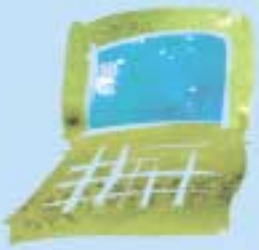

Green Korea 2006
A Beautiful Environment and A Healthy Future
MINISTRY OF ENVIRONMENT
REPUBLIC OF KOREA



A Beautiful Environment and A Healthy Future

Contents

The Ministry of Environment of the Republic of Korea (MOE) will exert strenuous efforts to make the Korean Peninsula and the earth a place full of life and a healthy eco-community, and I believe that Green Korea 2006 will work as a great tool to realize that goal.

Minister's Message

The most important value of the 21st century is the Sustainability that integrates the environment, economy, and society, and the environment is particularly important in that the quality of life is interconnected with the environment.

Due to the growth policy that started in the 1960s, Korea was under serious environmental pressure. However, we have succeeded to overcome environmental problems, and we are carrying out various policies to build A Beautiful Environment and A Healthy Future in which human beings and the ecosystem live in harmony.

This year, the Korean government had the 2nd Environmental Performance Reviews published by the OECD in September. According to the OECD reviewers, since the first Environmental Performance Review in 1997, Korea has made "striking progress" in air management, water infrastructure, water management, waste management, and nature/biodiversity protection. OECD made 54 recommendations, and the Korean government promised to set up an implementation plan to follow up with the recommendations. MOE will take the lead in this mission.

These remarkable achievements are particularly rewarding and valuable since they were not borne out by the government's regulations but by Korean people's environmental awareness and commitment.

Currently, we are shifting the paradigm of supplier-oriented policy to receptor-oriented policy, focusing on various priority projects including implementation of environmental health policy for the people, conservation of healthy and lively national environment, improvement of living environment, and establishment of sustainable economy.

While each country's environmental policy is different from one another, the principle of Harmonizing Development and Conservation would be common to all countries. When the global stakeholders like each country, international organization, and environmental group gather heads and work together, a win-win synergy will be created, and when every country's environmental policies and experience are put together, each country will benefit from them through minimizing the trial and error in their policy.

In an effort to share the Korean experience with the world, MOE has collected the cases of Korea's environmental policy and published them in Green Korea annually since 1999.

Upon the publication of Green Korea 2006, MOE has added new contents to the existing environmental policies including Korea's environmental status in each area such as air, water quality, and waste.

Also, more detailed explanation on the well-received policies including the Comprehensive Ten Year Environmental Health Plan, Recommended Indoor Air Quality Standards for Newly Constructed Apartments, Strategic Environmental Assessment, and Electronic Waste Manifest System are included in this publication.

I hope that Green Korea 2006 helps raise the awareness of the importance of environment and also contributes to resolving global environmental problems.

December 2006

이치범

Lee Chi-Beom
Minister of Environment
Republic of Korea

Overview of Korea

and its Environment

- Republic of Korea in Figures
- Korea's Environment at a Glance
- Comprehensive Plan for National Environment (2006-2015)

Republic of Korea(ROK) in Figures

Area :	99,646.16 km^2
Population :	47,041,434 (end of 2005 est.)
Capital :	Seoul
Government Type :	Republic
Religion :	No affiliation 46.48%, Christian 18.32%, Catholic 10.94%, Buddist 22.8%, Confucianist 0.22%, Other 1.24%
National Assembly :	Unicameral National Assembly or *Kukhoe*(299 seats-members elected for four-year term; 243 in single-seat constituencies, 56 by proportional representation)
Administrative Divisions :	9 provinces(*Do*) and 7 metropolitan cities(*Gwangyoksi*)
GNI per capita :	$ 16,291 (2005 est.)
Currency :	South Korean Won(KRW)
Climate :	Four seasons, temperate, with rainfall heavier in summer than winter

Map of Korea

Source : www.korea.net

Korea's Environment at a Glance

Areas	Indicators	Unit	Level
Living Environment	Noise(night, residential area, roadside, Busan)	Leq dB(A)	64('04)
	NO_2(yearly average, Seoul)	ppm	0.034
	Waterworks supply	%	90.1('04)
	Sewerage system supply	%	81.4('04)
Ecosystem	National Biological Species (discovered)	1,000 species	30
	Protected Nature Area	%	9.6
Natural Resources	Renewable energy supply/ primary energy supply	%	2.1
	Recycled municipal wastes	%	49.2
Environmental Economy	R&D in ET/National total R&D	%	5.3
	Environmental protection expenditure/ GDP	%	1.7('03)
	Green Procurement (Public institutions)	%	31
Environmental Society	Additional deaths due to air pollution (out of 10,000 persons)	persons	9.5('03)
Global Environment	CO_2 emission per GDP	Ton/1,000 USD GDP	0.88('02)

Source : Ministry of Environment

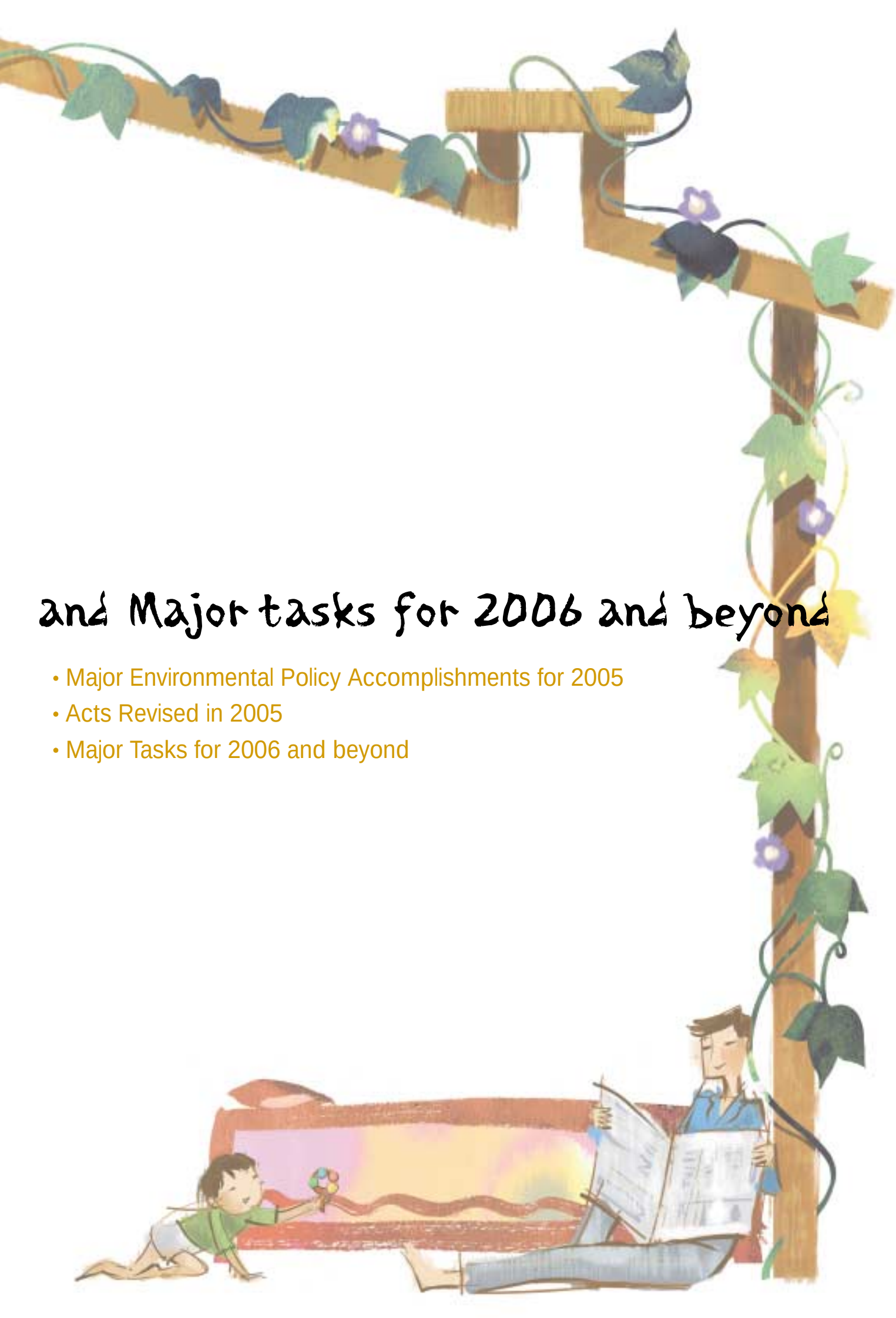
Comprehensive Plan for National Environment (2006-2015)

Vision	Building a more sustainable & advanced nation
Goals	• Maintaining and increasing environmental capacity of the Korean Peninsula • Establishing a society that realizes environmental equity among & within generations • Creating a system for sustainable resource use • Building a stable and eco-friendly economic system
7 core strategies	• Conservation of sustainable nature • Efficient management of natural resources • Establishing a safe and comfortable living environment • Building interdependent relationship between economy and environment • Creating a basis for environmental equity • Enhancing environmental cooperation in Northeast Asia • Taking the lead in global efforts for sustainable development

Achievements in 2005

and Major tasks for 2006 and beyond

- Major Environmental Policy Accomplishments for 2005
- Acts Revised in 2005
- Major Tasks for 2006 and beyond



Major Environmental Policy Accomplishments for 2005

The year 2005 saw the MOE's policy focus shift from a "media-oriented" approach to "receptor-oriented one," which is based on interested parties' joint participation and cooperation, and aims at establishing an Environmentally Advanced Nation where human beings and nature can coexist.

A Healthy Environment for a Good Life

For the purpose of evaluating the environmental impact of land development projects from the beginning, the MOE amended relevant Acts to implement Strategic Environmental Assessment. Through creating a national eco-map and local biotope maps, the MOE has also set up the basis for a precautionary and eco-friendly management of land.

Furthermore, to establish an eco-network for the Korean peninsula, the MOE designated the Baekdu Daegan Mountain Range Protection Area (2,634㎢), established conservation measures for the ecosystem of the DMZ and its vicinity, developed a conservation plan for coastal regions and islands, and set up a basic plan for the protection of special islands, thereby preparing a framework for the management of three core ecological axes.

Protection of Public Health by Strengthening the Function of Environmental Health

The MOE set up the Comprehensive Ten Year Environmental Health Plan, aiming at shifting the environmental policy centered on media such as air, water, etc., to that oriented to receptors like human and ecosystem, thereby formulating the basis for a new environmental health policy which includes the verification of interconnection between pollution and environmental disease and the establishment of preventive system for health impact.

In order to strictly control indoor air quality and prevent Sick House Syndrome, the MOE announced a list of construction materials that discharge pollutants and restricted their use, thereby reducing substances that cause Sick House Syndrome at the construction stage. In addition, the MOE also prepared recommended standards for indoor air quality, particularly concerning formaldehyde and volatile organic compounds used in newly constructed apartment. The MOE also conducted research and expanded the category of buildings subject to indoor air quality management to include restaurants, theaters and public transportation.

A Higher Standard of Living through the Improvement of the Environment

The MOE set up a comprehensive ten year plan for air quality improvement for the years 2006 to 2015. The MOE mainly focused on the Seoul Metropolitan area which is

notorious for serious pollution issues, and began the implementation of measures to reduce the emissions in accordance with the ten year basic plan on metropolitan air quality improvement for the years 2005 to 2014.

At the same time, in order to create a safe and ecologically healthy aquatic environment which is free from hazardous substances, the MOE launched a water environment management master plan for the years 2006 to 2015, which will be the systematic management basis for dealing with small stream basins and the main streams of four rivers.

In order to establish a clean and safe tap water system, the MOE, in particular, set up measures to resolve water pollution issues resulted from sewage pipes in poor condition. This was done in part by transferring sewage maintenance projects that require a large budget to the private sector-led BTL (Build-Transfer-Lease) program.

Besides improving the regulations concerning the use of disposable products and establishing comprehensive measures dealing with food wastes, the MOE initiated reductions in the use of disposable products and food wastes while setting up ways to use them as resources. The MOE prepared a foundation for facilitating the recycling of construction waste by setting up an information management system for construction wastes, and quality standards for recycled aggregate together with a certification system.

The MOE also developed comprehensive measures concerning municipal noise reduction, aiming to streamline municipal noise management which had been managed by several ministries. Four industrial complexes, including Banwol and Sihwa, were designated as offensive odor management areas, and the intensive management of such areas began by their respective municipalities.

Enhanced Capacity to Manage the Environment for Sustainable Development

In order to create a framework for sustainable national environment management, the MOE set up a comprehensive national environmental plan for the years 2006 to 2015, including blueprints for the comprehensive management of the environment on a sector by sector basis .

Also, in order to facilitate green purchasing and sales, the MOE set up a basic plan for promoting green procurement for the years 2006 to 2010, and established the Korea Eco-Products Institute with the responsibility for developing the criteria for eco-products, providing information on purchasing, education, PR, etc.

Strengthening Response Measures to Global Environmental Issues

Upon the effectuation of the Kyoto Protocol, the MOE established the third comprehensive measure for the United Nations Framework Convention on Climate Change (UNFCCC) including a monitoring plan regarding ecological change caused by climate change. The MOE launched a task force committee on climate change to implement greenhouse gas reduction policies while effectively carrying out measures on Kyoto Protocol by forming a council on Korean climate change between the Ministry of Environment and the Korea Meteorological Administration.

Also, in order to extend the basis for a Clean Development Mechanism (CDM) project, the MOE conducted a feasibility study on landfill sites and implemented a CDM project with a 50 MW generation facility in Sudokwon landfill site while preparing a basis for introducing greenhouse gas emissions trading by conducting trial emissions trading.

To strengthen international environmental cooperation, the MOE hosted the MCED 2005 (Ministerial Conference on Environment and Development in Asia and the Pacific) under the title of "Environmentally Sustainable Economic Growth."

At that conference, a variety of development measures for win-win solutions to environmental and economic problems in the Asia-Pacific region were announced, and the Seoul Initiative Network on Green Growth was launched. Moreover, Korea-China-Japan environmental ministerial talks, ASEAN FTA negotiations on the environment and other projects for international environmental cooperation were conducted.

Acts Revised in 2005

Framework Act on Environmental Policy

- SEA concept was introduced in the Pre-Environmental Review System.
- Renegotiation is now required for the developers executing projects in preservation areas or expanding business projects after initial negotiations.
- In terms of development projects that already began prior to the completion of negotiation, the head of project review authority can request the head of project approval authority to restore the area or to nullify the approval for such projects.
- Legal basis was laid for creating and distributing a national eco-map which shows respective grades according to the estimated environmental value of each area.

Indoor Air Quality Management Act to be applied to public places

- Legal ground for setting recommended standards for indoor air quality in new apartments was established.
- The scope of public places was expanded to include underground shopping areas attached to the ground-level buildings.
- Dormitories were included in the category of apartment, requiring them to be managed more systematically.

Clean Air Conservation Act

- Pre-examination system for automobile fuels and additives was introduced to prevent air quality deterioration from the massive distribution of illegal fuels and additives.
- The responsibility of auto-makers for defects in exhaust-related devices was strengthened.
- Change was made in reporting requirements for vehicles subject to an improvement order. Inspection agents, rather than the vehicle owner, are now required to report to the authorities such as mayors, heads of counties (*Gun*), or heads of boroughs (*Gu*).

Water Supply and Waterworks Installation Act

- General waterworks enterprises now have the obligation to inspect and examine water quality and the regulations concerning water supply facilities, including in-house water supply pipes.
- A licensing system for water purification plant operator has been introduced to secure professional personnel in the field of water purification.
- To dissolve the public distrust of tap water, information disclosures on tap water was introduced.

