



SINGAPORE

Environmental Health Country Profile

World Health Organization

As of April 28, 2005



1 Development, Environment and Health Status

1.1 Development Pattern of the Country

1.1.1 Maps / geography / demography / urban-rural trends

Singapore is a small city-state covering a land area of 697.1 km². In 2003, the estimated population was 3,437,300, with an almost equal percentage of male and female. The proportion of the young population (below 15 years old) is about 20.80 percent while the proportion of the elderly (65 years old and above) is 7.70 percent. This number is expected to increase to 27 percent in 2030.

An estimated 94.20 percent of Singapore's population is literate, 97.10 percent of males and 91.40 percent of females. The state's well-established educational system accounts for this relatively high literacy. In 2003, infant mortality rate was 2.2 for every 1 000 live births while under-five mortality rate was 3.20 for every 1,000 live births. These are among the lowest figures in Asia. In 2001, about 91.60 percent of newborn infants weighed at least 2.5 kg at birth.

1.1.2 General economy of the country

Singapore is characterized by a highly developed and successful free-market economy, a remarkably open and corruption-free business environment, stable prices, and the fifth highest per capita Gross Domestic Product (GDP) in the world. It was estimated in 2003 that the GDP per capita was S\$38,023. Exports, particularly in electronics, chemicals and services are the main drivers of the economy. The government promotes high levels of savings and investment through a mandatory savings scheme and spends heavily in education and technology. It also owns government-linked companies (GLCs) - particularly in manufacturing - that operate as commercial entities and account for 15 per cent of GDP. As Singapore looks to a future increasingly marked by globalization, the country is positioning itself as the region's financial and high-tech hub. In fiscal year 2002, the government expenditure on health was S\$1533 million or 1 per cent of GDP. The total expenditure per capita on health was S\$1703.

1.1.3 Development priorities

1.1.4 Human Development Index

This is a composite index developed by the United Nations Development Programme (UNDP) based on three indicators: longevity, as measured by life expectancy at birth; educational attainment, as measured by adult literacy and total primary, secondary and tertiary enrolment

ratio; and standard of living, as measured by GDP per capita. Singapore is now in the high HDI level with an HDI of 0.88 as of 2002 and ranked 28 out of 177 countries.

1.2 Existing Service Levels

1.2.1 Proportion of population (national) with existing utilities (water supply, sanitation, solid waste collection, drainage, sewerage, electricity)

The entire populace has access to safe water and use adequate sanitation facilities. A hundred percent of the solid wastes generated are collected and all are served by a sewerage system.

1.2.2 Proportion of urban population served by piped water, sewers, electricity, municipal solid waste collection

Piped water and electricity are available to every household.

1.2.3 Presence of other basic services such as fire fighting and emergency management (flood, earthquake, chemical emergency, etc.)

Singapore has excellent emergency response system to deal with emergencies such as natural disasters, fire, chemical emergency and oil spills.

1.2.4 Housing: presence of building regulations, proportion of people living in informal settlements

There are building regulations in place and inspections are being conducted to ensure public safety. There are no informal settlements in Singapore since the government provides housing for its citizens.

1.2.5 Transport related: number of vehicles registered, number of motorcycles registered, rate (number per 100,000 population)

1.2.6 Capacity for monitoring environmental quality (drinking water, water resources, ambient air, noise, radiation, etc)

The government conducts monitoring activities to check various environmental quality parameters for drinking water, water resources, ambient air, noise and radiation.

1.2.7 Capacity for data collection and processing

The government through its various agencies such as the National Environment Agency usually carries out data collection and processing.

1.3 Environmental Quality

1.3.1 Air pollution (percentage of population using solid fuels, proportion of vehicles using diesel and unleaded gasoline, frequency of exceeding national air quality standards)

As of 2000, only a small fraction of the population (less than 5 percent) was using solid and biomass for cooking such as outdoor grilling. Singapore has maintained a very good air quality through constant monitoring and control.

1.3.2 Water pollution (frequency of exceeding national water quality standards, drinking water quality standards)

The same vigilance is performed on water quality especially drinking water and the results showed the standards are being met.

1.3.3 Solid waste (generation of municipal solid waste, proportion of recyclables)

According to the National Environment Agency, in 2003 about 4,728,200 tons of solid wastes were generated and that almost half (47 percent) was recyclable.

