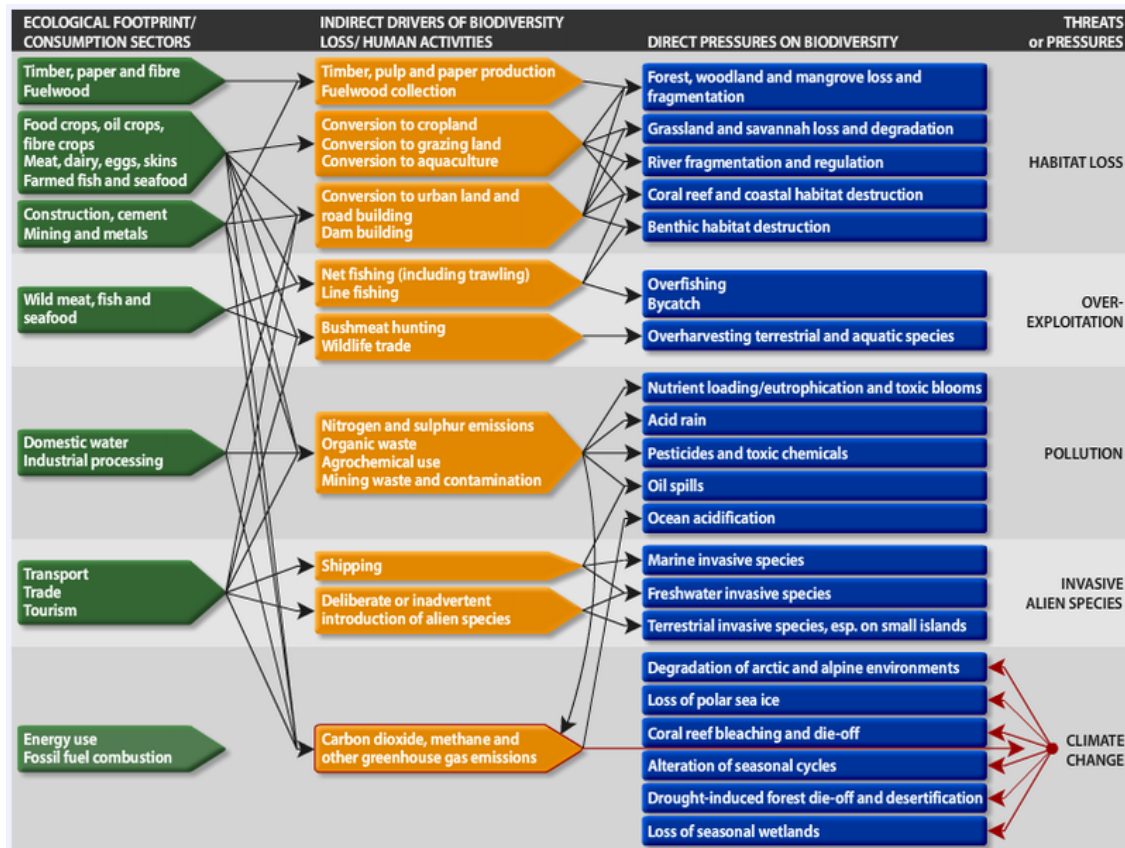


Fig. 1.2: Cause and effect relationships of biodiversity loss, human pressure and ecological footprint

Reading 1.1

WWF (2008) Living Planet Report 2008: http://assets.panda.org/downloads/living_planet_report_2008.pdf (http://assets.panda.org/downloads/living_planet_report_2008.pdf)

- Pages 2–5: Introduction

In short, the ecological footprint concept is about human's demand on the planet's resources.

- Pages 14–15: Ecological footprint of nations

Based on some assumptions, it is possible to compare such footprints for developed and developing nations.

After reading the above, you should have an understanding of the concept of the ecological footprint and the critical issues of habitat/biodiversity loss; depletion/over-exploitation of resources, particularly water; and environmental degradation due to pollution. You will have a better idea of how different countries perform in terms of their ecological footprint compared to their biocapacity. Table 1 in the [WWF report](http://assets.panda.org/downloads/living_planet_report_2008.pdf) (http://assets.panda.org/downloads/living_planet_report_2008.pdf) (pages 32–39) lists the ecological footprint and the biocapacity per capita of nations in 2005. In the Asia-Pacific, Australia had the highest ecological footprint per capita: 7.8 gha. Yet due to its vast land area and low population, Australia had relatively high biocapacity per capita:

15.4 gha. Japan on the other hand, a small densely populated developed country, showed an ecological footprint per capita of 4.9 gha and a low biocapacity of 0.6 gha. China, a large developing country with large population, had an ecological footprint of 2.1 gha per capita in 2005 yet a biocapacity of only 0.9 gha per capita.