Drinking Water Management Act

- Potable deep ocean water was added to the category of drinking water.
- The groundwater abstraction charges for making soft drinks, liquor and other fountain drinks were elevated.

Environmental Technology Promotion Act

- A self-registration system for environmental consulting companies was introduced.
- Designation criteria for eco-labeling agencies were established.

Act on Promoting the Saving and Recycling of Resources

- In order to dispose and recycle large-sized waste in an environmentally friendly manner, more than one recycling center in each city, county, and borough should be built.
- In an attempt to increase the collection of empty containers, the legal ground for an empty container handling fee for wholesalers and retailers was prepared.
- The legal ground for utilizing the “unclaimed empty cotainer deposit” as public finances was prepared.

Act on Han River Water Quality Improvement and Community Support

- Apartment construction is now one of the activities restricted in the buffer zone of the Han River watershed.

Act on Promoting the Recycling of Construction Waste

- A legal basis was prepared for setting up the standards for construction waste discharge in addition to the existing standards for the collection, transfer, storage, and treatment of construction waste.
- It is now obligatory to outsource the treatment of construction waste, separately from the construction work at the construction order stage.

Water Quality Preservation Act

- A legal ground was prepared for managing non-point pollution sources by classifying water pollution sources as point pollution sources, non-point pollution sources, and other pollution sources.

Major Tasks for 2006 and beyond

Year 2006 is the time for environmental health policy promotion that focuses on the public health based on advanced environmental policies that have been established so far.
The government has set up and proceeded with various environmental policies to achieve its vision of "A Beautiful Environment and A Healthy Future," which is to build a circulatory economy, to reinforce the health protection of those who are susceptible to environmental pollutants including children, to keep national land healthy and animated, and to create a more pleasant and comfortable living environment.

First, the MOE is pushing forward a comprehensive ten year plan for environmental health to protect the public health, conducting basic surveys on areas and social classes vulnerable to environmental pollutants, examining heavy metal levels in human blood and building a continuous monitoring system of the damage from the hazardous substances in children's products. In addition, the MOE aims to minimize the impact of environmental pollution on the public health by strengthening the management of hazardous substances in the living environment, and indoor air quality. The MOE also intends to enact a special law on the control of Persistent Organic Pollutants (POPs) such as dioxin to protect the public health from their harmful effects with a plan to phase out PCBs by 2015.

Yangjae Stream, Seoul

Second, the MOE will set up a master plan for circulating national resources for sustainable materials management while enacting the "Act on Promoting a Resource-Circulating Society"(tentative title) to establish a sustainable circulating economy.

The MOE aims to increase the sustainability of water use by investing a total of KRW 102.3 billion in building sewage water reuse facilities in seven sewage treatment plants and supplying 80 million tons of treated sewage water annually to maintain minimum streamflow.

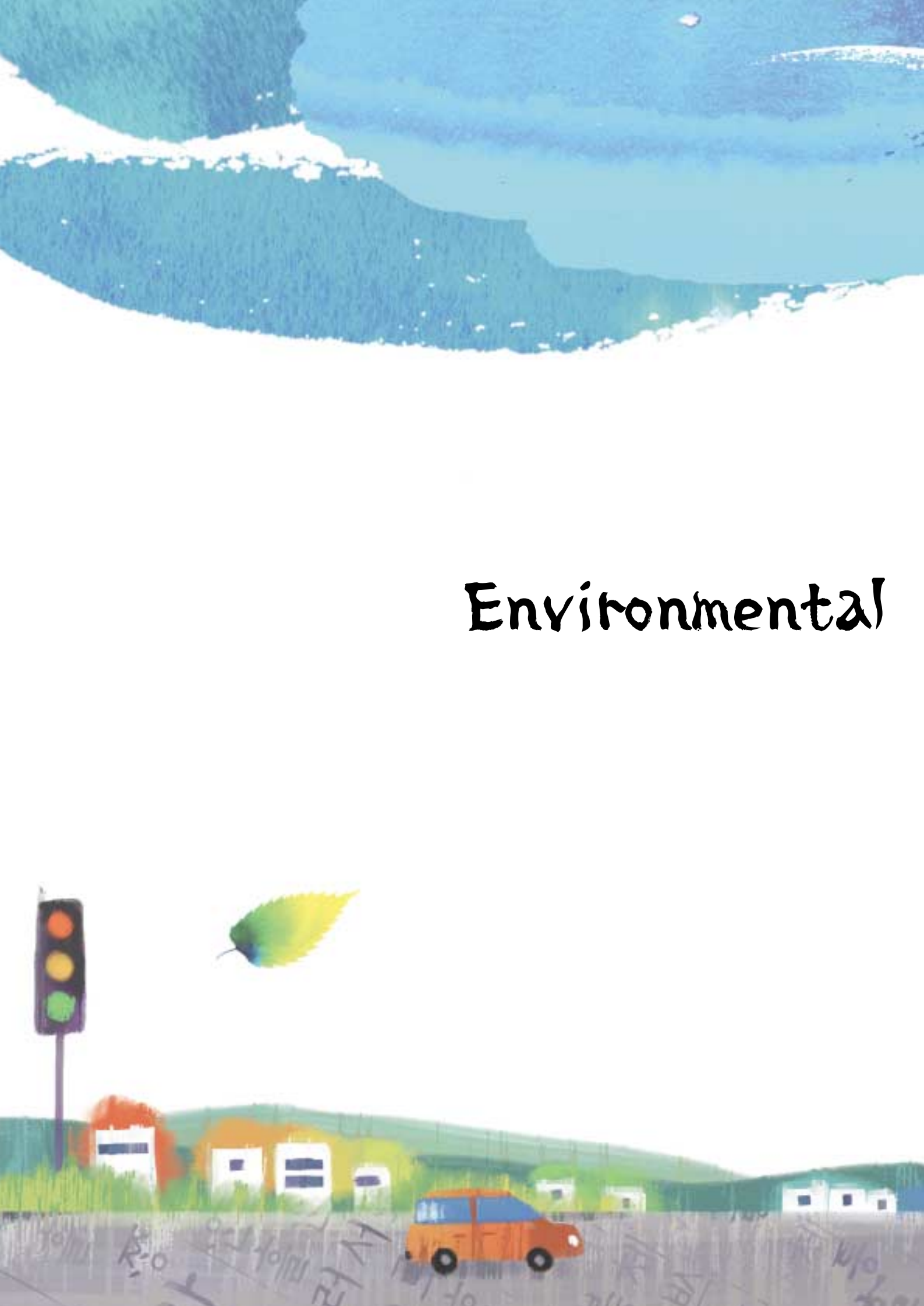
By 2015, the MOE will establish the "2nd Comprehensive Measures for Tap Water Demand Management", to be implemented from 2007 to 2015 to cut back on 1.06 billion tons of water use and promote the diversification of tap water sources while considering the use of top quality agricultural reservoirs as a tap water source.

Third, the MOE plans to strengthen environmental assessment of development projects including the implementation of a strategic environmental assessment to keep national land healthy and full of life while minimizing business inconveniences by establishing a support system of environmental impact assessment and reducing the timeframe for consultations.

Fourth, the MOE will reinforce control over diesel-fueled vehicles in metropolitan areas starting this year to create a pleasant and comfortable living environment and also promote air quality improvement in regions other than metropolitan areas. In addition, the MOE will set up a regional emissions cap for three metropolitan areas (Seoul City, Incheon City, Gyunggi province) and implement the "Metropolitan Area Emissions Cap System" in July next year to regulate the new construction and expansion of businesses that exceed the regional emissions cap.
Meanwhile, the MOE plans to shift the focus of our aquatic environment policy to public health and the restoration of aquatic ecosystem, and carry out a restoration project of ecological quality in rivers and riparian zones. In addition, the MOE will push forward a "Project for the Tap Water with the Natural Taste," which applies different concentrations of residual chlorine by region and season to dissolve public distrust of tap water.

Fifth, the MOE will lay the groundwork for enhancing national efforts for reducing greenhouse gas emissions to lead sustainable development at a global level and drive a full-fledged environmental cooperation project to improve the environment of North Korea. Meanwhile, for the efficient management of protected area, the Korean government plans to hold the "Korea Protected Area Forum" with the participation of governmental organizations (Ministry of Environment, Ministry of Maritime Affairs & Fisheries and Korea Forest Service) as well as NGOs (Korean commission of IUCN and UNESCO) to streamline and advance the management of protected areas. The Korean government will also host the international workshop, study the best practices of East Asian countries, and implement measures to improve the management of protected areas.

Environmental



Status of Korea

- Nature
- Air
- Water
- Soil and Groundwater
- Waste
- International Environmental Cooperation

Nature

With the increase in the income of citizens, the demand for a higher standard of life and living places harmonizing with nature has surged together with a desire for sustainable development.

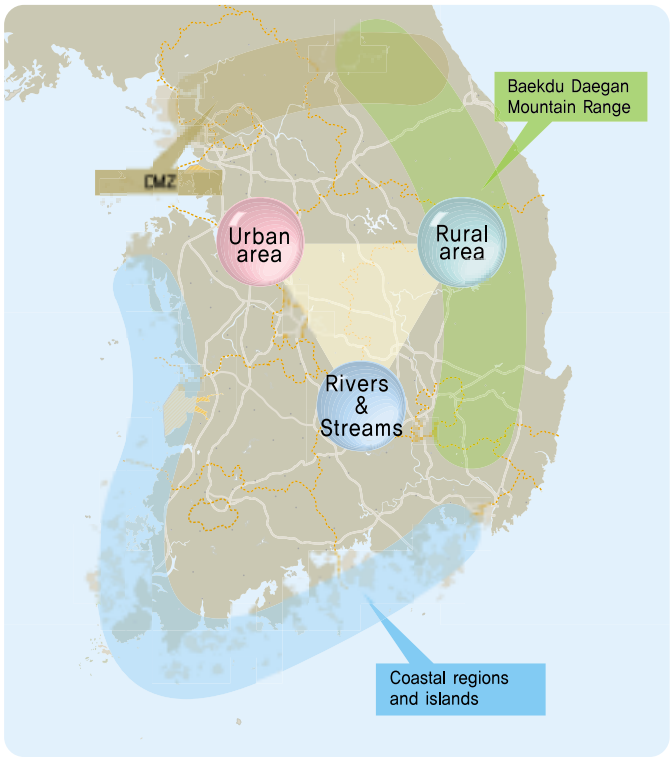
Therefore, the concept of a "life community where human beings and nature coexist" is at the center of the policy goal of natural environment preservation. That is to say, the desire is to realize a dynamic life community on the Korean peninsula by organically connecting the natural environments on the peninsula.

Conservation of Three Ecological Axes

So far, there has been less awareness of the importance of conserving and managing the entire land base as one organism, since environmental policies have focused primarily on the preservation of individual habitats. It is therefore time to shift to a new system through which the entire land base of Korea is managed as ecologically sound organic body.

To do so, the MOE designated a Baekdu-Daegan mountain range, a DMZ and its vicinity, and a coastal regions and islands as three core ecological axes, and has been preserving them. The MOE has also been preserving and restoring the eco-systems of both urban and rural areas and organically connecting them to the three core ecological axes, thereby setting up an eco-network integrating the entire ecosystem of Korea.

Concept Map for Integrated Ecological Network on the Korean peninsula



Designation of Nature Conservation Areas and Promotion of Measures for Preservation

Korea has designated the areas which have an excellent natural ecology and are rich in biological diversity as protected areas including ecosystem and landscape conservation area, and is taking measures to prevent ecosystem degradation of those areas.

Ramsar wetlands and UNESCO biosphere reserves are places that have been designated or registered as international reservation areas. On the 30th of March, 2005, the Sinan Gun Jangdo island moor were registered as a Ramsar Wetland according to the Ramsar convention, the third designation after Yong moor of Mt.Daeam and the Changnyong Woopo wetland. In October 2004, Guweol Mountain was designated as the 4th UNESCO Biosphere reserve in Korea, after Seorak Mountain, Baekdoo Mountain, and Hanla Mountain in Chejudo.

Types of Protected Areas

Types	Sites	Area	Designated in 2005
Ecosystem and Landscape conservation area	27	293.545㎢	3 sites(45.531㎢)
Wetland protection area	15	186.594㎢	-
Natural parks	76	7,805㎢	1(33㎢)
Special islands(including Dokdo)	153	9.985㎢	-
Wildlife protection area	545	1,418㎢	1 site(26.2㎢)

Source: Ministry of Environment

Natural Parks

Areas are being designated and administered as natural parks in order to protect cultural relics and to preserve the natural ecosystem and beautiful scenic areas. They are classified into national, provincial, and county natural parks.

As of December, 2005, there are 76 natural parks in Korea (total area 7,805km^2): 20 national, 23 provincial, and 33 county natural parks. Together they make up a land area which totals 5,125km^2 (5.1% of the national land area), and surface sea area of 2,889km^2 (2.9% of the national land area). This takes up 7.8% of the total territory of the nation.

Baek yang temple, Naejang mountain

Protection of Endangered Wildlife & Preservation of Biological Diversity

The government revised the Natural Environment Preservation Act in 1997, which provided a framework for designating and managing endangered and protected wildlife, and also substantially reinforced the penalties (up to 5 years in prison and a KRW 30 million fine) for illegal capture or gathering, thereby providing a legal system for the protection of wildlife.

In February 2004, each of the regulations regarding wildlife protection in the Natural Environment Preservation Act and the Wildlife Protection and Hunting Act were consolidated into the Wildlife Protection Act. The presidential and the ministerial decree were enacted and went into effect on the 10th of February, 2005.

The Wildlife Protection Act categorizes the previously endangered species and protected wildlife into 221 species and classifies them into endangered species category I and II.