1.3.4 Hazardous waste (generation of toxic chemicals, hazardous materials, health-care waste, nuclear waste)

1.4 *Public Health Statistics*

1.4.1 Ten leading causes of mortality and morbidity

The top ten leading causes of morbidity are accidents, poisonous and violence (31 249), heart disease (20 627), cancer (19 614), pneumonia (8 930), cerebrovascular disease (8 904), complications related to pregnancy (8 150), infections of skin and subcutaneous tissue (6 560), unspecified urinary tract infections and haematuria (5 962), benign neoplasms (5 352) and intestinal infections (5 104)

The top ten leading causes of mortality are cancer (4 121), ischaemic and other heart diseases (3 972), pneumonia (2 321), cerebrovascular disease (1 549), accidents, poisoning and violence (657), diabetes mellitus (371), nephritis, nephrotic syndrome and nephrosis (213), chronic liver disease and cirrhosis (113), septicaemia (87), tuberculosis (78).

Due to rising standards of living, high standards of education, good housing, safe water supply and sanitation, a high level of medical services and the active promotion of preventive medicine, Singapore's state of health is very good. The leading causes of morbidity and mortality are currently the major non-communicable diseases such as cancer, coronary heart diseases, strokes, accidents and injuries. Cancer and cardiovascular diseases together accounted for approximately 60 per cent of the total causes of death.

1.4.2 Diseases associated with agricultural and irrigation development (proportion of undernourished people, schistosomiasis, pesticide poisoning)

1.4.3 Respiratory diseases related to outdoor air pollution from energy, transport and industry sectors

There are large number of cases of acute respiratory infections, an illness which is associated with poor air quality. In 2003, there were 7, 484 ARI cases.

1.4.4 Traffic crashes (mortality due to traffic accidents, rate: deaths /100,000 population, injuries due to traffic accidents, rate: injuries/100,000 population)

1.4.5 Diseases relating to poor housing (including pulmonary diseases, tuberculosis)

Tuberculosis is the tenth leading cause of mortality in Singapore. This illness could be due to poor housing conditions or overcrowding. Around 78 cases of tuberculosis were reported in 2003.

1.4.6 Water supply and sanitation-related diseases (such as diarrheal diseases, hepatitis, cholera, typhoid)

Singapore has one of the lowest cases of water supply and sanitation related diseases. In 2003, there were about 131 cases of hepatitis and 2 cases of cholera.

1.4.7 Vector-borne diseases (such as malaria, plague, dengue fever and dengue hemorrhagic fever)

Singapore had many cases of dengue and dengue hemorrhagic fever in 2002 with about 3,560 cases. Dengue is preventable by eliminating the habitat of the mosquito *Aedes aegypti* that breeds in urban and semi-urban environment such as man-made containers like earthenware jars, metal drums and concrete cisterns used for domestic water storage, as well as discarded plastic food containers, used automobile tires and other items that collect rainwater.

2 Legal, Policy, and Institutional Structure

2.1 Legislative and Policy Framework

2.1.1 National policies, plans or strategies for environmental health

Singapore has a national environmental policy that sets the direction for environmental work:

To attain a high standard of public health and a quality environment conducive to gracious living, with a population that cares for the local and global environment. One strategic direction to achieve this goal is enhancements in environmental infrastructure, environmental management and public health with the following guides:

- a) Environmental education
- b) Resource conservation
- c) Promotion of clean technologies
- d) Nature conservation
- e) Noise management
- f) Promotion of environmental technologies

A key legislation in Singapore is the Environmental Public Health Act, Chapter 95, which embodies all aspects of public health. For tobacco control, Smoking (Prohibition in Certain Places) Act, Chapter 310 was promulgated and strictly enforced.