WWF Hong Kong (<http://www.wwf.org.hk/en/whatwedo/footprint/>) also produced a report on Hong Kong's ecological footprint. You are assigned to read selections of the report to give you a better understanding of China and Hong Kong's ecological footprint and biocapacity, some suggestions on how Hong Kong needs to reduce its ecological footprint, and some frequently asked questions and technical notes on ecological footprint.

Reading 1.2

WWF Hong Kong (2008) *Hong Kong Ecological Footprint Report 2008: Living Beyond Our Means*, 'China's ecological footprint and biocapacity' and 'Hong Kong's ecological footprint and biocapacity', pp. 7–9; and 'Hong Kong: Transformation to sustainability', pp. 14–15:

http://www.footprintnetwork.org/images/uploads/Ecological_Footprint_HongKong.pdf (http://www.footprintnetwork.org/images/uploads/Ecological_Footprint_HongKong.pdf)

The report shows that even though Hong Kong has compact housing and an extensive public transportation system, its ecological footprint per person has doubled since 1965. The government has moved towards sustainability through closer collaboration across the [Pearl River Delta](http://en.wikipedia.org/wiki/Pearl_River_Delta) (http://en.wikipedia.org/wiki/Pearl_River_Delta), optimization of fuel mix for power generation and development of wider use of [renewable energy](http://wwf.panda.org/who_we_are/404error.cfm) (http://wwf.panda.org/who_we_are/404error.cfm).

Hong Kong had an ecological footprint of 4.4 gha per capita but a biocapacity of only 0.017 gha in 2008; an over consumption of more than 250 times, indicating Hong Kong's lack of natural resources and reliance on imports to sustain the population.

Having read extracts from the above reports, try [Activity 1.1 \(Page 8\)](#).

If you are interested in finding out more about the Ecological Footprint and biocapacity, you are encouraged to explore:

Reading 1.3

Global Footprint Network (2009) 'Ecological Footprint atlas 2009' and 'Global Footprint network 2009 annual report: How we can bend the curve':

<http://www.footprintnetwork.org> (<http://www.footprintnetwork.org/>)

1.3.1.1 Activity 1.1



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1. WWF's Living Planet Report 2008 says the 'ecological footprint' is about human's demand on nature. Why do we need to know the human's demand on our earth?
2. Look at [Figure 1.2](#). In your own words, write down the cause-effect relationship between Construction & Habitat Loss and Energy Use & Climate Change.
3. What are some possible limitations of ecological footprinting?

1.3.1.1.1 Feedback to Activity 1.1



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One reason for finding out more about human demands on nature is that if we continue with business as usual, we may not have adequate resources to feed all of our needs by the 2030s.

Construction leads to timber production, forest loss and finally habitat loss. Energy-use leads to greenhouse gas emissions, loss of wetlands and finally climate change.

Some of the possible limitations you may have thought of regarding the ecological footprint are that this concept involves many assumptions including future human demands, advancement and efficiency of technologies, estimations of natural resources reserve, etc. These variables could change over time or political conditions.

1.3.2 Environmental issues in China



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Economic development in China over the last couple of decades has created environmental problems, particularly air quality, water quality and waste. China publishes annual reports on the state of its environment. The latest one ([Ministry of Environmental Protection of the People's Republic of China](http://english.mep.gov.cn/) (<http://english.mep.gov.cn/>), 2009) describes the status of the environment in China in 2008 and the measures and actions that the country undertook to combat pollution. In general, surface water across China was still heavily polluted; while urban air quality and acoustic quality was good and acid rain distribution areas remained stable in 2008. Surface water quality standards in China are divided into 5 grades, Grade I being the best and Grade V being the worst water quality. Air quality standards in China are divided into 3 grades. Grade I being the best and Grade III being the worst.

Reading 1.4

Ministry of Environmental Protection of the People's Republic of China (2009) *Report on the State of the Environment in China 2008*, pp. 3–15 and 21–28:

<http://english.mep.gov.cn/download/Documents/201002/P020100225377359212834.pdf> (<http://english.mep.gov.cn/download/Documents/201002/P020100225377359212834.pdf>)

- Pages 21–24: Atmospheric environment

The amount of acid rain is a measure of air pollution. In 2008, acid rain was concentrated in the region south to Yangtze River and east to Sichuan and Yunnan, most of Hunan and Chongqing as well as the Yangtze River delta and the Pearl River delta.