Endangered Species Category Ⅰ (50)

Types	Species Name
Mammals(12)	Wolf Canis lupus coreanus, Manchrian sika Cervus nippon hortulorum, Sea lion Zalophus californianus japonica, Manchurian black bear Ursus thibetanus ussuricus, Red bat Myotis formosus chofukusei, Musk deer Moschus moschiferus parvipes, Goats Naemorhedus caudatus, Otter Lutra lutra, Ocelot Lynx lynx, Fox Vulpes vulpus peculiosa, Leopard Panthera pardus orientalis, Tiger Panthera tigris altaica
Birds(13)	Golend eagle Aquila chrysaetos, Spoon-billed sandpiper Eurynorhynchus pygmeus, Chinese egret Egretta europhotes, Spoonbill Platalea leucorodia, Crane Grus japonensis, Hawk Falco peregrinus, Black-faced spoonbill Platalea minor, Steller's sea eagle Haliaeetus pelagicus, Spotted Greenshank Tringa guttifer, Woodpecker Dryocopus javensis, Mute swan Cygnus olor, Stork Ciconia boyciana, White-tailed eagel Haliaeetus albicilla
Amphibia & Reptiles(1)	Boa Elaphe schrenckii
Fishes(6)	Balck shiner Pseudopungtungia nigra, Korean stumpy bullhead Pseudobagrus brevicorpus, Miho spine loach Iksookimia choii, Olruksaekomikuri Koreocobitis naktonsgensis, Bull-head torrent catfish Liobagrus obesus, Hinsumaja Gobiobotia naktonsgensis
Insects(5)	Twospotted long-horned bittle Metopodontus blanchardi, Sangultuk butterfly Eumenis autonsoe, Black-veined white butterfly Aporia crataegi, Suyeom bettle Polyphylla laticollis manchurica, Long-horned Beetle Callipogon relictus
Inveterates(5)	freshwater pearl mussels Cristaria plicata, trumpet shell Charonia sauliae, grapsid crabs Helice leachi, Lamprotula coreana Lamprotula coreana, Gammarus zeongogensis Gammarus zeongogensis
Plants(8)	Lady's Slipper Orchid Cypripedium japonicum , Nadopungnan Aerides japonicum , Euchresta japonica Euchresta japonica , Cotonseaster wilsonii Cotonseaster wilsonii, Diapensia lapponica var. obovata Diapensia lapponica var. obovata, Cymbidium lancifolium Cymbidium lancifolium , Japanese Wind Orchid Neofinetia falcata , Cymbidium kanran Cymbidium kanran

Endangered Species Category Ⅱ (171)

Types	Species Name
Mammals(10)	Marten Martes flavigula, Manchurian weasel Mustela nivalis, Sea cat Callorhinus ursinus, Ringed seal Phoca largha, Harbor seal Phoca spp., Bengal cat Prionailurus bengalensis, Little tube-nosed bat Murina ussuriensis, Steller Sea lion Eumetopias jubatus, Long-eared bat Plecotus auritus, Eurasian flying squirrel Pteromys volans aluco
Birds(48)	Baikal teal Anas formosa, March hawk Circus aeruginosus, Swan goose Anser cygnoides, Saunders gull Larus saundersi, Oyster Catcher Haematopus ostralegus, Common crane Grus grus, Whistling swan Cygnus columbianus, Ural owl Strix uralensis Black woodpecker Dryocopus martius, Bustard Otis tarda, Eagle Aegypius monachus, Crake Gallicrex cinerea, Buzzard Buteo buteo, Black stork Ciconia nigra, Fish eagle Pandion haliaetus, Honey Buzzard Pernis ptilorhychus, Bear's pochard Aythya baeri, Japanese nigh heron Gorsachius goisagi, Red-footed falcon Falco amurensis, Japanese murrelet Synthliboramphus wumizusume,

Types	Species Name
Birds(48)	Crested lark Galerida cristata, Black paradise flycatcher Terpsiphone atrocaudata, Hobby Falco subbuteo, Black kite Milvus lineatus, Merlin Falco columbarius, Eagle owl Bubo bubo, Siberian white crane Grus leucogeranus, Pied harrier Circus melanoleucus, Australian curlew Numenius madagascariensis, Owl Strix aluco, While-naped crane Grus vipio, Hen harrier Circus cyaneus, Relic gull Larus relictus, Japanese lesser sparrow hawk Accipiter gularis, Goshawk Accipiter gentiles, Whooper swan Cygnus Cygnus, Bean goose Anser fabalis Schrenck's bittern Ixobrychus eurhythmus, Upland buzzard Buteo hemilasius, Rough-legged buzzard Buteo lagopus, Fairy pitta Pitta nympha, Spotted eagle Aquila clanga Chinese merganser Mergus squamatus, Brant Branta bernicla, Hooded crane Grus monacha, Long-billed ringed plover Charadrius placidus, Lesser white-fronted goose Anser erythropus, Imperial eagle Aquila heliaca
Fishes(12)	Eastern golden frog Rana plancyi, Reeve's turtle Chinemys reevesii, Korea narrow-mouthed forg Kaloula borealis, Collared Black-Headed Snake Sibynophis collaris, Chinese Spotted Lacerta Eremias argus
Amphibia & Reptiles(5)	Slender shinner Pseudopungtungia tenuicorpa, Stickleback Pungitius sinensis, Kuguri Gobiobotia macrocephala , Sand lamprey Lampetra reissneri, Dolsanguh Gobiobotia brevibarba, Siberian sculpin Cottus poecilopus, Morejusa Microphysogobio koreensis Korean bittering Acheilognathus signifier, Limsylnapjaru Acheilognathus somjinensis Small Stickleback Pungitius kaibarae, Lamprey Lampetra japonica, River sculpin Cottus hangiongensis
Insects(15)	Koryo earwig Challia fletcheri, Protantigius superans Protantigius superans, Nannophya pygmaea Nannophya pygmaea, Cicindela anchoralis punctatissima Cicindela anchoralis punctatissima, Damaster mirabilissimus mirabilissimus Damaster mirabilissimus mirabilissimus, Lethocerus deyrollei Lethocerus deyrollei , Parnassius bremeri Parnassius bremeri, Jewel beetle Chrysochroa fulgidissima , Dung bettle Gymnopleurus mopsus, Spindasis takanonis Spindasis takanonis, Copris tripartitus Copris tripartitus, Fabriciana nerippe Fabriciana nerippe, yellow-spotted longicorn beetle Psacothea hilaris, Cicindela hybrida nitida Cicindela hybrida nitida, Osmoderma opicum Osmoderma opicum
Inveterates(24)	Chasmagnathus convexus Chasmagnathus convexus, Dendronephthya suensoni Dendronephthya suensoni, Clithon retropictus Clithon retropictus, Tadpole Shrimp Triops longicaudatus, Plumarella spinosa Plumarella spinosa, Ellobium chinense Ellobium chinense, Euplexaura crassa Euplexaura crassa, Plexauroidea reticulata Plexauroidea reticulata, Dendronephthya castanea Dendronephthya castanea, Verrucella stellata Verrucella stellata, Sesarma intermedium Sesarma intermedium, Ophiacantha linea Ophiacantha linea, Dendronephthya mollis Dendronephthya mollis, Dendrophyllia cribrosa Dendrophyllia cribrosa, Pseudomaretia alta Pseudomaretia alta, Dendronephthya putteri Dendronephthya putteri, Dendrophyllia micranthus Dendrophyllia micranthus, Scelidotoma vadososinuata hoonsooi Scelidotoma vadososinuata hoonsooi, Orange cup coral Tubastraea coccinea, Plumarella adhaerans Plumarella adhaerans, Koreanohadra koreana Koreanohadra koreana, Plexauroidea complexa Plexauroidea complexa, Antipathes japonica Antipathes japonica, Dendronephthya alba Dendronephthya alba
Plants(57)	Prickly water lily Euryale ferox, Siberian ginseng Eleutherococcus senticosus, Quercus gilva Quercus gilva, Echinosophora koreensis Echinosophora koreensis, Shieldleaf Rogerr's Flower Astilboides tabularis, Paliurus ramosissimus Paliurus ramosissimus, Trientalis europaea var.

Types	Species Name
Plants(57)	arctica Trientalis europaea var. arctica, Jeffersonia dubia Jeffersonia dubia, Drosera peltata var. nipponica Drosera peltata var. nipponica, Kirengeshoma koreana Kirengeshoma koreana, Rosebay Rhododendron aureum, Iris odaesanensis Iris odaesanensis, Iris koreana Iris koreana, Aster altaicus var. uchiyamae Aster altaicus var. uchiyamae, Iris dichotoma Iris dichotoma, Cymbidium macrorrhizum Cymbidium macrorrhizum, Cicuta virosa Cicuta virosa , Hylotelephium ussuriense Hylotelephium ussuriense, Korean Berchemia Berchemia berchemiaefolia Ranunculus kazusensis Ranunculus kazusensis , Lasianthus japonicus Lasianthus japonicus, Isoetes japonica Isoetes japonica, White Forsythia Abeliophyllum distichum Osmanthus insularis Osmanthus insularis, Aconitum koreanum Aconitum koreanum, Vexillabium yakushimensis Vexillabium yakushimensis, Woodland Peony Paeonia obovata, Saururus loureier Saururus chinensis, Viola raddeana Viola raddeana, Bupleurum latissimum Bupleurum latissimum, Scrophularia takesimensis Scrophularia takesimensis, Aconitum austrokoreense Aconitum austrokoreense, Nodding lily Lilium cernuum, Psilotum nudum Psilotum nudum, Leontopodium coreanum Leontopodium coreanum, Frogleaf, or Little Water-lily, Brasenia schreberi, Wisteria japonica Milletia japonica, Thalictrum coreanum Thalictrum coreanum, Viola websteri Viola websteri, Galeola septentrionalis Galeola septentrionalis, Utricularia yakusimensis Utricularia yakusimensis, Smilacina bicolor Smilacina bicolor, Mankyua chejuense Mankyua chejuense, Buckbean Menyanthes trifoliata, Sarcandra glabra Sarcandra glabra, Sarcanthus scolopendrifolius Sarcanthus scolopendrifolius, Lycoris chinensis var. sinuolata Lycoris chinensis var. Sinuolata, Polygonatum stenophyllum Polygonatum stenophyllum, Trillium tschonoskii Trillium tschonoskii, Spotted Lady's-slipper Cypripedium guttatum, Victoria Asplenium antiquum, Leontice microrrhyncha Leontice microrrhyncha, Arctous ruber Arctous rubber, Sea Hibiscus Hibiscus hamabo, Membranous milk-vetch root Astragalus membranaceus, Corylopsis gotoana var. coreana Corylopsis gotoana var. Coreana, Coccophora langsdorfii Coccophora langsdorfii

Source: Ministry of Environment

Protection of Endemic Species

The number of biological species in Korea is estimated at about 100,000, but currently only about 30,000 have been confirmed. In order to prepare for inter-state competition in securing biological resources, and to preserve and manage systematically the biological resources of the country, "Comprehensive Measures for the Conservation of National Biological Resources" were established in January 2005. These include measures to investigate biological resources, unearth indigenous species, restore endangered ones, and to reinforce the management of invasive species.

The MOE is planning to unearth undiscovered biological resources such as unrecorded species, endemic species, and new species by exploring indigenous species in regions with an abundance of biological resources such as woodlands, tidal flats, estuaries, and wetlands across the entire country. This will also be done through comparative studies of these indigenous species, which will help gain biological information on them.

The MOE is also drawing up an "Illustrated Book of Korea's Indigenous Species" and constructing a database (2002.2~2005.9) of specimen information (pictures, characteristics, habitat distribution, preserving institution, collector, collection site and time) for those that have been proven to be indigenous species as a result of on-site investigations and documentary surveys.

To better manage the export of biological resources, the Wildlife Protection Act (Effective as of February 2005) required approval or permission for the export of 1,057 species. Of these, 221 are endangered species, 333 are biological resources requiring permission for export (reptiles 1, fish 37, insects 53, plants 242 species), and 503 are animals subject to approval for export and import.

Management of Invasive Species

Invasive species in Korea number 510 (223 animals and 287 plants) and have recently increased precipitously. Damage to indigenous species is occurring across the nation. The government has responded by designating principal invasive species as ecosystem-disturbing species in order to adequately manage these species.

Designation of Ecosystem-Disturbing Species

Total	Amphibia & Reptiles	Fishes	Plants
10	2 (Bull frog Rana cartesberana, Red-eared sliders Trachemys scripta elegans)	2 (Blue gill Lepomis macrochirus, Bigmouth bass Micropterus almoides)	6 (Hog-weed Ambrosia artemisiaefolia L., Buffalo-weed Ambrosia trifida L., White snakeroot Eupatorium rugosum Houtt., Joint grass Paspalum distichum L., Joint grass Paspalum distichum var. indutum Shinners, Horse-nettle Solanum carolinense L.)

Source: Ministry of Environment

The import of mammals (except whales), rodents, and birds must go through the process of obtaining a permit of or declaration to the mayor, county chief, or district chief, and clinical tests and close examination at the national veterinary research & quarantine service. In the case of plants, a paper review at the national plant quarantine service and an on-site examination are necessary for importation.

The MOE has also established a risk grading system for invasive species to manage the invasive plants (2004, National Institute of Environmental Research).

Grading system of invasive plants

Grade	Evaluation	Species
Grade Ⅰ	High-level invasion and spread High-level negative impact Need urgent countermeasures	4 including Hog-weed
Grade Ⅱ	Mid-level invasion and spread Mid-level negative impact Need persistent observation	3 including Joint grass
Grade Ⅲ	Low-level invasion and spread Need re-evaluation for the next 5~10 years	203 including Daisy fleabane
Ungradable	Need evaluation after securing data	77 including Bifora radians

Source: Ministry of Environment

Air

The level of sulfuric acid gas is decreasing, thanks to various air pollution abatement policies such as supplying low-emissions vehicles, increasing the supply of low-sulfur fuel, and the use of cleaner fuel. However, because of the precipitous jump in the number of automobiles, and increasing industrial activities, the density of nitrogen dioxide and particulate matters in the air has remained at a high level, especially in the larger cities.

SO_2

Due to measures such as supplying clean fuel and making the use of low-sulfur fuel mandatory, the level of SO_2 has gone down since the mid-90s and has remained below WHO recommended standards (0.019ppm) since 1997. The Ulsan region, where large industrial emitters are concentrated, has shown relatively high levels of pollution, but the average level of pollution in cities as a whole was 0.008ppm, which is lower than the environmental standard of 0.02ppm.

PM10

The density of particulate matters in Seoul has been decreasing after peaking in 2002, but is still high compared to cities in other advanced countries. Particulate levels in the other large cities in Korea have also demonstrated a trend toward lower levels, but density in Incheon, a city in the Metropolitan area, has been increasing slightly.

PM10 level of major cities

(Unit: ㎍/㎥)

	2000	2001	2002	2003	2004	2005
Seoul	65	71	76	69	61	58
Busan	62	60	69	55	60	58
Daegu	63	67	71	59	58	55
Incheon	53	52	57	61	62	61
Gwangju	58	57	52	36	46	49
Daejeon	51	48	53	43	49	48
Ulsan	52	55	54	40	50	50

Source: Ministry of Environment

Acid Rain

A study of precipitation acidity in the major cities in 2005 shows a distribution between pH 4.4~5.3, and the level of acidity in Seoul is high (4.4).

Acidity in rain of major cities

	2000	2001	2002	2003	2004	2005
Seoul	4.8	4.7	5.6	4.8	4.5	4.4
Busan	4.9	5.0	6.2	4.9	5.0	4.8
Daegu	5.8	6.0	5.6	4.8	5.3	5.3
Incheon	5.0	4.7	4.8	4.7	4.7	4.5
Gwangju	5.2	5.0	5.1	5.0	5.2	4.8
Daejeon	4.7	4.9	5.1	4.7	4.8	4.6

Source: Ministry of Environment

NO_2

NO_2 has adverse effects on the respiratory organs and irritates the nose and throat. Together with hydrocarbons, it is also a source of photochemical smog. In the major metropolitan cities, exhaust is the main source, and Seoul has shown the highest pollution level.

NO_2 level in major cities

(Unit: ppm)

	2000	2001	2002	2003	2004	2005
Seoul	0.035	0.037	0.036	0.038	0.037	0.034
Busan	0.024	0.030	0.029	0.026	0.024	0.023
Daegu	0.029	0.030	0.023	0.026	0.026	0.023
Incheon	0.024	0.027	0.027	0.030	0.028	0.025
Gwangju	0.020	0.026	0.021	0.019	0.019	0.021
Daejeon	0.023	0.025	0.020	0.018	0.022	0.020
Ulsan	0.020	0.022	0.019	0.016	0.022	0.024

Source: Ministry of Environment

Ozone

In the case of ozone, the frequency of exceeding safety standards in the short-term is more important than the average level over the year because exposure to high densities for a short time can have adverse effects on the human body. A look at the current state of the frequency with which ozone levels exceed standards in the short term shows that, since 2002, the number of times per monitoring station when standard is not met has been increasing. The reason for this is thought to be the rise in the number of cars.

Unattainment of 1-hr average standard (Ground-level Ozone)

Year	2000	2001	2002	2003	2004	2005
No. of unattainment (A)	828	794	790	1,241	1,831	1,303
No of valid monitoring station(B)	144	148	164	181	194	206
Ratio (A/B)	5.8	5.4	4.8	6.9	9.4	6.3

Source: Ministry of Environment

Heavy metals

In general, heavy metal contamination in all cities has remained level or is decreasing.

Lead in particular has decreased because of the supply of unleaded gasoline. In the case of Cadmium, pollution levels are relatively higher in cities such as Ulsan and Incheon than in Gwangju or Daejon due to the higher number of factories.