2.1.2 Relevant legislation addressing environmental health issues

Legislations relevant to environmental health are more than adequate in Singapore. At least 23 are listed below:

- a) Clean Air Act, (Cap. 45) (in the process of being repealed by Environmental Pollution Control Bill 1999)
- b) Environmental Public Health Act, Chapter 95 (relating to public health in general)
- c) Sale of Food Act, Chapter 285
- d) Hydrogen Cyanide (Fumigation) Act, Chapter 132
- e) Infectious Diseases Act, Chapter 37
- f) Poisons Act, Chapter 234 (PART II)
- g) Water Pollution Control and Drainage Act, Chapter 348 (in the process of being repealed by Sewerage and Drainage Bill 1999)
- h) Hazardous Waste (Control of Export, Import and Transit) Act, Chapter 122A (Implementation of the Basel Convention on the Transboundary Movement of Hazardous Wastes)
- i) Control of Vectors and Pesticides Act 1998, Act 24 of 1998
- j) Road Traffic Act, Chapter 276 (vehicle pollution and traffic congestion)
- k) Control of Plants Act, Chapter 57A
- l) Radiation Protection Act, Chapter 262
- m) Sales of Drugs Act, Chapter 282
- n) States Land Act, Chapter 314
- o) State Lands Encroachment Act, Chapter 315
- p) Urban Redevelopment Authority Act, Chapter 340
- q) Building Control Act, Chapter 29
- r) Planning Act, Chapter 232
- s) Fisheries Act, Chapter 111
- t) Endangered Species (Import & Export) Act, Chapter 92A
- u) Public Utilities Act, Chapter 261
- v) Prevention of the Pollution of the Sea Act, Chapter 111
- w) Merchant Shipping (Civil Liability and Compensation for Oil Pollution) Act 1998, Act 33 of 1998
- x) Maritime and Port Authority of Singapore Act, Chapter 170A

2.1.3 Decentralization and / or privatization policies dealing with environmental health

Almost all of the environmental services such as waste collection, environmental monitoring, and water treatment are subcontracted to private companies.

2.2 *Institutional Structure for Environmental Health*

2.2.1 Administrative / organizational set-up of the country

The National Environment Agency (NEA) was formed on 1 July 2002 under the Ministry of the Environment and Water Resources (MEWR), to focus on the implementation of environmental policies. It has two important divisions:

- a) Environmental Protection - implements programmes to monitor, reduce and prevent environmental pollution.
- b) Environmental Public Health – undertakes comprehensive ground surveillance and appropriate preventive measures.

2.2.2 Other agencies and partners other than government

The civil society organizations are active in Singapore, such as below.

- a) Singapore Environment Council
- b) Nature Society, Singapore

2.2.3 Agencies involved and their respective functions

The most active partners working jointly on environmental health are:

- a) The Ministry of Environment and Water Resources, set up in 1972, is responsible for protecting and improving the environment.
- b) National Environment Agency

2.3 *Relevant International Conventions and Agreements Ratified or Signed*

Singapore is signatory to:

- a) The Vienna Convention for the Protection of the Ozone Layer
- b) The Montreal Protocol on Substances that Deplete the Ozone Layer.
- c) The United Nations Framework Convention on Climate Change
- d) The Convention on the Biodiversity
- e) MARPOL (London 1978)
- f) The United Nations Convention on Law of the Sea
- g) The Convention on International Trade in Endangered Species (CITES)
- h) Basel Convention on Transboundary Movements of Hazardous Wastes and their Disposal

3 Human Resources Development Programs

3.1 *Environmental health workforce, professionals and their skills*

3.2 *Formal and informal training programs for environmental health*

Singapore has excellent universities that are well known globally for teaching and research. Training and short-term courses are also offered to both national and international participants.

3.3 *Government certification*

There are highly recognized licensing and certification in Singapore, which are requirements prior to practicing a profession by the professional boards.

3.4 *Professional associations*

Numerous professional associations exist in Singapore. Below are two most relevant ones :

- a) Society of Environmental Health Officers
- b) Environmental Engineering Society of Singapore

The following international associations have membership from Singapore and are actively promoting environmental health:

- a) International Water Association (IWA)
- b) International Union of Air Pollution Prevention Association (IUAPPA)
- c) International Institute of Noise Control Engineering (I-INCE)
- d) Water Environmental Federation (WEF)

4 Priority Environmental Health Issues

The environmental health concerns of Singapore are:

- a) Air pollution from motor vehicles and haze
- b) Waste water
- c) Solid waste
- d) Emerging and re-emerging diseases