- Pages 25–26: Acoustic environment

New noise standards such as Environmental Quality Standard for Noise, Emission Standard for Industrial Enterprises Noise at Boundary and Emission Standard for Community Noise went into effect as of 1 Oct 2008.

- Pages 27–28: Solid waste

The amount of hazardous waste reached over 13 million tons and about 8 million tons were comprehensively utilized, 2 million tons stored and 4 million tons disposed of.

Upon reading these pages, you should have a better understanding of China's water, atmospheric and acoustic environment as well as its solid waste status in 2008.

One issue that will put tremendous pressure on environmental quality from now till the mid-21st century in China is urbanization. Please see the following animation about [urbanization in China](http://www.un.org/apps/news/story.asp?NewsID=34202&Cr=urban&Cr1#.VBksPajafDY) (<http://www.un.org/apps/news/story.asp?NewsID=34202&Cr=urban&Cr1#.VBksPajafDY>).

Urbanization in China

Urbanization in China

Click this link to watch the video:

http://www.opentextbooks.org.hk/system/files/resource/10/10004/10012/media/Flash%201.3_Urbanization%20in%20China.mp4

According to the *Report on the Development of Chinese Cities 2008* issued by the China Mayors Association, 666.7 million Chinese lived in 655 cities in 2008, representing 45.68% urbanization. Figure 1.3 shows the United Nation's data on population growth in China, and the percentage of urban population. You can see that by the year 2015, 50% of the Chinese population are expected to reside in cities. By 2045, urbanization may reach 70% with the urban population reaching 1 billion.

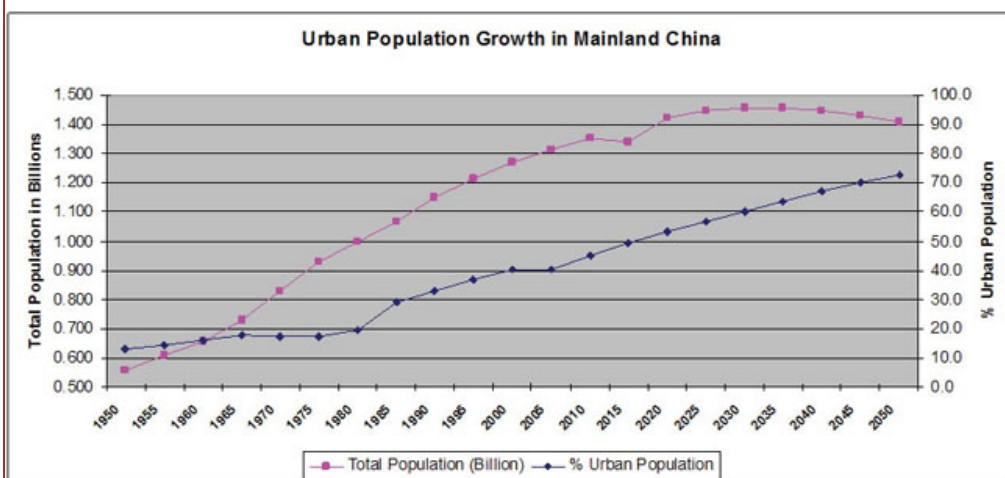


Fig. 1.3: Urban population growth in mainland China Source: United Nations 2008

Do you know the problems that are caused by **urbanization** (<http://en.wikipedia.org/wiki/Urbanization>), and **how they affect the environment** (http://english.peopledaily.com.cn/200405/19/eng20040519_143708.html)? With more and more people migrating from the countryside to cities to look for employment and to improve their quality of living, the cities are under tremendous pressure to create jobs and housing for these people. Most cities are lagging behind in providing the needed environmental infrastructure to accommodate these migrants, resulting in inadequate storm water drainage, waste water treatment and solid waste treatment facilities. If you are interested in finding out the impact of urbanization in China, we suggest you read the McKinsey Report (McKinsey Global Institute 2009). It tells you about China's infrastructure needs in the coming decades to accommodate the rapidly growing urban population and its developing needs (highways, mass transit systems and houses). Such infrastructure development comes with an increasing demand on our resources and increasing pollution problems.

Reading 1.5

McKinsey Global Institute (2009) *Preparing for China's Urban Billion*, McKinsey & Company:

http://www.mckinsey.com/mgi/publications/china_urban_billion (http://www.mckinsey.com/mgi/publications/china_urban_billion)

Pages 413–32 of the report address the implications of China's urbanization on its energy demand.

The McKinsey report you read above documents the predicted energy demands in China. According to the report, energy demand will more than double by 2025, coal shall remain the dominant fuel source, the demand for oil shall grow, and the renewable energy capacity will be ramped up.