Water

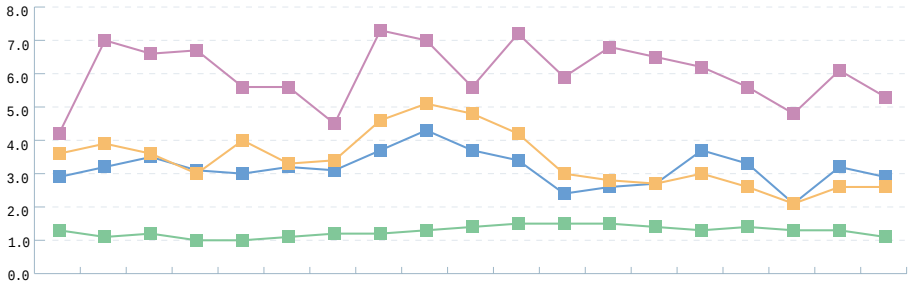
Change in the Water Quality at Main Points of the Four Major Rivers

As the figure below shows, the water quality of four major rivers is improving as a whole. The MOE sees this as the result of efforts to improve the water quality, such as the expansion of environmental treatment facilities, establishment of special measures for improving the water quality of the four rivers, and the enforcement of the special act.

The Han river showed BOD level of 1.1ppm in 2005, an improvement over last year. The Geum, Yeongsan, and Nakdong rivers have also shown similar improvements.

Water quality trend of four major rivers

(Unit: BOD, mg/ℓ)



	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05
Yeongsan river(Naju)	4.2	7.0	6.6	6.7	5.6	5.6	4.5	7.3	7.0	5.6	7.2	5.9	6.8	6.5	6.2	5.6	4.8	6.1	5.3
Nakdong river(Mulgeum)	3.6	3.9	3.6	3.0	4.0	3.3	3.4	4.6	5.1	4.8	4.2	3.0	2.8	2.7	3.0	2.6	2.1	2.6	2.6
Geum river(Buyeo)	2.9	3.2	3.5	3.1	3.0	3.2	3.1	3.7	4.3	3.7	3.4	2.4	2.6	2.7	3.7	3.3	2.1	3.2	2.9
Han river(Paldang)	1.3	1.1	1.2	1.0	1.0	1.1	1.2	1.2	1.3	1.4	1.5	1.5	1.5	1.4	1.3	1.4	1.3	1.3	1.1

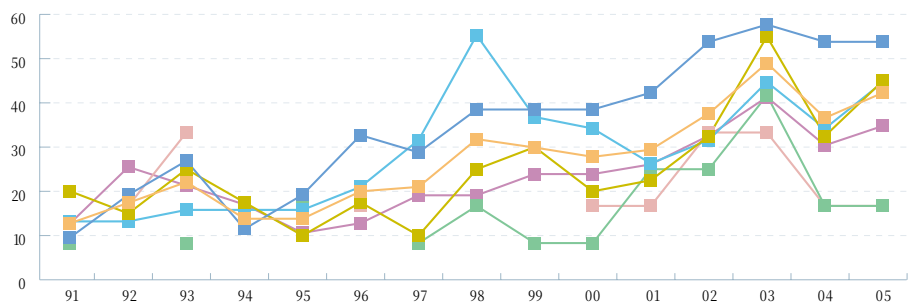
Source: Ministry of Environment

Achievement of Water Quality Standards

The government has set water quality improvement goals for 194 rivers nationwide, and has been enforcing water quality management. The achievement ratio of water quality improvement (number of goal achievements per number of goals established) went from 12.8% in 1991 to 37.6% in 2002. It was 42.3% in 2005, showing a trend of continued improvement.

Achievement of water quality standard

(Unit: BOD, mg/ℓ)



	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05
National	12.8	17.4	22.1	13.8	13.8	20.0	21.0	31.8	29.9	27.8	29.4	37.6	49.0	36.6	42.3
Han river	9.6	19.2	26.9	11.5	19.2	32.7	28.8	38.5	38.5	38.5	42.3	53.8	57.7	53.8	53.8
Nakdong river	20.0	15.0	25.0	17.5	10.0	17.5	10.0	25.0	30.0	20.0	22.5	32.5	55.0	32.5	45.0
Geum river	13.2	13.2	15.8	15.8	15.8	21.0	31.6	55.3	36.8	34.2	26.3	31.6	44.7	34.2	44.7
Yeongsan river	8.3		8.3		16.7		8.3	16.7	8.3	8.3	25.0	25.0	41.7	16.7	16.7
Seomjin river		16.7	33.3			16.7				16.7	16.7	33.3	33.3	16.7	16.7
Others	12.8	25.5	21.3	17.0	10.6	12.8	19.1	19.1	23.9	23.9	26.1	32.6	41.3	30.4	34.8

Source: Ministry of Environment

The achievement ratio for watersheds in 2005 was 54%, 45%, 45%, 17%, and 17% for the Han, Nakdong, Geum, Yeongsan, and Seomjin rivers respectively. In terms of water class, achievement ratio for class I is 34%, while it is 49%, 56%, 75%, and 75% for class II, III, IV, and V respectively.

Achievement ratio of water quality target (2005)

Watershed	Ⅰ (≤BOD 1mg/ℓ)	Ⅱ (≤BOD 3mg/ℓ)	Ⅲ (≤BOD 6mg/ℓ)	Ⅳ (≤BOD 8mg/ℓ)	Ⅴ (≤BOD 10mg/ℓ)
Total	41/120(34)	24/49(49)	5/9(56)	6/8(75)	6/8(75)
Han river	13/30(43)	7/11(64)	3/3(100)	1/2(50)	4/6(67)
Nakdong river	12/32(38)	4/6(67)	1/1(100)	-	1/1(100)
Geum river	5/20(25)	6/12(50)	1/1(100)	5/5(100)	-
Yeongsan river	0/5(0)	2/5(40)	0/1(0)	0/1(0)	-
Seomjin river	1/6(17)	-	-	-	-
Others	10/27(37)	5/15(33)	0/3(0)	-	1/1(100)

Note: ( ) = achievement rate, i.e. No. of achievement/No. of establishment
Source: Ministry of Environment

Current State and Features of Lakes

Currently in Korea there are 18,797 lakes. Most are agricultural reservoirs, which are man-made lakes that are formed when building dams.

The COD, instead of the BOD, is used for lakes that have a retention time of over 35 days, and the MOE also has set environmental standards for phosphorous and nitrogen. The MOE has set and is managing water quality targets and compliance periods for the forty largest lakes in the country. Most lakes have the water quality of class II or III, and the number of days which exceed the standards of the algae prediction system has been on the rise since 1994.

Eo reum chi, endemic fish and one of natural precious treasures of Korea

Status of Water Supply Services

As of December 2004, 44.2 million (90.1% of the total population), in 1,015 water service areas, benefit from waterworks. The daily capacity of waterworks is 23,156,000m^3. If we compare the supply ratio according to the size of the region, the supply rate for the seven special metropolitan and metropolitan area cities is 98.8%, 97.3% for city areas, 82.5% for towns, and 35.2% for rural area myeons; the supply level drops as we move to the rural areas.

The supply level per person is 365ℓ and has dropped since 1996. This is attributed to the installation of water saving devices and water saving campaigns.

Waterworks supply

Classification	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Total Population (10^3 persons)	45,974	46,426	46,878	47,171	47,543	47,477	48,289	48,518	48,824	49,053
Population benefiting from waterworks (10^3 persons)	38,107	38,823	39,607	40,190	40,948	41,774	42,402	43,021	43,633	44,187
Supply rate (%)	82.9	83.6	84.5	85.2	86.1	87.1	87.8	88.7	89.4	90.1
Capacity (10^3 ㎥/day)	22,000	22,902	23,695	25,695	26,590	26,980	27,751	28,561	2,825	23,156
Water supply amount (ℓ /day • person)	398	409	409	395	388	380	374	362	358	365

Source: Ministry of Environment

Status of Sewerage Service

As of late 2004, the supply rate (registered population divided by the population in sewerage service regions) is 81.4%. The capacity of 268 sewage service facilities across the nation is 21,535 thousand tons per day.

The total length of sewer pipelines was 82,215km as of late 2004. 47,225km (57.5%) were combined sewer system pipelines, which simultaneously remove rain and sewage water, and 34,959km (42.5%) were separate sewer system pipelines that remove rain and sewage water separately.

Sewerage supply

Classification	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Total Population (10^3 persons)	45,974	46,426	46,878	47,171	47,543	47,977	48,289	48,518	48,824	49,052
Population benefiting from sewerage treatment (10^3 persons)	20,908	24,420	28,559	31,099	32,539	33,843	35,369	36,760	38,558	39,680
Sewerage plants (Number)	71	79	93	114	150	172	184	207	242	268
Supply Rate (%)	45.4	52.6	60.9	65.9	68.4	70.5	73.2	75.8	79.0	81.4
Capacity (10^3 ton/day)	9,653	11,452	15,038	16,616	17,712	18,400	19,230	20,233	20,885	21,535

Source: Ministry of Environment

Drinking Water Quality Management

In 1963 drinking water standards according to 29 substances were set for the first time based on the Water Supply and Waterworks Installation Act. After 11 revisions, we now manage drinking water quality standards according to 55 substances.

Recently, viruses, pathogenic microbes, and disinfection byproducts have drawn attention as new hazardous substances

in drinking water. In response, the water treatment technique standard has been implemented, which reinforces the filtration and disinfection in the water purification process to eliminate viruses and pathogenic microbes to safe levels. The MOE has also established new standards for inland water quality regarding pathogenic microbes and five new disinfection byproducts such as Haloacetic acid.

In order to guarantee safety, the MOE has also established water quality monitoring systems that differentiate substances and cycles according to the type of drinking water supply facility.

According to the water quality test in 2005 by joint participation of public and private sector, 0.9% of facilities tested exceeded the water quality standards, and a high number of village-level waterworks in particular exceeded standards.

Most of these cases were due to bacteria, E-Coli, and nitrate nitrogen. This is deemed to be caused by insufficient disinfection or negligence of facility maintenance, etc.

Water quality test result by joint participation of public and private sector (2005)

Classification	No. of examined sites (A)	No. of sites over the standard (B)	Unattainment (B/A, %)
Water treatment plant	937	5	0.5
Tap	3,806	12	0.3
Village-level waterworks	531	28	5.3
Storage tanks	559	5	0.9
Total	5,833	50	0.9

Source: Ministry of Environment

Soil and Groundwater

Soil

Currently, sixteen substances, including Cadmium, Copper, Arsenic, Mercury, Oil, and Solvents have been prescribed as soil contaminants and are subject to regulation. For each of these substances, a "soil contamination precautionary level" and "soil contamination regulatory level" have been set. The former level is based on the concern about giving rise to the adverse effects on human health, assets, or animal and plant life. The latter is concerned with the higher level of damages to human health, assets, or animal and plant life, thus requires countermeasures.

The MOE established 250 stations nationwide in 1987 constituting the national soil monitoring network and started routine measurements. Starting in 1997, it expanded this to regional networks and by 1999 had 4,500 stations.

In 2005, MOE ran soil monitoring networks at 1,500 sites and carried out a soil contamination investigation at 2,402 sites. Out of 3,902 sites, 56 sites (1.4%) exceeded soil contamination precautionary level and 22 sites (0.6%) soil contamination regulatory level. In the case of soil monitoring networks, 4 sites (0.3%) exceeded "soil contamination precautionary level" of Ni, but there are no sites exceeding soil contamination regulatory level. Meanwhile, 52 sites (2.2%) from 2,402 soil contamination investigation sites didn't meet the "soil contamination precautionary level" and among them 22 sites (0.9%) exceeded "soil contamination regulatory level."

Soil contamination investigation was changed in 2001 to a system that rotated monitoring sites each year by focusing on contamination-prone areas. This was due to the previous regional monitoring network not conforming to its purpose of pinpointing contaminated areas. The investigation monitored eleven sites where concern of contamination existed, such as factories and industrial sites, areas of waste water inflow, and waste treatment facilities.

Result of soil pollution level test

Classification	Year	2000	2001	2002	2003	2004	2005
Total sites tested (A)	Soil monitoring network	1,499	1,500	1,500	1,500	1,500	1,500
	Soil contamination investigation	2,995	3,000	2,045	2,105	2,183	2,402
Sites over the standard (B)	Soil monitoring network	12(6)	2(1)	28(13)	25(1)	10(2)	4(-)
	Soil contamination investigation	9(6)	18(8)	24(10)	33(10)	51(24)	52(22)
Unattainment ratio (B/A, %)	Soil monitoring network	0.8(0.4)	0.1(0.07)	1.9(0.9)	1.7(0.07)	0.7(0.1)	0.3(-)
	Soil contamination investigation	0.3(0.2)	0.6(0.3)	1.2(0.5)	1.6(0.5)	2.3(1.1)	2.2(0.9)

( ): data for the sites exceeding the regulatory level out of sites over the precautionary level
Source: Ministry of Environment

Groundwater

The supply of water had thus far relied mostly on inland water but pollution, limitations of water supply by dams, and the rise in water consumption has led to more underground water being used. As of late 2004, there were 1,234 underground water sources in use or under construction.

The total use of groundwater in 2004 was still only at 32.1% (3.7 billion m^3/year) of the development potential (11.7 billion m^3/year), which signifies that the value of groundwater as a alternative source of water is very high. A groundwater monitoring network has also been put in place to regularly update the status of groundwater quality and to monitor trends, so that basic data for policy formulation can be assured.

As a result of the 2004 groundwater quality study, of the 4,760 test samples, 230 (4.8%) did not meet the standard. In terms of which criteria were not met, they were general bacteria 32%, NO_3-N 24%, Chloride ion 13%, TCE 6% and pH 10%.

That general bacteria criteria are not being met is due mainly to insufficient management of groundwater wells, and the case of NO_3-N is from sewage water and leachate infiltrating into the ground. While the unattainment rate in 2005 has decreased from 2004 (5.4% ➞ 4.8%), it is propelled by the enhanced management of general bacteria which mainly accounted for the unattainment rate in 2004.

Yearly unattainment rate of water quality

Classification	1999	2000	2001	2002	2003	2004	2005
Tested samples (A)	3,419	3,890	3,861	3,882	3,934	3,865	4,760
Over the standard (B)	180	184	189	143	142	212	230
Unattainment rate (B/A)	5.3%	4.7%	4.9%	3.7%	3.6%	5.4%	4.8%

Source: Ministry of Environment

Waste

Separate Dishcarge Label.
Producers of mandatory recycling products or packages are obliged to attach a separate discharge label on their products.

Generation of Waste

Of the materials that are no longer of use to people, the current Waste Management Act differentiates between industrial waste and municipal waste. Industrial waste is further divided into general industrial waste, construction waste, and designated waste.

Total waste generation is on the rise since 1993. Municipal waste, generated during everyday life and economic activities, decreased substantially in 1995 when the volume-based waste fee system was implemented, but has been gradually increasing since 1999. Municipal waste generation per person has decreased from 1.3kg/day in 1994 to 1.03 kg/day in 2004. On the other hand, industrial waste generation has been increasing by a large margin each year because of expansion in industrial activities.

Waste generation trend

(Unit: ton/day)

Classification		1998	1999	2000	2001	2002	2003	2004
Total		190,254	219,216	234,282	261,032	277,533	303,028	311,666
Municipal waste	Total	44,583	45,614	46,438	48,499	49,902	50,739	50,007
	Generation per capita	0.96	0.97	0.98	1.01	1.04	1.05	1.03
Industrial waste		145,671	173,602	187,844	212,533	227,631	252,292	261,659

Source: Ministry of Environment

Disposal of Waste

A look at the status of waste disposal shows that recycling has increased rapidly, while the percentage of land filling has gone down. Use of incinerators is gradually on the rise. In the case of municipal waste, 72.3% went to landfills in 1995 and only 23.7% was recycled, but due to the volume-based waste fee system and recycling polices, the recycling rate became 49.2% and land filling was down to 36.4% by 2004. This change shows that the waste disposal structure is moving in a positive direction.