- 4.1 *Agriculture Sector* such as pesticide poisoning, irrigation runoff laden with fertilizer and pesticides, contamination of water resources, pesticide residues on vegetables
- 4.2 *Energy Sector* such as air pollution, noise, thermal pollution, fly ash and sludge disposal, nuclear wastes
- 4.3 *Industry Sector* such as air and water pollution, chemical emergencies, hazardous waste management
- 4.4 *Transport Sector* such as road safety, traffic crashes, ambient air pollution, noise
- 4.5 *Urban /Rural Development Sector* such as water supply systems, sanitary facilities, sewerage system, safe and adequate drinking water, solid waste management, drainage and flood control, good housing design and location, safe recreational waters
- 4.6 *Cross-cutting issues* such as health care waste, infectious / communicable diseases, vector-borne diseases, effects of climate change

5 Areas Requiring Improvement

- 5.1 *Specific policies and legislation for environmental health (where absent in the country)*
- 5.2 *Institutional development and intersectoral collaboration (strategies forging partnerships)*
- 5.3 *Human resources development (especially preparedness and response)*
- 5.4 *Monitoring and surveillance (including management of information)*
- 5.5 *Integration of health and environment in international/regional agreements*
- 5.6 *Others*

References

Appendix

SINGAPORE
Environmental Health Data Sheet
As of April 28, 2005

	INDICATORS	DATA	Year	Source
1	Development, Environment and Health			
1.1.1	Area (1000 km ²)	0.69	2004	http://www.singstat.gov.sg/keystats/annual/indicators.htm 1
1.1.1	Estimated population ('000)			
	- Total	4240	Nov 2004	http://www.singstat.gov.sg/keystats/annual/indicators.htm 1
	- Male	2107.203	Nov 2004	Calculated from data at http://www.singstat.gov.sg/keystats/annual/indicators.htm 1
	- Female http://www.singstat.gov.sg/keystats/annual/indicators.html	2132.797	Nov 2004	Calculated from data at http://www.singstat.gov.sg/keystats/annual/indicators.htm 1
1.1.1	Annual population growth rate (%)	1.3	2004	http://www.singstat.gov.sg/keystats/annual/indicators.htm 1
	Percentage of population			
	- 0-14 years			
	> Total	20.80	2003	1
	> Male			
	> Female			
	- 65+ years			
	> Total	7.70	2003	1
	> Male			
	> Female			
1.1.1	Urban population (%)	100.00	2003	1
1.1.1	Adult literacy rate (%)			
	- Both sexes	94.20	2003	1
	- Male	97.10	2003	1
	- Female	91.40	2003	1
1.1.1	Infant mortality rate (per 1000 live births)	2.5	2004	http://www.singstat.gov.sg/keystats/annual/indicators.htm 1

	INDICATORS	DATA	Year	Source
1.1.1	Under-five mortality rate (per 1000 live births)	3.20	2003p	1
1.1.1	Newborn infants weighing at least 2500g at birth (%)	91.60	2001	3
1.1.2	General economy: narrative report (separate sheet)			
1.1.2	Per capita GDP at current market prices (S\$)	42,581	2004	1
1.1.2	Total health expenditure on health as % of GDP	3.60	2002	1
1.1.3	Development priorities: narrative report (separate sheet)			
1.1.3	Land area for agriculture (as percentage of total land area)	3	2002	Calculated with data from http://apps.fao.org/faostat/collections?version=ext&hasbulk=0&subset=agriculture
1.1.4	Human development index (Highest = 1)	0.90	2002	http://hdr.undp.org/statistics/data/cty/cty_f_SGP.html
	Human development index Rank (out of 177 countries)	25	2002	http://hdr.undp.org/statistics/data/cty/cty_f_SGP.html
1.2.1	Population with access to safe water (%)	100	2003	2
1.2.1	Population with adequate excreta disposal facilities (%)	100	2003	2
1.2.1	Solid waste collection (% of total waste generated)	100		
1.2.1 1.2.2	Proportion of urban population served by municipal solid waste collection (%)	100		
1.2.2	Proportion of urban population served by sewerage system (%) National or major city	100		
1.2.1 1.2.2	Proportion of population with electricity (%) Total Urban Rural	100		
1.2.3	Poison center service (Y/N list, year)	Y		
1.2.3	Chemical emergency preparedness (Y/N list, year)	Y		
1.2.4	Proportion of population living in informal settlements (%)	0		
1.2.4	Presence of building regulations and inspection (Y/N list, year)	Y		