1.3.3 Environmental issues in Hong Kong



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Having studied some of China's environmental issues, we now turn to the issues facing Hong Kong.

Hong Kong, a small coastal city (in area) in the **Pearl River Delta** (http://en.wikipedia.org/wiki/Pearl_River_Delta), shares similar environmental problems as other metropolises arising from dense population and land use conflicts. Less than 15% of the approximately 1,000 km² of land area in Hong Kong is inhabitable. To create more land to accommodate Hong Kong's population, Hong Kong has been **reclaiming**

coastal areas since the early part of the 20th century (<http://hkss.cedd.gov.hk/hkss/eng/education/gs/eng/hkg/chapter9.htm?tab=2>). Excessive reclamation has become a political, social and environmental issue. Our famous [Victoria Harbour has become narrower and narrower](http://www.friendsoftheharbour.org/main.php?lang=chi) (<http://www.friendsoftheharbour.org/main.php?lang=chi>) due to years of reclamation off both shores. As a result, the ability of the water body flowing through Victoria Harbour to assimilate pollutants is reduced, and the current speed is increased with resultant impacts upon the local ecology and the ability of the water way to accommodate natural biological life which is able to break down water borne pollutants.



These have caused deterioration in the water quality of Victoria Harbour and the transport of pollutants to farther sensitive receivers. A non-government organization (NGO), the [Society for Protection of the Harbour](http://www.harbourprotection.org/en/) (<http://www.harbourprotection.org/en/>), was formed in 1995 with the objective to protect Victoria Harbour from destruction caused by the government's excessive reclamation and improper development. In 1996, the Society proposed [the Harbour Protection Ordinance](http://www.harbourprotection.org/en/) (<http://www.harbourprotection.org/en/>), which aimed at limiting land reclamation in Victoria Harbour, and presented it to the Legislative Council. [The Ordinance, Cap. 531](http://www.legislation.gov.hk/blis_pdf.nsf/6799165D2FEE3FA94825755E0033E532/A6F680241E02ADBD482575EF00152C69?OpenDocument&bt=0) (http://www.legislation.gov.hk/blis_pdf.nsf/6799165D2FEE3FA94825755E0033E532/A6F680241E02ADBD482575EF00152C69?OpenDocument&bt=0), was passed in 1997 and then amended in 1999 making it applicable to the entire area of Victoria Harbour. As a result of the judicial review applied by the Society in 2003 on the third phase of the Central reclamation project, the High Court in 2003 laid down three tests to justify or dejustify reclamation projects in Victoria Harbour under planning. These three tests are:

- compelling, over-riding and present need;
- no viable alternative; and
- minimum impairment.

Due to Hong Kong's dense population and limited inhabitable areas, land uses in Hong Kong often lead to conflicts with the environment, particularly the conservation of the surviving natural habitat. One well known incident was the [Lok Ma Chau Spurline project](http://en.wikipedia.org/wiki/Lok_Ma_Chau_Spur_Line) (http://en.wikipedia.org/wiki/Lok_Ma_Chau_Spur_Line), with the MTR proposing an alignment of the rail line passing through [Long Valley](http://en.wikipedia.org/wiki/Long_Valley,_Hong_Kong) (http://en.wikipedia.org/wiki/Long_Valley,_Hong_Kong), a freshwater wetland supporting rich avifauna. A judicial review of the EIA for the project resulted in the MTR putting the rail

line in a tunnel through Long Valley, thus conserving the freshwater wetland. We will study this case in more detail in a later unit. Another more recent case is the extension of the SENT landfill in Tseung Kwan O (http://www.epd.gov.hk/epd/english/environmentinhk/waste/prob_solutions/msw_sent.html). Objections have been raised by green groups because the extension would intrude into a country park, and also by nearby residents for environmental reasons.



Some people call Hong Kong a concrete jungle due to the high density of high rise buildings. Densely populated high rise buildings create efficiency particularly in public transport. However, such land use also creates environmental problems. These buildings, if not properly planned and laid out, could form barriers to air ventilation resulting in a heat island effect, increasing the air temperature in urban areas, as well as trapping roadside air pollutants emitted by road traffic. Air pollution from transport is a major environmental concern in Hong Kong. If you want to learn more about this, we suggest that you read the Civic Exchange's two publications on 'The air we breathe.'