Municipal waste treatment

(Unit: ton/day)

Classification	1998	1999	2000	2001	2002	2003	2004
Generation	44,583	45,614	46,438	48,499	49,902	50,736	50,007
Landfilling	25,074	23,544	21,831	21,000	20,724	20,450	18,195
	(56.2%)	(51.6%)	(47.0%)	(43.3%)	(41.5%)	(40,3%)	(36.4%)
Incineration	3,943	4,676	5,440	6,577	7,229	7,348	7,224
	(8.9%)	(10.3%)	(11.7%)	(13.6%)	(14.5%)	(14,5%)	(14,4%)
Recycling	15,566	17,394	19,167	20,922	21,949	21,938	24,588
	(34.9%)	(38.1%)	(41.3%)	(43.1%)	(44.0%)	(45,2%)	(49.2%)

Source: Ministry of Environment

Similar to municipal waste, land-filling for industrial waste has decreased and the rate of recycling is also continuously increasing. In 2004, the rate of recycling was at 81.3%.

Industrial waste treatment

(Unit: ton/day, %)

Classification	1998	1999	2000	2001	2002	2003	2004
Total	145,672 (100)	173,602 (100)	187,844 (100)	212,533 (100)	227,631 (100)	252,292 (100)	261,659 (100)
Landfilling	36,752 (25.2)	30,573 (17.6)	29,904 (15.9)	32,677 (15.3)	34,303 (15.1)	29,377 (11.6)	26,043 (10.0)
Incineration	7,342 (5.1)	8,893 (5.1)	11,757 (6.3)	12,105 (5.7)	10,892 (4.8)	11,338 (4.5)	11,341 (4.3)
Recycling	96,351 (66.1)	125,990 (72.6)	138,035 (73.5)	158,842 (74.7)	172,323 (75.7)	200,829 (79.6)	212,728 (81.3)
Others (dumping at sea, storage, etc)	5,227 (3.6)	8,146 (4.7)	8,148 (4.3)	8,909 (4.2)	10,113 (4.4)	10,748 (4.3)	11,547 (4.4)

Source: Ministry of Environment

Korea, because of its unique food and cooking style, generated a lot of food waste. Various campaigns and policies have been implemented to decrease this kind of waste, and as a result the amount of food waste has been declining. Thanks to the strong push by the government to recycle food waste as livestock feed and compost, as of 2004 the rate of recycling is 81.3%.

Food waste generation and treatment

(Unit: ton/day)

Classification	1997	1998	1999	2000	2001	2002	2003	2004
Generation	13,063	11,798	11,577	11,434	11,237	11,397	11,398	11,464
Per capita generation (kg/day • capita)	0.29	0.25	0.25	0.24	0.23	0.24	0.24	0.24
Landfilling	10,973 (84.0%)	8,308 (70.4%)	6,803 (58.8%)	5,185 (45.4%)	3,856 (34.3%)	3,345 (29.3%)	2,836 (24,9%)	1,607 (14.0%)
Incineration	815 (6.2%)	923 (7.8%)	846 (7.3%)	1,088 (9.5%)	1,003 (8.9%)	922 (8.1%)	844 (7,4%)	541 (4.7%)
Recycling	1,275 (9.8%)	2,566 (21.8%)	3,928 (33.9%)	5,161 (45.1%)	6,378 (56.8%)	7,130 (62.6%)	7,718 (67,7%)	9,316 (81.3%)

Source: Ministry of Environment

International Environmental Cooperation

Responding to Global Warming

Green House Gas(GHG) emissions in 2003 were 582 million tons of CO_2, which was an 87% increase from the 311 million tons in 1990. As for the types of green house gases, increases in CO_2 and F-gas from expanding demand due to economic growth have been salient. However, due to less waste going to land fills and an increase in recycling, CH_4 has dropped by about 40% compared to the 1990 level.

GHG emission

(Unit: 10^6 CO_2ton)

GHG	1990	1995	2000	2001	2002	2003	Ratio (%)
CO_2	259	401	465	482	501	510	96.9
CH_4	43	29	27	26	26	26	-39.5
N_2O	8	12	15	15	15	18	125
HFCs	1	5	8	6	9	8	700
PFCs	-	-	2	2	2	3	50
SF_6	-	6	12	19	16	17	183.3
Total	311	453	529	548	569	582	87.4

Source: Korea Energy Economics Institute

By sector, energy production makes up 481mill. (82.7%), industrial processes 70mill. (12%), agriculture and livestock industry 16mill. (2.7%), and the waste sector 16 mill. tons of CO_2 emissions. Industry, electricity production, and transportation have seen increases due to the continuous economic growth, but the other sectors have been stable since the late 1990s. Emissions from industrial processes have increased due to the expansion of an energy-intensive economy, while emissions from the agriculture/livestock industry and the waste sector have dropped due to the decline in waste generation and farmland.

Sector-wise green house gas emission

(Unit: 10^6 CO_2ton)

Sector	1990	1995	2000	2001	2002	2003	Ratio (%)
Power generation	40	84	128	139	147	151	278
Industry	90	134	153	155	160	161	79
Transportation	45	78	88	90	95	98	118
Household	73	76	70	69	71	71	-3
Industrial process	20	47	58	63	64	69	245
Agriculture/livestock	17	18	16	16	16	16	-6
Waste	25	16	16	16	16	16	-36
Total	310	453	529	548	569	582	87.4

Source: Korea Energy Economics Institute

Cop12, UNFCCC in Nairobi 6-17 November 2006

The Korean government has promoted various reduction policies in order to participate in efforts to resolve the global warming. The MOE has allotted KRW 4.4 trillion for 22 projects from 2005 to 2007. This includes building the infrastructure for a GHG trade system, development of next-generation environmental technology challenging climate change, expanding the supply of zero-, low emission vehicles including hybrid electric vehicle, measuring greenhouse gas levels in the atmosphere of Korean Peninsula, and monitoring ecological changes due to climate change.

Ozone Layer Protection

In order to reduce the use of Ozone Depleting Substances (ODSs), the UNEP has come up with the Montreal Protocol on Substances that Deplete the Ozone Layer, which sets out phase-out periods for the production and consumption of ODSs. Korea joined the Protocol in 1992 and has reduced the production, import, and consumption of such materials each year.
As a result, the consumption of ODSs such as CFCs has decreased by 81% from 28,953 ODP (Ozone Depletion Potential) tons in 1992 to 5,573 ODP tons in 2004.

Trend of ODS consumption

(Unit: ODP ton)

Substances	1997	1998	1999	2000	2001	2002	2003	2004	2005
Total	14,081	8,215	10,327	12,424	9,241	10,108	7,872	5,573	3,504
Annex A substances (CFC, Halon)	13,153	7,660	9,599	10,254	9,205	8,834	7,430	6,420	3,586
Annex B substances (CCl_4, 111-TCE)	928	555	728	2,170	36	1274	442	△847	△82

Source: Ministry of Commerce, Industry & Energy

International Environmental Treaty

As global environmental problems have become a new issue in international society, various environmental treaties, which have a direct impact on each country's environmental policies and economic activities, have increased in number. There are about 221 international environmental treaties. Korea has signed 45 including the United Nations Framework Convention on Climate Change, the Vienna Convention for the Protection of the Ozone Layer, the Montreal Protocol on Substances that Deplete the Ozone Layer, the Convention on International Trade in Endangered Species of Wild Fauna and Flora, the Convention on Biological Diversity, the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, and the United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa.

International Environmental Treaties Signed by Korea

Classification	Total	Air & Climate	Freshwater protection	Marine & Fishery	Nature & Biological resources protection	Nuclear safety	Hazardous substances & Waste	Others
Adoption	221	14	15	86	50	13	13	30
Entry into force	164	10	9	66	40	12	8	19
Joining	45	7	-	16	7	6	2	7

Source: Ministry of Environment

Promoting Environmental Cooperation in Northeast Asia

As regional environmental problems such as the dust and sandstorm issue have become more serious, the need for strengthening regional environmental cooperation regimes has increased. Northeast Asia is a region where rapid changes for continuous economic growth and improvement in living standards have occurred, and joint efforts for environmental conservation among states are urgently called for. According to this need, active promotion of multi-lateral environmental cooperation is taking place in Northeast Asia since the 1992 UNCSD. Initiatives include the Northeast Asian Conference on Environmental Cooperation (NEAC), the Northeast Asia Sub-regional Program on Environmental Cooperation (NEASPEC), and the ADB-GEF project on prevention and control of dust and sandstorms.

In particular, since the Tri-partite Environment Ministers Meeting was formed based on ten years of cooperative experience, it has played a pivotal role in environmental cooperation in the region. The 8th conference, to be held in China, will evaluate the previous projects of the TEMM and discuss new projects to be adopted.

Ongoing TEMM projects

Projects	Overview
Ecological conservation in North-west China	The northwestern area of China has been experiencing rapid desertification in recent years as a result of over-grazing, water shortages, etc. The much attention is paid to frequent dust and sandstorms (DSS), which has become exacerbated by droughts and land degradation in Northeast Asia including Northwest China. The project encompasses capacity building to mitigate problems related to DSS and a pilot Eco-Village Project, etc * 2005 budget: KRW 144 million
Freshwater(Lake) Pollution Prevention Project	The project includes: an annual international symposium on the prevention of freshwater (lakes) pollution hosted by the three countries in turn; west lake water quality management system project; joint field investigation for Lake Xihu in Hangzhou and Lake Taihu in Jiangsu, China; technical training program on water quality management schemes; creation of a uniform guideline in english for water quality management of eutrophic lakes. * 2005 budget: KRW 100 million
Environmental industry cooperation	Three countries recognized the need for tripartite cooperation in developing environmental technology. Roundtable on environmental industry has been held since 2001 on a yearly rotating basis. This roundtable encompasses international environmental technology exhibition, environmental technology seminar, etc. * 2005 budget: KRW 26.6 million
Joint Environmental Training Project	The program aims to establish a basis of cooperation among the three countries by promoting personnel exchange of environmental officials and developing their network. This project has been conducted since 2001 on a yearly rotating basis with national training institutions of the three countries as the focal points * 2005 budget: KRW 33 million
TEMM Website	The National Institute of Environmental Research (NIER) of Korea has a central role in creating the official TEMM website (http://www.temm.org/) with the Japanese and Chinese focal points in order to disseminate the results of Tripartite Environment Ministers Meetings. The site provides information including TEMM Joint Communiques and other documents, and reports on the progress * 2005 budget: KRW 19 million
Tripartite Environmental Education Network	TEEN holds experts' workshops and open symposiums on environmental education annually since 2000. It also established a database of outstanding public environmental organizations of each country, and introduces their activities on the official TEMM website. The most significant thing is that TEEN is motivated not by the government but by the private sectors. It has contributed to creating and strengthening a human and organizational network in the field of environmental education of the three countries. * 2005 budget: KRW 78 million

Source: Ministry of Environment & www.temm.org

Environmental Cooperation with Southeast Asia

Environmental cooperation with Southeast Asia started in this decade, but lags behind the level of cooperation with Northeast Asian countries such as Japan and China. However, after 2002, channels of cooperation have been built through the ASEAN+3 Senior Officials Meeting, and the Environmental Ministers Meeting, and various cooperative projects have been pursued.

The environmental cooperation projects that the MOE has carried out include education/training program, research on each country's environment through Knowledge Partnership Program, KOICA's Official Development Assistance, and technology/policy support through dispatch of experts.

Ongoing cooperation projects with ASEAN countries (2005)

Projects	Period	Funds(USD)
Knowledge partnership projects		
Study on building the eco-city in Hai-phong, Vietnam	'05.6 ~ '06.5	180,000
Strategy on district development in Laos	'04.5 ~ '05.6	36,600
Levy of wastewater charge in water quality management area of Philippine	'05.2 ~ '06.1	49,400
Introduction of trade system in water quality management area of Philippine	'05.2 ~ '06.1	70,000
Environmental management of Vietnam industries	'05.7 ~ '06.6	180,000
Development of environmentally-friendly cities in East-Asia	'05.9 ~ '06.6	100,000
ROK-ASEAN special cooperation fund		
"Restoration of Degraded Forest Ecosystem in the Southeast Asian Tropical Region" (1st)	'00.7 ~ '05.6	2.45 million
"Restoration of Degraded Forest Ecosystem in the Southeast Asian Tropical Region" (2nd)	'05.6 ~ '08.6	1.05 million

Source: Ministry of Environment


Outline

# of MOE Policies

- Coexistence of Environment and Economy
- Environmental Health Policy & Management of Hazardous Chemicals
- Nature Conservation
- Air Quality Management
- Water Quality Management
- Improvement of Water Supply Systems
- Circulatory Waste Resources Management System
- Partnership with Interested Parties and Environmental Education
- Environmental Dispute Resolution

Coexistence of Environment and Economy

The Ministry of Environment is pursuing environmental policies that facilitate a win-win synergy between the environment and economy by achieving economic development while protecting the environment.

Establishment of Green Business Management & Green GDP

The Ministry of Environment has developed environmental management guidelines to make business management and production more environmentally-friendly. Also, MOE has increased the number of items to be entitled to the eco-label and expanded the range of the subject of Common Criteria Recognition Arrangement (CCRA). And, “Act on Promoting the Purchase of Environmentally-Friendly Products” has come into effect on July 1, 2005, in an attempt to encourage purchase of environmentally-friendly products by requiring government agencies to buy green products. The Ministry is also implementing a 10-year plan to establish an integrated account of the environment and economy in order to calculate the Green GDP.

Development of Environmental Technology

The Korean government is pushing forward “Eco-Technopia 21 Project (ET21) (2001~2010),”with the aim to join the ranks of advanced countries in the environmental industry. The government invested KRW 368 billion from 2001 to 2005 for the implementation of 751 projects. In 2006, it is expected that KRW 93 billion will be invested. Since 2004, strategic environmental technologies have been selected as future growth engines and are being managed separately under the “ECO-STAR Project (2004~2010).” This project includes the development of technologies that have the high promise for marketability and success (e.g. zero- or low-emission vehicles; advanced water treatment processes). In addition, financial support will be provided to 10 universities until 2009 in order to train highly-skilled manpower in the fields of core environmental technology. Also, education in new technologies will be provided at “Environmental Technology Education Center” to foster professionals in environmental industries.

Nurturing Environmental Industry

Korea established the Environmental Industry Development Strategies in 2001 and has been implementing the strategy to support Korean companies so that they can enter the global environmental market, which has grown by more than 3% each year. To build the developing infrastructure of environmental industry, the Korean government made a plan to introduce environmental consulting services industry and amended the relevant Act in 2005.

The Korean government is supporting environmental industries through assisting conferences, exhibitions and joint technology development. Currently, those supports are focused on activities in China and Vietnam with yearly environmental ministers meeting. Yet, the Korean government is expanding the cooperation in the environmental industry to other regions.