	INDICATORS	DATA	Year	Source
1.2.5	Number of registered vehicles (i.e. Private cars)	380,142	2003	http://www.lta.gov.sg/corp_info/doc/Statistic%20Brief-layout_final.pdf
	Rate (number per 100,000 population)			
	Number of registered motorcycles	135,649	2003	http://www.lta.gov.sg/corp_info/doc/Statistic%20Brief-layout_final.pdf
	Rate (number per 100,000 population)			
1.2.6	Presence of government/private laboratories and equipment for monitoring	Y		
	Drinking water (Y/N; G/P)	Y (G&P)		
	Water resources (Y/N ; G/P)	Y (G&P)		
	Ambient air (Y/N ; G/P)	Y (G&P)		
	Noise (Y/N ; G/P)	Y (G&P)		
	Radiation (Y/N ; G/P)	Y (G&P)		
1.2.7	Presence of government/private system for data collection and processing (Y/N; G/P)	Y (G&P)		
1.3.1	Proportion of population using solid/biomass fuels for cooking or heating (%)	<5	2000	8
1.3.1	Proportion of vehicles using diesel (%)	20%	2004	Land Transport Authority
1.3.1	Proportion of vehicles using unleaded gasoline (%)	80%	2004	Land Transport Authority
1.3.1	Average number of times national air quality standards are exceeded in a year: a. short-term (1-hour average) frequency of exceedance b. long-term (8-hour average) frequency of exceedance	0	2004	9
1.3.2	Average number of times national water quality standards are exceeded in a year a. In three major rivers b. In major drinking water supplies	0	2004	9
1.3.2	Industries generating wastewater (number)			
1.3.3	Solid waste generated (kg/per capita/day)	1.6	2004	9
1.3.3	Solid waste generated (tons per year)	2.48 million	2004	9

	INDICATORS	DATA		Year	Source
1.3.3	Proportion of recyclable solid waste (%)	48		2004	9
1.3.4	Toxic and hazardous wastes generated (tons/year)				
1.3.4	Industries generating toxic and hazardous wastes (number)				
1.3.4	Health-care waste generation (tons per year)				
1.3.4	Nuclear waste generation (tons per year)	n.a.			
1.4.2	Cases of pesticide poisoning (number)				
1.4.2	Proportion of undernourished population (%)	...			
1.4.2	Prevalence of underweight children under five years of age (%)	...			
1.4.4	Motor and other vehicle injuries (number)	177		2003p	2, 4
1.4.4	Road traffic crashes:				
	Number of accidents (within a year)				
	Rate (Accident per 100,000 population)				
	Rate (Accident per 10,000 vehicle registration)				
	Rate (Injuries per 10,000 vehicle registration)				
	Rate (deaths per 100,000 population)				
1.4.1-1.4.7	Ten leading causes of morbidity	Number	Rate per 100 000 population		
	1. Accidents, poisonous and violence	31 249	909.10	2003p	2
	2. Heart disease	20 627	600.10	2003p	2
	3. Cancer	19 614	570.60	2003p	2
	4. Pneumonia	8930	259.80	2003p	2
	5. Cerebrovascular disease	8904	259.00	2003p	2
	6. Complications related to pregnancy	8150	237.10	2003p	2
	7. Infections of skin and subcutaneous tissue	6560	190.80	2003p	2
	8. Unspecified urinary tract infections and haematuria	5962	173.50	2003p	2
	9. Benign neoplasms	5352	155.70	2003p	2
	10. Intestinal infections	5104	148.50	2003p	2

	INDICATORS	DATA		Year	Source
1.4.1-1.4.7	Ten leading causes of mortality	Number	Rate per 100 000 population		
	1. Cancer	4121	119.90	2003p	2, 4
	2. Ischaemic and other heart diseases	3972	115.60	2003p	2, 4
	3. Pneumonia	2321	67.50	2003p	2, 4
	4. Cerebrovascular disease	1549	45.10	2003p	2, 4
	5. Accidents, poisoning and violence	657	19.10	2003p	2, 4
	6. Diabetes mellitus	371	10.80	2003p	2, 4
	7. Nephritis, nephrotic syndrome and nephrosis	213	6.20	2003p	2, 4
	8. Chronic liver disease and cirrhosis	113	3.30	2003p	2, 4
	9. Septicaemia	87	2.50	2003p	2, 4
	10. Tuberculosis	78	2.30	2003p	2, 4
		Number of cases	Number of deaths		
1.4.5	Tuberculosis (All types)	78	...	2003p	12
1.4.5	Rheumatic fever and rheumatic heart diseases	169	30	2003p	2, 4
1.4.6	Acute respiratory infections	7484	1	2003p	2, 4
1.4.6	Hepatitis viral	131	25	2003p	2, 4
1.4.6	Cholera	2	0	2003p	2, 4
1.4.6	Typhoid fever (and paratyphoid fever)	...	...
1.4.6	Encephalitis	12	0	2003p	2, 4
1.4.6	Diarrhoeal diseases	...	...
1.4.7	Plague	...	...
1.4.7	Malaria	...	...
1.4.7	Dengue/DHF	3560	0	2002	12
2	Legal, Policy, and Institutional Structure				
2.1.1	National environmental health policy (Y/N list, year) Environmental Public Health Act, Chapter 95		Y		
2.1.1	National environmental policy (Y/N list, year) To attain a high standard of public health and a quality environment conducive to gracious living, with a population that cares for the local and global environment.		Y		5