Reading 1.6

Civic Exchange (2009a) *The Air We Breathe 2: Dialogue on Road Transportation*, Expert Symposium Summary Report:

<http://www.civic-exchange.org/en/live/upload/files/091127report.pdf> (<http://www.civic-exchange.org/en/live/upload/files/091127report.pdf>)

Reading 1.7

Civic Exchange (2009b) *The Air We Breathe 2: Dialogue on Road Transportation*, Public Conference Summary Report:

<http://www.civic-exchange.org/en/live/upload/files/091128report.pdf> (<http://www.civic-exchange.org/en/live/upload/files/091128report.pdf>)

These two documents provide you useful information on Hong Kong's status of air pollution, particularly at road side from traffic on Hong Kong's busy streets, the kinds

of air pollutants and their health effects. Densely populated high rises also expose comparatively more people to traffic noise, which is another major environmental concern in Hong Kong. When you are travelling on Hong Kong's roads and highways, you will notice extensive noise barriers of different sizes and shapes to protect residents in nearby flats against traffic noise. In fact, Hong Kong is likely to be the one city on earth with the most extensive noise barriers.

Hong Kong has been building infrastructure to treat and dispose of its liquid and solid wastes. The Stonecutters Island Sewage Treatment Plant (http://www.dsd.gov.hk/EN/Files/publications_publicity/publicity_materials/leaflets_booklets_factsheets/STW%20APP%20Form.pdf) is among the largest in the world and is being upgraded to treat more than 2.5 million m³ of sewage per day from urban Kowloon and Hong Kong and reduce the incidents of pathogens deposited on the neighboring shoreline. Since Hong Kong is a coastal city, there have been arguments on whether to adopt cheaper low level of sewage treatment for disposal to the ocean to make use of the dispersive and assimilative capacity of the sea, or to adopt more expensive high level treatment after which the treated effluent would be discharged to the sea anyway. Due to limited land space for landfills, Hong Kong's strategy on reducing solid waste is to incinerate. This is a controversial issue that has been debated for quite some time. You are welcome to form your own views on how we should treat our liquid and solid wastes: low level vs high level sewage treatment, and landfilling vs [incineration](http://www.epd.gov.hk/epd/english/environmentinhk/waste/prob_solutions/WFdev_IWMF.html) (http://www.epd.gov.hk/epd/english/environmentinhk/waste/prob_solutions/WFdev_IWMF.html).

Hong Kong is small and is affected by the environmental conditions in its hinterland in the [Pearl River Delta](http://en.wikipedia.org/wiki/Pearl_River_Delta) (http://en.wikipedia.org/wiki/Pearl_River_Delta) (PRD). Industrialization, population growth and economic development in the Pearl River Delta have resulted in environmental deterioration, particularly to air quality and water quality, that have been affecting Hong Kong. Such regional and trans-boundary influence cannot be ignored and is difficult to mitigate, needing cooperation among different municipalities in the PRD. Later in this unit, you will be introduced to EIAs that address regional and trans-boundary environmental issues.

Upon reading the above sections let's try a [Self-test 1.1 \(Page 15\)](#) to see if you can grasp the concepts above. Do not forget to check the [Feedback to Self-test 1.1 \(Page 15\)](#).

Reading 1.8 will help you understand the issues related to air quality, noise, waste, water quality and nature conservation in Hong Kong and what the EPD has done to protect Hong Kong's environment. Please read Reading 1.8 before you proceed.

Reading 1.8

Environmental Protection Department (2009) 'Chapter 9: Water' and 'Chapter 10: Nature conservation', in *Environment Hong Kong 2009*, HKSAR Government, pp. 60–70:

<http://www.epd.gov.hk/epd/misc/ehk09/en/index.html>

- Chapter 9 (pp. 60–64): Water

Some highlights in 2008 include an agreement reached with Shenzhen to clean up contaminated sediment in the Shenzhen River and beginning construction on the Disinfection Facilities for the Harbour Area Treatment Scheme.

- Chapter 10 (pp. 65–70): Nature conservation

In 2008, the 24th country park was opened and the government planned to set up Hong Kong's first geopark.

After finished the reading above, please complete the [Activity 1.2 \(Page 16\)](#) and [Self-test 1.2 \(Page 16\)](#). Do not forget to check the answers before you moved on.

Yes there are environmental problems. What about solutions? In general, most developed countries consider sustainable development to be the way forward. We will discuss this concept in the next section.

1.3.3.1 Self-test 1.1



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After reading the above, now you are aware that each human being induces some impacts for our mother earth.

1. Identify sources of environmental impacts.
2. Which government department is mainly responsible for regulating these impacts?
3. How does this department monitor and control such impacts?

1.3.3.1.1 Feedback to Self-test 1.1



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1. In theory, sources of impacts can come from your daily activities including clothing you wear, food you consume, apartment you live in, transport you take, etc.
2. The Environmental Protection Department (EPD) is mainly responsible for controlling environmental impacts but other departments such as Leisure &

Cultural Services Department and Civil Engineering & Development Department are also involved.