Environmental Health Policy & Management of Hazardous Chemicals

In 2006, MOE established “Comprehensive Ten Year Environmental Health Plan (‘06.2)”, aiming at switching to receptors-centered environmental policy from the environmental media-oriented one . In addition, MOE amended the Toxic Chemicals Control Act in 2004 to introduce a Risk Assessment System, and Chemical Treatment Restriction which limits the use of hazardous substances with high level of risk. This revised Act has come into force from January 2006. In order to comply with the Stockholm Convention on Persistent Organic Pollutants (POPs), MOE is planning to enact a Persistent Organic Pollutants Management Act. Therefore, basic researches focusing on finding out the range of contamination by endocrine disruptors will be turned into an in-depth investigation on areas that are suspected to be influenced by POPs. The ministry will extend support for related agencies to establish cooperation among those agencies and to strengthen international environmental cooperation to control and manage endocrine disruptors.

Nature Conservation

Korea has diverse natural habitats and abundant bio-diversity: 65.4% of the land is covered with forests and three sides of its land are surrounded by the ocean. This is why it has long been called “Geum-Su-Gang-San,” which refers to a beautiful land seemingly embroidered with silky threads of mountains and rivers.
Due to the supply-oriented development policies for the past 40 years, Korea is facing the degradation of natural environment such as the destruction of ecosystems as well as the reduction of forests in the Baekdudaegan (the Baekdu Mountain Range) and tidal flats in many islands and coastal regions. However, as living standards improve, people long for sustainable development, with which nature and society can live together in harmony.

Conservation of Scenic Beauty & Ecosystem

The Natural Environment Conservation Act amended in December 2004 was a breakthrough to prevent development projects from recklessly destroying scenic beauty. One of the biggest improvements as the introduction of the Assessment System for Natural Sites of Scenic Beauty, which is reviewed by the Environmental Preservation Advisory Committee under the MOE or the Landscape Review Committee under the Regional Environment Office.
To protect the scenic view and bio-diversity on the Korean Peninsula, the government designates protected

areas: Ecosystem conservation area; Wetland protection area; Natural parks; Special islands (including Dokdo); Wildlife protection area . Korea has several internationally-recognized areas with high conservation values. Three wetlands (i.e. Jangdo Island moor, Yong moor of Mt. Daeam, Woopo wetland) are registered in the Ramsar List of Wetlands of International Importance under the Ramsar Convention. Also in October 2004, Mt. Guwol was designated as the fourth UNESCO Biosphere Reserve of Korea along with Mt. Baekdu (in DPRK), Mt. Seorak (3,932㎢), and parts of Jeju Island (Mt. Halla, two stream corridors, and three islets, 831㎢).

Eco-Network on the Korean Peninsula

Recently, MOE has created a concept of integrated eco-network enabling animals to move from the northern part to the southern part of the Korean Peninsula. Therefore, the government selected Baekdudaegan (Baekdu Mountain Range), the Demilitarized Zone (DMZ), and Islands and Coastal regions as the national ecological corridors and has been implementing the conservation measures on the eco-system of three areas.

Protection of Biological Resources and Wildlife

According to the Wildlife Protection Act (2005), MOE designated 221 endangered species (50 for category Ⅰ and 171 for category Ⅱ) and added articles to punish people who knowingly eat illegally captured wildlife and its processed food. Comprehensive Measure for Conservation of Biological Resources (2005~2014) was established in January 2005, which includes systematic investigation of biological resources, discovery of endemic species, restoration of endangered species and strengthened management of invasive species.

The government plans to make 'Distribution Map of Fauna and Flora in the Korean Peninsula,' containing all the information on biological resources, which include endemic species, indigenous species and undiscovered species which are estimated to be about 70,000. The government will also open the National Biological Resources Center to the public in 2007.

Precautionary Environmental Management System for National Land

Since 1981, the Environmental Impact Assessment (EIA) System has been in place, which reviewed and evaluated environmental impacts before any development projects took place. Pre-Environmental Review System was also introduced in August 2000 to strengthen the EIA system. The government amended the Framework Act on Environmental Policy in May 2005 to introduce the Strategic Environmental Assessment (SEA), which has been enforced since June 2006. SEA requires the developer to take into account alternatives and reflect opinions of experts, civic groups, and residents in the planning stage.

Air Quality Management

The air quality deterioration from aggressive industrial activities and soaring number of vehicles is one of the most serious challenges that Korea has experienced in the past several decades. In particular, health problems caused by air pollution have called for immediate actions to be

taken. To tackle these problems, the MOE has not only set up air quality improvement targets on six substances (SO_2, CO, NO_2, PM10, O_3, Pb) but introduced measures to achieve these goals. The measures include Special Measures for Metropolitan Air Quality Improvement, a landmark policy that stipulates tightened emission standards, cap and trade system, and the supply of low emission vehicles, etc.

Ambient Air Quality Standard

Korea took initial steps by setting the ambient air quality standard on nitrogen oxide in February 1979, followed by standards on carbon monoxide, nitrogen dioxide, TSP (Total Suspended Particulate), ozone, and hydrocarbon in 1983, and lead in February 1991. In 1993, the standard on such substances as sulfurous acid gas and carbon monoxide was tightened as the pollution level of those substances fully achieved the ambient standard. TSP has been replaced by PM10 starting in 1995; only PM10 has been monitored since 2001.

The Ministry of Environment and local governments are operating 10 types of monitoring networks aiming to measure the six substances, visibility, photochemicals, heavy metals and hazardous air pollutants, etc in various places. As of December 2005, 370 monitoring stations are in operation.

Special Measures for Metropolitan Air Quality Improvement

Metropolitan areas (Seoul and its vicinities) take up only 12% of the total national land, but account for 47% of the total population and vehicles, already exceeding the environmental capacity. To improve the air quality of metropolitan area, the Ministry of Environment established Special Measures for Metropolitan Air Quality Improvement, which includes emission cap and trade system, supply of low emission vehicle and improvement of in-use vehicles. The measures were followed by the Special Act on Metropolitan Air Quality Improvement in December 2003, which has been enforced since January 2005. It is expected the investment for the above countermeasures will amount to KRW 4.3 trillion and lead to the substantial improvement of particulate matters and nitrogen oxides in Metropolitan areas.

Point Source Management

To control point sources operating in industrial complexes, the MOE has set emission standard for each emitter and gradually fortified it. Emitters are categorized into five groups according to the annual emission. The more emission, the stronger control is applied. Meanwhile, large-scale emitters have been required to install Tele-Monitoring System (TMS) in the stacks since February 2002. TMS data are utilized for the administrative purpose such as imposing the emission charge and calculating the emission for the cap and trade system, etc. As of June 2006, 2,197 TMS were installed in 878 smoke stacks of 370 industrial emitters.

Vehicle Emission Management

Efforts are also being made to fundamentally reduce exhaust, which is the biggest contributor to air quality degradation (In the metropolitan region only, 67% of PM10 and 51% of NOx are originated from exhaust). The government has set the exhaust emission standard on new and in-use vehicles as well as the fuel standard. In particular, starting in 2006, emission standard on new gasoline and natural gas vehicles will be strengthened to the level of ULEV (Ultra Low Emission Vehicle) and that on diesel vehicles to the level of EURO-4.

MOE has started to replace high particulate emission diesel vehicles with Natural Gas Vehicles (NGVs) since 2000. As of July 2006, the Korean government has supplied 10,500 NGVs and will bring in a total of 23,000 NGVs by 2010.
Also as for the reduction measure on exhaust from in-use diesel vehicles, MOE is executing the installation of Diesel Particulate Filters (DPF) and Diesel Oxidation Catalysts (DOC).

Noise & Vibration Management

Industrial plants located near residential areas are required to attain a license and comply with the noise standard by MOE. The government also promotes other measures to control excessive municipal noise such as encouraging the installation of noise and vibration prevention devices and arranging working hours in construction sites.
In particular, a noise labeling system for construction equipment was introduced in December 2004 in order to reduce noise in construction sites as the noise complaints have been soaring at construction sites. MOE is also endeavoring to tackle the problem of noise from transportation, which includes installation of noise protection walls, expansion of noise control areas and train noise-monitoring network.

Countermeasures for New Environmental Demand

In recent years, the Sick House Syndrome has been globally recognized as a significant environmental problem, which is also an emerging environmental challenge in Korea.
MOE brought in the Indoor Air Quality Management Act (May 2004). The Act states that the substances such as formaldehyde and fine particulate are kept under the standard and the builder of a new apartment measures the indoor air quality and announces the result. MOE established the recommended indoor air quality standard for the new apartments in January 2006. As a multilateral approach to indoor air quality improvement, MOE also plans to expand the affected places of the Act and improve the air quality of public transportation.
Meanwhile, MOE put into force Foul Odor Prevention Act in February 2005 to control offensive odor, designated an odor management area and set up the emission standard.

Water Quality Management

Since the 1960s, the government and the public have recognized the need to address the deterioration of water resources due to rapid industrialization and urbanization, especially after the safety of tap water became a social problem. The Office of the Prime Minister led the way in establishing Comprehensive Measures on Clean Water Supply in 1989.
The measures mainly focused on end-of-pipe controls like constructing sewage treatment facilities. But this was unable to meet the demand for clean water, and so in 1998, the Comprehensive Water Quality Management Measures for the Four Rivers was established; the four rivers are Han River, the Nakdong River, the Geum River, and the Yeongsan River. To facilitate the implementation of the Plan, the Act on Watershed Management and Community Support was introduced for each river from 1999 to 2002.

The Comprehensive Water Quality Management Measures for the Four Rivers strengthened preventive measures like TMDLS (Total Maximum Daily Load System). It has also set up the joint management system encompassing upstream and downstream.
More than 400 explanatory meetings, public hearings and forums have been held to reach an agreement between residents in the upstream and downstream areas.

Total Maximum Daily Load System

The TMDLS allows total discharge of pollutants within the range of water quality targets set by river basins. This system guarantees both water quality conservation and regional development to the extent which regional development would be made as long as the total discharge of pollutants is controlled.
Currently, the TMDLS is being implemented in 59 municipalities in four river basins: the Han River (1), the Nakdong River (18),the Geum River (23), and the Yeongsan River (17).

Designation of Riparian Buffer Zones

Riparian buffer zones are established for the areas up to 300m~1,000m from the water edge along the upstream banks of tap water sources. In the buffer zone, new pollution-causing activities are restricted.
As of January 2006, about 1% of national territory (about 1,130 ㎢) was designated as riparian buffer zones in the four river watersheds.
The government has bought 12 million m^2 and is building riparian buffer forest, which aims to restore the riparian ecology and to abate the impact of non-point sources on the watershed.

Establishment of Environmental Treatment Facilities

As of 2004, KRW 26.1 trillion has been invested for building facilities to treat wastewater from household, industry, livestock farming, etc. As a result, 630 facilities (22.63 million tons/day) are in operation and the treatment rate has increased up to about 80%.

Restriction on Factory Construction & Strengthening Emission Standards

MOE has restricted approvals for factories that will discharge specific water pollutants into catchments areas located 20km upstream from tap water sources. In addition, MOE raised the maximum permissible BOD of the effluent standard from 60~80ppm to 30~40ppm.

Strengthened Management on Livestock Waste Water & Non-point Source Pollution

In association with the Ministry of Agriculture and Forestry (MAF), MOE established Countermeasures for Livestock Waste Management and Use in November 2004, which aim to reduce the generation of livestock excretions, reuse as fertilizers or manure and properly treat the final residues.
In March 2004, Office of the Prime Minister led the plan to reduce pollutants from non-point sources by 34.3% (from 381 tons/day to 250 tons/day) until 2020, which was established in coalition with other governmental agencies. This plan includes such activities as institutional enhancement, on-site investigation and research, pilot plant to treat pollutants from non-point sources, etc.

Cooperative System among Upstream and Downstream Areas

MOE has levied a water use charge on end users in order to make up for the loss of upstream residents caused by land use restriction, and also to promote water saving by raising water price. The collected water use charge is used to support the upstream residents and to build and operate environmental facilities such as sewage treatment plant. In 2005, water use charges with the range of KRW 110 and 140 per ton were levied on, and a total of KRW 551 billion was collected.

Water Environment Management Master Plan

Due to the implementation of the Comprehensive Water Quality Management Measures for Four Rivers, water quality level in the main tap water sources is kept in the range of Grades I and II. Also, rivers are steadily making progress in achieving the water quality target.

Meanwhile, the Water Environment Management Master Plan proposed by MOE aims to promote ecologically healthy water environment to ensure high quality water, which breaks away from the previous policy geared toward point sources that discharge conventional water pollutants. To materialize this plan, MOE will pursue the following measures: firmly establishing TMDLS; strengthening toxic water pollutants management; improving environmental soundness of rivers; expanding the support for the local residents near tap water sources; fortifying riparian buffer zones management; setting up the governance system; promoting local residents' involvement in decision-making.

Improvement of Water Supply Systems

Korea has 30% higher annual precipitation (1,283mm) than world average (973mm). But due to high population density, the average annual rainfall per capita (2,705m^3) is about only 10% of the global average (26,800m^3). Also, the available water resources are only 1,550m^3 per capita, which is the reason why Korea is classified as a water-stressed nation. Despite concerns about water shortages, Korea's water usage per capita is high compared to other OECD countries.

The countermeasures of Korean government have been tilted to water supply, in particular dam construction. But it is estimated such dam-oriented supply policy has now reached its limit due to environmental degradation and opposition from local residents.

MOE has established Comprehensive Plan for Water Saving in March 2000 and is shifting the focus of relevant policies from water supply to demand management. Also, MOE is making efforts to ease the imbalance in waterworks and sewerage supply between rural and urban areas.

Expanding Waterworks and Sewerage

As of December 2004, 90.1% of the Korean population had access to waterworks and 81.4% were covered by sewerage. Moreover, the capacity of waterworks is 23.15million m^3/day and that of sewerage is 21.53million m^3/day. MOE will continuously expand the waterworks and sewerage to provide the clean tap water and improve the water quality of tap water sources.

Strengthening Water Purification to Supply Safe Tap Water

Water quality has deteriorated as more sewage water and wastewater are discharged into watersheds. Hazardous pollutants are also released from the industries. Therefore, some treatment plants needed to introduce advanced water purification methods. As of 2004, three plants with advanced purification methods were operating in Paju, Daegu, and Changwon. A "treatment technique standard" was introduced to eliminate viruses, which was one of the main reasons of public distrust to tap water. A comprehensive program to improve the efficiency of water treatment plants was developed (April 2003). Technological support was also provided to water treatment plants that showed poor performance and 70 small-scale waterworks.

For the period of 1997-2011, KRW 3.8 trillion will be invested to replace 42,757km of old water pipes to prevent degradation of tap water and reduce water leakages.

Implementation of Water Management Strategy for Efficient Water Use

The Korean government has been implementing Comprehensive Plan for Water Saving, which encompasses such activities as distributing water saving equipment to households and installing grey water and rain water-using systems. This plan saved 674 million tons of water, which is equivalent to KRW 602.4 billion including KRW 402.5 billion for tap water production and KRW 199.9 billion for sewage treatment.

Sewage & Excretions Treatment

In the early 1990s, Korea began installing sewage treatment plants after establishing Comprehensive Measures for Clean Water Supply. As of 2005, sewerage supply rate has reached 81.4%. However, the feasibility of installing pipelines in the regions like rural areas where pollution sources are highly dispersed is low. Therefore, such regions cannot rely only on sewage plants to treat sewage water. With the recent increase of flush toilets, most of excretions are treated with sewage. Districts with separate sewerage systems have excretions linked directly to the sewage treatment plants, and regions with combined systems have them go through septic tanks before transferred to treatment plants. Sewage water and excretions in non-sewerage areas are treated by septic tanks or individual treatment facilities.