	INDICATORS	DATA	Year	Source
	<p>The strategic directions to achieve this goal are:</p> <ul style="list-style-type: none"> • Enhancements to environmental infrastructure, environmental management and public health. <p>Six other directions are:</p> <ul style="list-style-type: none"> • Environmental education • Resource conservation • Promotion of clean technologies • Nature conservation • Noise management • Promotion of environmental technologies 			
2.1.1	<p>Policies/legislation to reduce exposure to environmental tobacco smoke (Y/N list, year)</p> <ul style="list-style-type: none"> • Smoking (Prohibition in Certain Places) Act, Chapter 310 	Y		5
2.1.1	<p>National policies for healthy settings (such as healthy cities) (Y/N list, year)</p>			
2.1.2	<p>Environmental/Health Acts promulgated: (Y/N list, year)</p> <ol style="list-style-type: none"> Water Air Solid Waste Toxic chemicals/Hazardous Waste Others <ul style="list-style-type: none"> • Clean Air Act, (Cap. 45) (in the process of being repealed by Environmental Pollution Control Bill 1999) • Environmental Public Health Act, Chapter 95 (relating to public health in general) • Sale of Food Act, Chapter 285 	Y		5

	INDICATORS	DATA	Year	Source
	<ul style="list-style-type: none"> • Hydrogen Cyanide (Fumigation) Act, Chapter 132 • Infectious Diseases Act, Chapter 37 • Poisons Act, Chapter 234 (PART II) • Water Pollution Control and Drainage Act, Chapter 348 (in the process of being repealed by Sewerage and Drainage Bill 1999) • Hazardous Waste (Control of Export, Import and Transit) Act, Chapter 122A (Implementation of the Basel Convention on the Transboundary Movement of Hazardous Wastes) • Control of Vectors and Pesticides Act 1998, Act 24 of 1998 • Road Traffic Act, Chapter 276 (vehicle pollution and traffic congestion) • Control of Plants Act, Chapter 57A • Radiation Protection Act, Chapter 262 • Sales of Drugs Act, Chapter 282 • States Land Act, Chapter 314 • State Lands Encroachment Act, Chapter 315 • Urban Redevelopment Authority Act, Chapter 340 • Building Control Act, Chapter 29 • Planning Act, Chapter 232 • Fisheries Act, Chapter 111 • Endangered Species 			

	INDICATORS	DATA	Year	Source
	(Import & Export) Act, Chapter 92A <ul style="list-style-type: none"> • Public Utilities Act, Chapter 261 • Prevention of the Pollution of the Sea Act, Chapter 111 • Merchant Shipping (Civil Liability and Compensation for Oil Pollution) Act 1998, Act 33 of 1998 • Maritime and Port Authority of Singapore Act, Chapter 170A 			
2.1.2	Environmental impact assessment as an official requirement (Y/N list, year)	Y		
2.1.2	Health impact assessment as part of EIA (Y/N list, year)			
2.1.3	Policies for decentralization such as for environmental health and monitoring (Y/N list, year)	Y		
2.1.3	Policies for privatization such as for environmental health and monitoring (Y/N list, year)	Y		
2.2.1	Organizational structure for environmental health (separate sheet)			
2.2.2	List of agencies and partners for environmental health other than government <ul style="list-style-type: none"> • Singapore Environment Council • Nature Society, Singapore 	Y		5
2.2.3	List of relevant government agencies and their functions Ministry of Environment and Water Resources, set up in 1972, is responsible for protecting and improving the environment.	Y		5
2.3	Relevant international conventions/agreements (List, year signed/ratified) Singapore is signatory to: <ul style="list-style-type: none"> • The Vienna 	Y		5