3. One way to monitor impacts is to set up monitoring stations. EPD has air and water monitoring stations to monitor air and water qualities. Legislation is a way to control the magnitude of impacts. Much environmental related legislation was established during the last 30 years in Hong Kong.

1.3.3.2 Activity 1.2



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Read through 'Chapter 6: Air' and 'Chapter 8: Waste' of the Environment Hong Kong 2009 report from Reading 1.8 and attempt the following:

1. What is the largest air pollution source in Hong Kong and what is the Hong Kong government doing to improve this?
2. List the types of waste facilities in Hong Kong, both existing and being planned.

1.3.3.2.1 Feedback to Activity 1.2



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The major source of Hong Kong's air pollution comes from local power plants; through a new scheme of control agreements for power companies, the government has introduced emission caps to reduce air pollution.

Examples of existing waste facilities include domestic waste transfer stations, landfills, chemical waste treatment plant etc. Hong Kong is considering a waste-to-energy incinerator.

1.3.3.3 Self-test 1.2



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1. What is the major contributor to Hong Kong's Ecological Footprint?
2. Give your suggestions on how we could reduce Hong Kong's Ecological Footprint.
3. In addition to Hong Kong's initiatives, do you think we should involve Shenzhen and the Guangdong Province in combating water pollution? Justify your answers.

1.3.3.3.1 Feedback to Self-test 1.2



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1. Continuing demand for higher and higher living standards.
2. Through education and selection of more environmental friendly alternatives to our daily lives, we could assist to reduce the overall footprint.
3. Definitely yes as pollution has no boundaries and many sources of pollution come from industries in Shenzhen and Guangdong.

1.4 The concept of sustainable development



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You have just learned about [Ecological Footprint](http://www.footprintnetwork.org/en/index.php/GFN/page/footprint_basics_overview/) (http://www.footprintnetwork.org/en/index.php/GFN/page/footprint_basics_overview/), which can be deemed as an indicator of sustainability. Let us ask ourselves: Are we sustainable if our Ecological Footprint is greater than the [biocapacity](http://wwf.panda.org/about_our_earth/all_publications/living_planet_report/demands_on_our_planet/biocapacity/) (http://wwf.panda.org/about_our_earth/all_publications/living_planet_report/demands_on_our_planet/biocapacity/) of our earth?

The sustainability movement, which started in the mid-1980s, was a progression of the environmental movement that started in the late 1960s. What is sustainability or sustainable development, which has become a buzz word that is often mentioned yet poorly understood by many? The most commonly quoted definition of sustainable development is the one from the [Bruntland Report](http://en.wikipedia.org/wiki/Our_Common_Future) (http://en.wikipedia.org/wiki/Our_Common_Future) in 1987 (Our Common Future) from the United Nations World Commission on Environment and Development. It defined sustainable development as 'development which meets the needs of the present generation without compromising the ability of future generations to meet their own needs.'

The publication of [Our Common Future](http://en.wikipedia.org/wiki/Our_Common_Future) (http://en.wikipedia.org/wiki/Our_Common_Future) and the work of the United Nations World Commission on Environment and Development laid the ground work for convening in Rio de Janeiro, Brazil in 1992 the United Nations Conference on Environment and Development (the Earth Summit) and the adoption of Agenda 21, the Rio Declaration and to the establishment of the Commission on Sustainable Development. The commission saw the possibility of a new form of growth, one such having 'economic growth yet sustain the environmental resource base.' This is particularly important as growth often comes from new technologies which could induce new forms of serious pollution. The rate of change could outstrip current scientific understandings and our capacities to assess and recover. Lastly, the commission calls for actions to deal with the balance of growth and environmental protection.



Click this link to watch the video:

<http://www.opentextbooks.org.hk/system/files/resource/10/10004/10020/media/The%20concept%20of%20sustainable%20development.mp4>

What makes a development sustainable? The concept of sustainable development recognizes that for any development to be sustainable, it must go beyond just the environment and strive for a balance among three components: environment, society and economy. You can imagine this as a three-legged stool, with one leg representing environment, society and economy respectively. This stool will be stable for you to sit on if all three legs are in place and balanced. Yet if any one leg is missing, shorter, or damaged, the stool is no longer balanced and stable and you might fall if you sit on it.



Fig. 1.4: Three pillars of sustainable development

Under the concept of sustainable development, we should look at the environment from the perspective that it is one of the three components making up sustainable development. Therefore it is not sustainable development if we protect the environment at all costs, sacrificing economic and social stability for our future generations. At the same time, we should not use economic growth and social benefits such as increases in income and employment as excuses for compromising or destroying our environment. The take away message for you is that all three legs of the stool must be in place and balanced.