Improvement & Efficient Management of Sewerage

According to the Comprehensive Measures for Water Management in August 1996, KRW 16.6 trillion was invested from 1996 to 2005 to expand sewage treatment plants, and more efforts will be made to improve the water quality of tap water sources to Grade Ⅱ. As of the end 2004, 268 sewage treatment plants were operating, thereby meeting the goal of increasing the supply rate of sewerage systems. Since the Ministry of Environment designated 2002 as the 'First Year of Sewage Pipelines Repair' and organized a task force, MOE has set up the comprehensive plan for repairing sewage pipeline and implemented efficient measures. In particular, MOE conducted pilot projects from 2002 to 2005 for the nine local governments nearby Paldang Lake (main tap water source for metropolitan areas) by investing KRW 650 billion.

Circulatory Waste Resources Management System

As the Korean economy had expanded rapidly for the past 40 years, waste generation has continued to increase (1,836kg/ha). But construction of incinerators and landfills has been getting harder due to the Not In My Backyard (NIMBY) syndrome.
In this context, the government established the 2nd Comprehensive National Waste Management Plan (2002-2011) in March 2002. The Plan has proposed as a policy goal the "establishment of a resource-circulating socio-economic framework." In order to realize this goal, MOE has been taking such measures as waste reduction, maximization of waste recycling, and safe and sanitary treatment of unavoidable wastes.

Minimizing waste generation

Volume-based Waste Fee (VBWF) System

The government introduced Volume-based Waste Fee (VBWF) system in 1995 in order to reduce and promote the recycling of municipal wastes. VBWF system charges volume-based waste treatment fee on households by having them buy designated disposal bags and providing free collection service for recyclable wastes. It is believed that VBWF system is highly effective in reducing waste generation and promoting the recycling of waste.

Regulation on Disposable Products and Packaging Materials

The use of disposable products has been regulated since March 1994, leading to significant reduction of the use of shopping bags in stores. Also, plastic cups, containers and lunch boxes are replaced by paper equivalents, which are environmentally friendly. Meanwhile, large discount retailers raised the price of plastic bag from KRW 20 to 50 in May 2002 to reduce the use of plastic bags, and have promoted the use of cloth shopping bag by giving incentives such as discount mileage, or coupons to those customers who bring their own cloth shopping bags.
MOE is also enforcing three key measures to reduce the generation of packaging waste: regulation on packaging material; controls on packaging methods; yearly cut-back on plastic packaging material. The packaging material regulation controls the use of unrecyclable plastic. Since September 1993, the use of expanded polystyrene (EPS) has been banned on toys and all the packaged products. And since January 2001, PVC shrink film and packaging materials which are laminated or coated with PVC have been prohibited. In addition, PVC has been banned on packaging materials for eggs, deep-fried food, hamburgers and sandwiches since January 2004.

Food Waste Reduction

The government has been implementing a wide variety of policies to reduce waste generation from the source and recycle food waste as much as possible. In an attempt to stress the importance of reducing food waste and elicit

public participation, the Korean government has been offering education programs and conducting campaigns in collaboration with NGOs since 2002. The government also launched a PR program through TV commercial, outdoor electronic billboards and advertisements in theaters and subways.

Waste Recycling

Extended Producer Responsibility (EPR) System

While the waste generation has been reduced and recycling increased since the implementation of the Volume-based Waste Fee System and Waste Deposit-Refund System, the waste reduction and recycling in production area was limited due to inadequate management system.

In response, the government abolished the Waste Deposit-Refund System and introduced Extended Producer Responsibility (EPR) system in 2003, which covered 15 items including paper cartons, glass bottles, metal cans, packaging film, batteries, tires, lubricants, electronic products. Afterwards, more products became subject to EPR; mobile phones and audio players were added in 2005 and facsimiles, printers and photocopy machines in 2006.

Recycling Food Waste

Diverse measures were implemented under the Master Plan on Utilising Food Waste as a Resource in September 1998. The goal of the Plan was to reduce the total generation by 10% or more and to recycle the generated food waste by 60% or more by 2002. As of 2004, 81.3% of food waste was recycled as livestock feed and compost.

To promote the utilization of food waste as resources, the government invested KRW 121.6 billion by 2004, which has been used for building facilities and buying the required appliances, etc. For a stable operation of the facilities, the government forced the operator to periodically test the performance, and strengthened installation standards. In addition, the Korean government has made efforts to disseminate advanced technologies through seminars and workshops since 2005.

Construction Waste Recycling

Improvement in the living environment and the boom of rebuilding and redeveloping projects in Korea had resulted in the soaring of construction waste from 10 million tons in 1996 to 54 million tons in 2004. Concrete and asphalt accounted for 42.3 million tons (78.1%) of the construction waste generated in 2004.

As a result, the Act on the Promotion of Construction Waste Recycling was introduced in December 2003 and the Enforcement Ordinances and Regulations of the Act were established in January 2005 in order to institutionally support the recycling of construction wastes. Under this Act, road construction, construction of industrial complex sites or environmental facilities, and sewage pipeline installation are subject to use recycled aggregates.

Meanwhile, for the stable supply of recycled aggregates, web-based Construction Waste Management System (CWMS) has been established in 2006, which links suppliers and users with regard to the information of production and demand and quality of recycled aggregates. Moreover, in order to encourage the use of high-quality recycled aggregates, MOE plans to introduce quality standards and certifications for recycled aggregates.

Recycling Landfill Gas

To prevent secondary pollution and global warming in the process of treating landfill gas, landfill gas power plants have been built nationwide and 8 landfills including the Saenggok landfill in Busan produce electricity. Three more landfills including the Daegu Dasa Landfill are being equipped with relevant facilities.

Proper treatment

Electronic Waste Manifest System

The six paper forms have been used since 1999 for the legal verification of industrial waste treatment, i.e. from producers through collector and transporter to disposer. But, it was estimated that this system requires manpower and costs too much since all the work is done by handwriting and reported to the administration body by post service. This system also has limitation in identifying the illegal activities. To solve these problems, the government introduced the Electronic Waste Manifest System under which all the information on production, collection, transportation and treatment of waste is registered on the website (www.wms-net.or.kr). This new system has come into force since 2003 after the pilot projects in 2001-2002. Until 2006, all the industrial waste generators (about 35,000) are subject to this system. The government expects that the Electronic Waste Manifest System will lessen the costs and efforts of affected places and further improve industrial waste management.

Management of Infectious Waste

Waste from hospitals has high potential for secondary infection when inappropriately treated. Therefore, institutes generating infectious wastes are required to follow strengthened regulation for the proper treatment.

Infectious wastes like discarded surgical instruments and needles as well as liquid-type medical waste are to be stored in the designated plastic containers. Also, more stringent emission standards of dioxin and air pollutants are applied for the incinerators of infectious waste; and Tele-Monitoring System is enforced to monitor the pollutants on a real-time basis.

The Korean government successfully conducted the pilot project on 'Infectious wastes management system using Radio Frequency IDentification technology from June 2005 to March 2006, which applied an electronic tag to the designated container to trace the process of infectious waste treatment in a real time. With the success of pilot projects, MOE plans to enforce this system from the second half of 2006.

Partnership with Interested Parties and Environmental Education

Green City

Local government with an outstanding environmental management record is being selected every 2 years as a "Green City" in order to encourage local governments to implement environmentally friendly administration.

Partnership with Other Social Sectors

Currently, MOE is closely cooperating with the Ministry of National Defense to enhance the environmental management in military bases. Other efforts have also been made to strengthen partnership with all sectors of

society including holding policy conferences to allow negotiations between NGOs, religious organizations, and other enterprises.

Promotion of Environmental Education in Schools and the Society

Thirty two schools have been designated as pilot schools on environmental education (13 kindergartens, 13 primary schools, 3 middle schools, and 3 high schools). MOE provides financial support and environmental education materials to these pilot schools.

MOE is running a youth environmental education program, which includes visits to environmental facilities, tidal flats, and outstanding eco-tour sites. In addition, a traveling environmental class is in operation over places where there is no environmental education facility. Also, MOE is developing environmental education text books. So far, 12 text books have been published and 8 more are on the way.

Environmental Dispute Resolution

The Korean government brought in the Environmental Dispute Adjustment Act in August 1990, followed by the formation of the National Environmental Dispute Resolution Commission (NEDRC) and Local Environmental Dispute Resolution Commissions in 16 cities in July 1991.

The National Environmental Dispute Resolution Commission is a permanent commission with 9 members including the Commissioner. NEDRC coordinates a dispute when the reported damages exceed KRW 100 million or the governments are involved. On the other hand, the Local Environmental Dispute Coordination Commission deals with cases with damages of less than KRW 100 million and disputes that take place in the jurisdictions of cities and provinces.

From 1991 to 2005, a total of 2,550 environmental disputes were reported and 2,044 of them were successfully settled. Since environmental disputes are expected to grow continuously in various sectors due to the increase of public demand for a pleasant living environment, NEDRC is endeavoring to strengthen the expertise of people responsible for settling environmental disputes, to promote scientific and structured negotiation procedures and ensure transparent decision-making processes.

Featured MOE

Policies & Efforts

- Environmental Health Plan for 2006-2015
- Recommended Standards for Indoor Air Quality of New Apartments
- Strategic Environmental Assessment (SEA) System
- Electronic Waste Manifest System

Environmental Health Plan for 2006-2015

Environmental Health Policy Division

Concerns over public health have been raised since 2000 due to environmental pollution and exposure to chemicals. In 2004, concerns over the outbreak of diseases from cadmium contamination were raised by residents living near an abandoned mine at Gosung, Kyungnam; other cases involve sick house syndrome caused by harmful substances from building materials or wallpaper, the prevalence of asthma and atopy caused by dust particles and VOCs, and far higher mercury levels in the blood than in the US, Germany or other nations. Health concerns over environmental pollution have been raised sporadically in the past; however, they were quite different from the current ones.

Background

National and overseas research results indicate a clear correlation between the environment and health. According to the World Health Organization (WHO), about 1million people in Asia die of environment-related factors annually and 25~33% of diseases in industrial nations arise due to environmental factors. The European Commission announced that there are about 310,000 early deaths annually due to contaminated air, and the European Environment Agency (EEA) reported that one out of seven European children suffers from asthma. According to research by Inha University in Korea, one out of four children has asthma or atopy symptoms. Likewise, the reason for increasing health concerns caused by environmental pollution lies in the increasing frequency of exposure to chemicals as the use is on the rise.

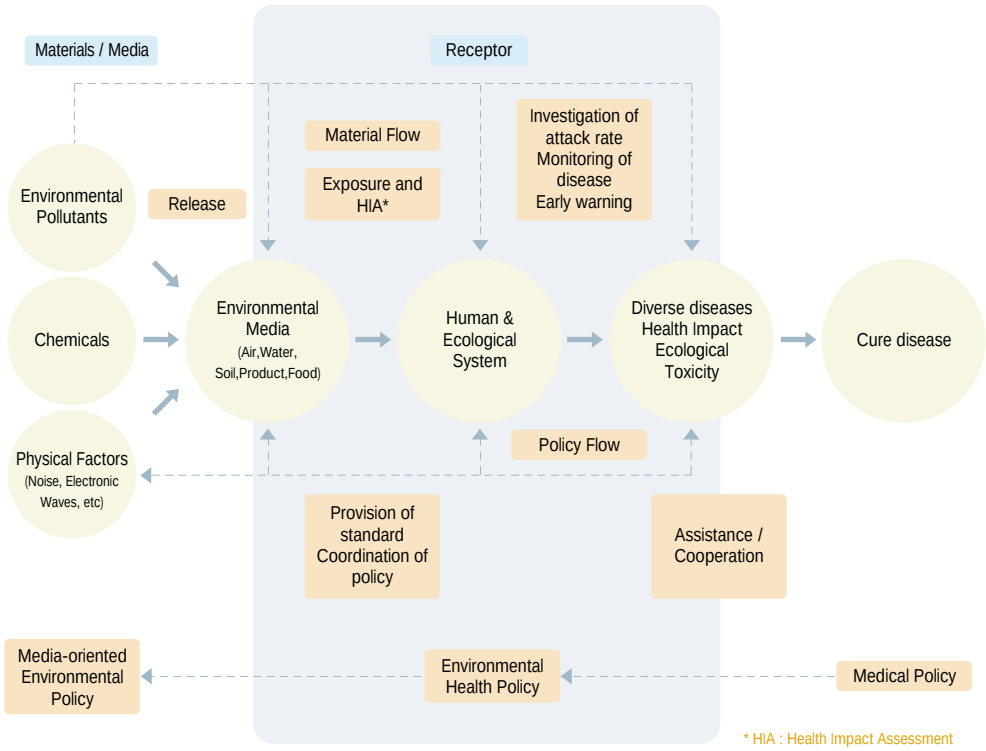
Along with that, enhanced public awareness of environment, widespread new life styles like "Well-being" and "LOHAS" (Lifecycle Of Health and Sustainability), and subsequently high expectations of the environmental administration contribute to increased health concerns over environmental pollution. It has been pointed out that the past environmental administration, which focused on the pollution management policy of reducing ppm levels (pollution levels measured as parts per million), was insufficient to deal with public health problems directly. The recent MOE survey of heavy metal levels in human blood, carried out with the help of the Ministry of Health showed the mercury level is up to 4.34 $\mu g/\ell$, five times greater than that of the US and Germany. So the MOE needs to find the reason and come up with counter-measures.

In this regard, the government found it difficult to tackle public health issues according to media-centered environmental policy because the phenomenon of environmental pollution has become complex and varied, and it has, therefore, been developing environmental health policies based on integrated pollution management and precautionary principles. In particular, the government declared this year "the first year of environmental health policy" and established a mid- to long-term roadmap and an action plan for environmental health policy, a "Comprehensive Ten-Year Environmental Health Plan 2006-2015" last February.

Preparation for an Action Plan on Environmental Diseases

Environmental health policy is an intermediate sector (a gray area) between environmental policy and health policy, and is a new field of managing both environmental pollution and public health concerns. In other words, it is directly concerned with the impact of such media as atmosphere and water, soil and pollutants on receptors like humans and ecosystems.

Scope and flow of environmental health policy



Source : Ministry of Environment

According to the recently established Comprehensive Ten-Year Environmental Health Plan, the government plans to invest KRW 760 billion in a total of 158 specific projects from this year through 2015 to halve the population at risk from environmental pollution, thereby aiming to enter a league of advanced nations in the area of environmental health.

To this end, the MOE will conduct the health impact assessment of hazardous substances and also evaluation on the hazardousness of such substances in the media like air, indoor air, water and soil. By doing so, the MOE plans to minimize the population at risk through newly establishing media-integrated environmental standards and readjusting

investment priorities. Moreover, through a nationwide survey of the so-called environmental diseases like asthma and atopy, the MOE will identify the correlation between pollutants and diseases, and establish a surveillance system covering outbreaks of these diseases.

The MOE will conduct systematic research on the impact on health of exposure to electronic waves and pharmaceuticals, comprehensively investigate hazardous substances contained in children's products and evaluate their hazardousness, and thereby implement control measures for hazardous substances.

Based on precautionary principles, the MOE also plans to implement a step by step survey of environmental exposure and health effects, resulting from the development of new scientific technologies and their applications such as Nano-technology.

Introduction of precautionary policy tools like HIA

The MOE will identify the scientific cause and effect relationship between environmental pollution and the outbreak of diseases and establish a disease-surveillance system for asthma, atopy, childhood cancer, and lung cancer in connection with environmental pollution. In particular, for the protection of infants and children who are the most susceptible to the environmental pollution, the MOE will designate five to ten national and public, and private hospitals by region as 'centers for environmental diseases' from next year to take charge of conducting research on the causes of environmental diseases and their prevalence, and on arranging preventive measures. As of this February, the MOE has established the "National Center for Environmental Health (NCEH)" composed of twelve environment and health experts with master's and doctoral degrees under the National Institute of Environment Research (NIER). The NCEH aims to systematically study environmental diseases, carry out the survey of health effects and epidemiological studies on pollution-vulnerable areas like closed mines and industrial complexes, and also to develop environmental health indicators. With such activities, the MOE plans to expand the NCEH research center with expertise in environmental health study.