	INDICATORS	DATA	Year	Source
	Convention for the Protection of the Ozone Layer <ul style="list-style-type: none"> • The Montreal Protocol on Substances that Deplete the Ozone Layer. • The United Nations Framework Convention on Climate Change • The Convention on the Biodiversity • MARPOL (London 1978) • The United Nations Convention on Law of the Sea • The Convention on International Trade in Endangered Species (CITES) • Basel Convention on Transboundary Movements of Hazardous Wastes and their Disposal 			
3	Human Resources Development Programs			
3.1	Environmental Health workforce			
	- environmental health officers			
	- health/sanitary inspectors			
	- assistant sanitarians			
	- environmental engineers			
	- sanitary engineers			
	- pollution control officers			
	- others			
3.2	Tertiary degrees related to environmental health (Y/N list) <ul style="list-style-type: none"> • Diploma in civil & environmental engineering 	Y		
3.2	Short courses and duration related to environmental health (Y/N list)	Y		

3.3	Government certification for environmental workforce (Y/N list)	Y		
3.4	Professional associations related to environmental health (Y/N list, memberships) <ul style="list-style-type: none"> • Society of Environmental Health Officers • Environmental Engineering Society of Singapore 	Y		
3.4	International associations' local affiliates (Y/N list, memberships) <ul style="list-style-type: none"> • International Water Association (IWA) • International Union of Air Pollution Prevention Association (IUAPPA) • International Institute of Noise Control Engineering (I-INCE) • Water Environmental Federation (WEF) 	Y		
4	Priority Environmental Health Issues			
4.1	Soil erosion (mm/year)			
4.1	Fertilizer consumption (metric tons/year)	2 418	2002	6
4.1	Pesticide consumption (metric tons/year)			
4.1	Banned pesticides used (number)			
4.1	Water resources withdrawal for irrigation (annual withdrawal as percentage of total water resources)			
4.1	Irrigated agricultural area (1000 ha)	...	...
4.2 - 4.6	Inputs from Chapter 1			
4.6	Carbon dioxide emissions (per capita metric tons)	13.7	1999	7
4.6	Consumption of ozone-depleting CFCs (ODP metric tons)	22	2001	7

Notes:

- ... Data not available.
- est. Estimate
- p Preliminary / provisional figures
- NR Not relevant

Sources:

- 1 Statistics Singapore - <http://www.singstat.gov.sg>
- 2 Ministry of Health, Singapore - <http://www.moh.gov.sg>
- 3 Report on Registration of Births and Deaths 2001, Registry of Births and Deaths, Immigration and Checkpoints Authority, Singapore
- 4 Singapore Demographic Bulletin December 2003, Registry of Births and Deaths, Immigration and Checkpoints Authority, Singapore
- 5 United Nations Environment Program, Regional Resource Center for the Asia and the Pacific (UNEP RRCAP) - <http://www.rrcap.unep.org/>
- 6 Food and Agriculture Organization Statistics - <http://apps.fao.org/default.jsp>
- 7 Asian Development Bank Statistics - <http://www.adb.org/statistics/>
- 8 2004 World Health Report - <http://www.who.int/whr/en/>
- 9 National Environment Agency - <http://app.nea.gov.sg/>
- 10 National Environment Agency's Annual Report 2002-2003 - <http://www.nea.gov.sg/cms/ccird/ar2002-2003/nea-ar-02.pdf>
- 11 UNDP Human Development Report 2004 - <http://www.undp.org>
- 12 Tuberculosis Cases 2002, data provided by Stop TB and Leprosy Unit, WHO Regional Office for the Western Pacific
Tuberculosis Control in the WHO Western Pacific Region 2003 Report
Malaria and Dengue cases and deaths, data provided by Malaria, Vectorborne and Parasitic Diseases Unit, WHO Regional Office for the Western Pacific, 10 March 2004
Cholera cases and deaths, information taken from the website of Regional Electronic Surveillance System for Notifiable Diseases in Western Pacific Region - <http://internet/cds/cds-query.cfm>