You should not confuse [environmental impact assessment](http://www.epd.gov.hk/eia/) (<http://www.epd.gov.hk/eia/>), particularly in the Hong Kong context, with sustainability assessment. EIA is different from [sustainable assessment](http://www.susdev.gov.hk/html/en/su/sus.htm) (<http://www.susdev.gov.hk/html/en/su/sus.htm>) because it only covers one of the three components of sustainability. A good EIA report for a development project is one of the contributors to the project's sustainability, but EIA alone without adequately addressing the economy and society components cannot be interpreted as the development project being sustainable. This course focuses on environmental impact assessment, but we will discuss sustainability assessment and other emerging issues in Unit 10 later in the course.

To strike such a balance is not easy, especially so in Asia, the world's fastest growing region where tremendous economic and poverty reduction pressures are evident. As Barron (1993), the editor of the new *Asian Journal of Environmental Management*, put it: in Asia, 'development-environment trade-offs are occurring at an unprecedented pace and often in ways which differ from those which characterized the earlier development of the older industrialized economies.'

At least, to some extent, this explosive Asian economic development has been matched by a rapid proliferation of EIA documents. Many of these EIAs were done in what can be described as a 'pre-sustainability era.' Their content and quality is highly variable.

A detailed look at the sustainability doctrine is both wise and essential. The following reading reports on a study by the Planning Department on sustainable development in Hong Kong and will help to familiarize you with the issues.

Reading 1.9

Planning Department, *The SUSDEV 21 Study*, HKSAR Government, 20–28:

http://www.pland.gov.hk/pland_en/p_study/comp_s/susdev/ex_summary/sum_eng.pdf (http://www.pland.gov.hk/pland_en/p_study/comp_s/susdev/ex_summary/sum_eng.pdf)

In the report, you will find the 40 sustainability indicators for Hong Kong covering the environment, economy and society. A computer aided assessment tool known as CASET (<http://www.susdev.gov.hk/html/en/council/Paper11-05e.pdf>) was also developed for assessing sustainability. This tool will be discussed *Unit 10* when we study sustainability assessment. Some important areas to focus on in this document include 'Box 5b — The final SUSDEV 21 guiding principles', 'Box 5c — Indicator criteria for SUSDEV 21' and 'Box 5d — The final SUSDEV 21 indicators'. After much work, the government concludes that 'Sustainable Development in Hong Kong balances social, economic, environmental and resource needs, both for present and future generations, simultaneously achieving a vibrant economy, social progress and a high quality environment, locally, nationally and internationally, through the efforts of the community and the government.'

The sustainability philosophy is a growing conceptual force behind the EIA process. *SUSDEV 21* (http://www.pland.gov.hk/pland_en/p_study/) is a Hong Kong version of this 'force.' SUSDEV is about how we can manage Hong Kong to ensure that the resources and environment are still livable in 2030!

After completed the above section, please complete [Self-test 1.3 \(Page 20\)](#). Do not forget to check the [Feedback to Self-test 1.3 \(Page 20\)](#).

1.4.1 Self-test 1.3



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Look closely at 'Box 5d — The final SUSDEV 21 indicators' in the previous reading. Which indicator do you think draws the most attention for Hong Kongers? Briefly explain why.

1.4.1.1 Feedback to Self-test 1.3



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Economic indicators may draw the most attention for Hong Kongers as most sectors are very much cost- and profit-driven. But more than 20 years after the establishment of the EPD, there are signs that the people of Hong Kong are beginning to value the physical environment more. Examples are that they care about air pollution as it is related to their health and they go to parks on weekends so they ask for more green space to be protected.

1.5 References



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Below are the resources referred to or cited by the developer(s) of the original unit:

Barron, B (1993) 'From the editor', *Asian Journal of Environmental Management*, 1(1): iii, May.

Civic Exchange (2009a) *The Air We Breathe 2: Dialogue on Road Transportation*, Expert Symposium Summary Report, <http://www.civic-exchange.org/en/live/upload/files/091127report.pdf> (<http://www.civic-exchange.org/en/live/upload/files/091127report.pdf>%)

Civic Exchange (2009b) *The Air We Breathe 2: Dialogue on Road Transportation*, Public Conference Summary Report, <http://www.civic-exchange.org/en/live/upload/files/091128report.pdf> (<http://www.civic-exchange.org/en/live/upload/files/091128report.pdf>%)

Ministry of Environmental Protection of the People's Republic of China (2009) *Report on the State of the Environment in China 2008*.

McKinsey Global Institute (2009) *Preparing for China's Urban Billion*, McKinsey & Company, http://www.mckinsey.com/mgi/publications/china_urban_billion (http://www.mckinsey.com/mgi/publications/china_urban_billion%)

McKinsey Global Institute (2009) *Preparing for China's Urban Billion*, McKinsey & Company, http://www.mckinsey.com/mgi/publications/china_urban_billion (http://www.mckinsey.com/mgi/publications/china_urban_billion%)

www.mckinsey.com/mgi/publications/china_urban_billion%20http://www.mckinsey.com/mgi/publications/china_urban_billion).

Ministry of Environmental Protection of the People's Republic of China (2009) *Report on the State of the Environment in China 2008*.

Rees, W and Wackernagel, M (1996) *Our Ecological Footprint*, New Society Publishers, Gabriola Island.

United Nations (2008) *World Urbanization Prospects — The 2007 Revision*.

WWF (2008) *Living Planet Report 2008*, http://assets.panda.org/downloads/living_planet_report_2008.pdf (http://assets.panda.org/downloads/living_planet_report_2008.pdf%20http://assets.panda.org/downloads/living_planet_report_2008.pdf).

WWF Hong Kong (2008) *Hong Kong Ecological Footprint Report 2008: Living Beyond Our Means*, http://www.footprintnetwork.org/images/uploads/Ecological_Footprint_HongKong.pdf (http://www.footprintnetwork.org/images/uploads/Ecological_Footprint_HongKong.pdf%20http://www.footprintnetwork.org/images/uploads/Ecological_Footprint_HongKong.pdf).

1.6 Conclusion



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In this free courseware module, we first looked at some of the main global and local (China and Hong Kong) environmental issues. Examples are climate change, [habitat loss](http://wwf.panda.org/about_our_earth/species/problems/habitat_loss_degradation/) (http://wwf.panda.org/about_our_earth/species/problems/habitat_loss_degradation/) and depletion of resources. These problems are relevant to world population, [urbanization](http://en.wikipedia.org/wiki/Urbanization) (<http://en.wikipedia.org/wiki/Urbanization>) and consumption patterns. One way to gauge the extent of the problems is an indicator called the [Ecological Footprint](http://www.footprintnetwork.org/en/index.php/GFN/page/footprint_basics_overview/) (http://www.footprintnetwork.org/en/index.php/GFN/page/footprint_basics_overview/).

Many governments believe the way to solve environmental problems is to adopt [sustainable development](http://www.susdev.gov.hk/) (<http://www.susdev.gov.hk/>), which relates to long-term views of balancing development and care for the environment. Environment, society and economy are the three pillars of sustainable development. This three-legged stool must be well-balanced to achieve sustainability. Sacrifice of any one pillar is not the goal of sustainable development.

To strike such a balance is not easy, especially in a fast-growing region like Asia. The booming population and economic growth has imposed tremendous pressure over our environment. However, the seriousness of any environmental impacts still needs to be estimated. This is the beginning of the process of something called [EIA](http://www.epd.gov.hk/eia/) (<http://www.epd.gov.hk/eia/>). EIA is about how the environmental impacts of a particular project affect our surroundings. Impact of chemicals on our physical environment was the catalyst to much environmental legislation including EIA legislation. But, within a city or a country, there are many projects occurring at the same time. Thus, policies,

plans and programmes are needed to reduce the cumulative effects of environmental impacts from all projects; these are the areas of coverage of SEA (<http://www.epd.gov.hk/epd/SEA/eng/index.html>) and REA.

In this free courseware module, we have not taken a deeper look at the concepts of EIA, SEA and REA. However, it is hoped that you will be able to have some background in some of the contemporary environmental issues, and the origins and concepts of sustainable development, which could help you to make sense of why there is a need for EIAs.

If you would like to learn more on this subject, you are welcome to enrol in [ENVR S320 Environmental Impact Assessment](http://www.ouhk.edu.hk/wcsprd/Satellite?pagename=OUHK/tcGenericPage2010&c=C_ETPU&cid=191154032000&lang=eng) (http://www.ouhk.edu.hk/wcsprd/Satellite?pagename=OUHK/tcGenericPage2010&c=C_ETPU&cid=191154032000&lang=eng) offered by the [School of Science and Technology](http://www.ouhk.edu.hk/wcsprd/Satellite?pagename=OUHK/tcSubWeb&l=C_ST&lid=191133000200&lang=eng) (http://www.ouhk.edu.hk/wcsprd/Satellite?pagename=OUHK/tcSubWeb&l=C_ST&lid=191133000200&lang=eng) of the OUHK.