The MOE plans to come up with a "mid-to long-term support plan for patients with environmental diseases" that supports patients hospital expenses, if they turn out to be patients with an environmental disease; to this end, the MOE aims to set up an exclusive body for examining and determining environmental diseases and create a disease countermeasures fund.

Along with this, the MOE will introduce a Health Impact Assessment (HIA) system to systematically assess the health effects of development projects, and new policy schemes like "Burden of Disease", which will analyze the social costs of environmental diseases and the results of the analysis will be reflected in environmental policies; to this end, the MOE will put the spurs to enacting the "Act for Environmental Health Promotion" (tentatively named) this year.

In addition, the MOE plans to develop basic technologies for environmental health to back up environmental health research and policies, including precision analysis technology for biological samples, assessment technologies for toxicity and hazardousness, and environmental health assessment and environmental health indices.

Comprehensive Ten-Year Environmental Health plan is distinct from existing environmental policies on the following grounds: If a controversy arises over the hazardous nature of a certain object, the plan rests on the precautionary principle that considers the substance harmful until it is proven to be safe; the plan focuses on protecting the groups most vulnerable to environmental pollution like children and the elderly, and has set up strict management standards.

Recommended Standards for Indoor Air Quality of New Apartments

Noise, Vibration & Dust Division

Recently, new environmental health issues such as SHS (Sick House Syndrome), SBS (Sick Building Syndrome) and MCS (Multiple Chemical Sensitivity) have emerged as social problems.
SHS is defined as symptoms of fatigue, headache, itching, smarting in the eye or neck caused by hazardous chemicals such as formaldehyde, and other volatile organic compounds emitted from construction materials of newly constructed buildings.
Interest in indoor air pollution issues, including SHS, comes fundamentally from the increased use of chemicals in construction materials, and from increased time spent in enclosed spaces, often with inadequate ventilation, as well as from the boom in people's health consciousness.
According to a survey conducted by the Korea Institute of Construction Technology between July and August, 2005, about 37% of a total of 1,013 households living in new apartments said they suffered from SHS, respiratory disease and dermatitis. Out of that 37%, 51% responded that they had already sought professional medical care, or felt the need to go to a hospital.
In June, 2004, the National environmental dispute resolution commission recognized the connection between dermatitis and other SHS type problems and chemicals, and ruled that the victims of SHS should be awarded KRW 3 million in compensation.
It is thus clear that SHS issues are already widespread and measures to prevent SHS are essential.

Background

Article 9 of the Act on Indoor Air Quality Management in public places stipulates that the constructors of new apartments should measure indoor air quality and post the results on message boards or in other public places plainly visible to the residents.

> Constructors of more than 100 household-sized apartments should report the results of measuring formaldehyde, volatile organic compounds and other pollutants to the local governor, and post them in public places like entrance and exit gates, message boards and so on for 60 days (Article 9 of the Act on Indoor Air Quality Management in public places and Article 7 of ministerial decree of the same Act).

The reason for imposing the obligation of measuring and reporting indoor air quality on constructors of new apartments is to induce them to use eco-friendly construction methods and environmentally-friendly materials emitting lower amounts of formaldehyde and volatile organic compounds, which are SHS causing substances.
However, there is no standard for indoor air quality and so residents are not clearly able to judge whether air quality is acceptable. In addition, there was the problem of overheated competition due to the comparison of the measurement outcomes of different constructors.

For these reasons, therefore, the MOE revised the Indoor Air Quality Management Act for public places in May 2005, so that it now stipulates the recommended standard of indoor air quality for new apartments as set by ministerial decree. Those standards went into effect January 1st 2006.

The Process for Setting the Recommended Standards

The MOE established the range of the recommended standard based on risk assessment and actual surveys of indoor air quality in 266 new apartments on the capital area from June 2004 to May 2005. In May, the MOE held a public hearing open to concerned experts, civic groups and relevant businesses in Seoul and Busan and confirmed the range of the recommended standard.
From April to August 2005, the MOE conducted an additional nationwide survey on 733 new apartments. And referring to the result, the MOE prepared the draft recommended standard considering the current indoor air quality level and local technology level.

Recommended indoor air quality standard for new apartment

(Unit: ㎍/㎥)

Substances	Monitoring result			Recommended standard	Range of recommended standard[1]	Standard of WHO & other countries[2]	Unattainment ratio to recommended standard[3]
	Avg.	Med.	Max.				
Formaldehyde	294	210	1,497	210	100~350	30~120	49.8%
Benzene	6	4	92	30	5~45	16~110	0.4%
Toluene	1,003	773	5,013	1,000	850~1,300	260~1,092	39.8%
Ethyl Benzene	120	62	1,192	360	360~1,500	1,447~3,800	4.4%
Xylene	287	138	2,723	700	240~700	870~1,447	11.5%
Stylene	64	42	531	300	300~1,500	30~300	2.3%

Note : 1. The range is suggested based on the 1st monitoring result by the MOE in May 2005.
2. Standard of WHO and other countries is applied when the value is measured in a ventilated condition for the existing buildings. Recommended standard is applied when the measurement is conducted for the new buildings in a condition sealed for 5 hrs. In general, state sealed for 5 hrs shows the value 2 times higher than ventilated condition.
3. Unattainment ratio is the percentage of households in excess of the recommended standard out of 733 households, measured during 2nd monitoring.

Source: Ministry of Environment

Expected Impact of the Recommended Standards

When the recommended standards are applied, it is expected that the incidence of SHS falls, so that the general public can enjoy the benefits of better air quality. In addition, the construction industry is expected to develop and use more eco-friendly construction materials. The 1st and 2nd surveys conducted by the MOE showed a usage rate of eco-friendly construction materials was at less than 5%, while even that 5% included only partial usage of eco-friendly materials.

Strategic Environmental Assessment (SEA) System

Environment Assessment policy division

A view of Gwacheon-Si from Mt. Gwonak

Concept and Purpose

The SEA is a support tool for systematic decision making, integratedly considering environmental impact, together with the economic and social impacts when setting up the administrative planning (policy development, planning and programs implementation)

The key factors are as follows: ① The SEA is applied to administrative planning; ② The analysis concerning diverse alternatives and their impact on environment are carried out; ③The opinions of residents are taken into account.

The SEA is conducted fundamentally to establish an environmental assessment system carried through from the stage of high-level administrative planning to bottom-level development projects.

Background

In order to encourage the efficient use of land and to realize Environmentally Sound and Sustainable Development or ESSD, the MOE has set up and run the Pre-Environmental Review System (PERS) and Environmental Impact Assessment (EIA).

The EIA has been carried out for 74 large-sized development projects, and PERS has been implemented for 38 administrative planning, and small sized development projects within preservation areas since it was enacted in August 2000.

However, The EIA is a process of merely reviewing measures for minimizing environmental impact under the assumption that the project will be executed. Therefore EIA has difficulty in resolving the fundamental disputes with regard to the feasibility and so on. In terms of PERS, it has been pointed out that there have only been 38 administrative plans subject to environmental assessment, and that there are no procedures for collecting the opinions of residents.

To correct those problems, the MOE implemented the following polices to change PERS to SEA.

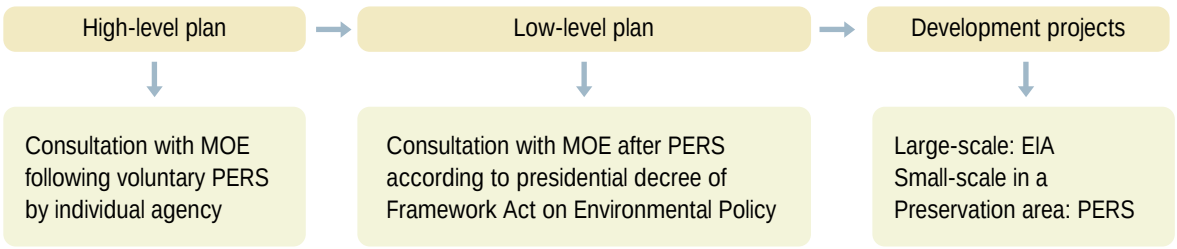
Major Contents of SEA

Reasonable adjustment of the range of review subjects

PERS review subjects were extended into all high and low level administrative plans affecting the environment (the number of plans affected has increased from 38 to 83), so that the MOE could create a more systematic and stage-based system enabling the authority to assess environmental impact at all levels from the administrative planning stage to individual development projects.

High-level administrative planning can voluntarily announce some procedures of PERS such as scoping and the methodology used to collect opinions, etc., since it is similar to the policy of individual agency.
Meanwhile, the lower-level administrative planning should thoroughly review environmental factors according to the presidential decree on Framework Act on Environmental Policy.

Stepwise Environmental Assessment Scheme

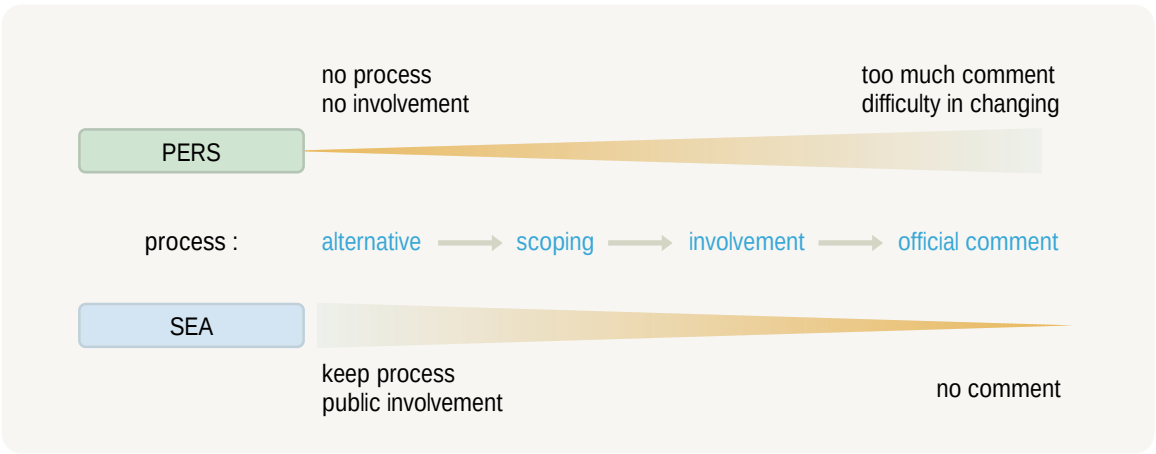


Source: Ministry of Environment

Review of the Environmental Factors, and Collection of Opinions from the Early Stages of Planning

When an agency plans construction, it must come up with alternatives reflecting environmental factors and analyze all of them. In addition, the agency must set up an Environmental Review Committee composed of competent people with knowledge and experience in the plan-related fields so that it can collect their opinions concerning alternatives and scoping. With regard to the draft review report written by environmental review committee, the agency must listen to and also reflect the opinions of residents, experts and environmental groups through circulation to residents, explanatory meetings, and public hearings in order to ensure the establishment of an environmentally friendly plan prior to negotiation with environment-related authorities.

Comparison of Negotiation Methodologies between PERS and SEA



Source: Ministry of Environment

Renegotiation on Pre-Environmental Review Added

In the past, even though environmental factors and impacts might have changed due to the expansion of a business after pre-environmental review negotiations, there was no procedure to renegotiate the issues. But, from now on, any changes require renegotiation if a business increases by more than 30% or when the project is to be conducted in areas which have been determined to be excluded or preserved during the pre-environmental review negotiations.

Also, if the project size increases between 10% and 30%, pre-negotiation is required prior to the implementation of the plan.

Enhancement of Differentiation and Connectivity with the Environmental Impact Assessment

There have been critics who argue that PERS and EIA are similar enough to see overlaps between their respective functions. But from now on, PERS will review the appropriateness of locations and other issues at the planning stage, prior to development project, while EIA review concrete measures to reduce environmental impacts at the development stage after a location is determined.

Meanwhile, in order to resolve procedural redundancies involved in the two systems, some contents from PERS can be quoted in EIA; if considered appropriate, opinions collected during pre-environmental review can be used in environmental impact statement without further opinion collection process.

Electronic Waste Manifest System

Industrial Waste Management Division

Overview

The electronic waste manifest system is an information system which allows individuals to access on the Internet the entire waste treatment process ranging from initial collection/transfer of industrial wastes, incineration, crushing or other intermediate treatment to final landfilling.

Those businesses discharging industrial wastes must register on the webpages of the Korea Environment and Resources Corporation <http://www.wms-net.or.kr> and input all waste discharge information so that all relevant governmental bodies, including the MOE and local governments can check it in real-time.

Flow of Electronic Waste Manifest System

Source: Korea Environment & Resources Corporation

Background

Illegal dumping of industrial waste undermines the natural environment with untreated hazardous waste, and is a financial burden on the government, so controlling illegal dumping is desperately needed.

With only a limited number of personnel, it is difficult for government bodies to maintain around-the-clock supervision of the entire waste treatment processes including discharge, transportation and disposal. Therefore, the Paper-based waste manifest system was introduced and implemented starting in 1999. Under that system, individual entrepreneurs in each process of industrial waste treatment are supposed to write the hand-over copier form and deliver copier form to the appropriate authorities for each discharge to prove proper treatment.

The introduction of the paper-based waste manifest system made some contribution to the prevention of illegal treatment since it

identifies manufacturers who discharge industrial wastes illegally. This system, however, led to a waste of resources and time, since the forms had to be filled out manually and delivered using the postal system. Furthermore, this system had no function of checking all the processes of industrial waste treatment in real time. Therefore, the effect of this system was not as great as expected when taking into account the reality that the number of administrative personnel is too small to check all the copier forms thoroughly.

Introduction Procedure

With the investment of KRW 1,147 million as one of the informatization projects of the Ministry of Information and Communication, the system was developed from 2000 to 2001.

The developed system was applied at 1,500 business locations by 2002 as a pilot project, leading to successful results.

The Korea Environment & Resources Corporation was designated as the operating body, which established and operated the nationwide system. Starting with designated wastes with a high level of risk, from 2005, all industrial wastes including general industrial waste and construction waste came to be managed under the system.

Incentives, including reductions in the number of inspections have been given to system users, and for some business sites where the informatization capacity is lacking, online e-learning education was provided. Moreover, business sites inaccessible to the internet are allowed to register their waste treatment information via cell phone, making the system available any time and anywhere.

Achievements

It is estimated that online reporting has reduced costs by KRW 120 billion. At the same time, the establishment of an electronic infrastructure allowing the supervision of the whole treatment process made it possible to check treatment situations around the nation any time from anywhere, and even to check the transboundary movement of exported or imported wastes.

An efficient waste management system was clearly established since it has become possible to check whether high-risk industrial wastes are treated legally, so that administrative bodies can secure proper supervision.

Future Plans

A variety of additional information services

- It is planned to make it possible to register and deal with the waste-related approvals and licensing through the waste manifest system.
- In the second half of 2006, together with the marine dumping system, an integrated management service for inland and marine waste disposal will be provided.
- The MOE plans to set up and provide a data base of recyclable wastes as would-be energy sources and resources.

IT-Based Waste Management

- It is planned to introduce a system supervising the treatment of infectious wastes in real time through the central computer system by applying RFID technology; with the successful result of a pilot project involving 40 hospitals in 2005, the MOE plans to broaden the system to 50,000 hospitals and clinics.
- RFID technology will be applied to harmful wastes, including PCBs from 2008, so that waste containing heavy metals can be transparently managed. The technology will be applied in the process of manufacturing, importing and using hazardous substances beginning in 2011.

Appendix

About MOE

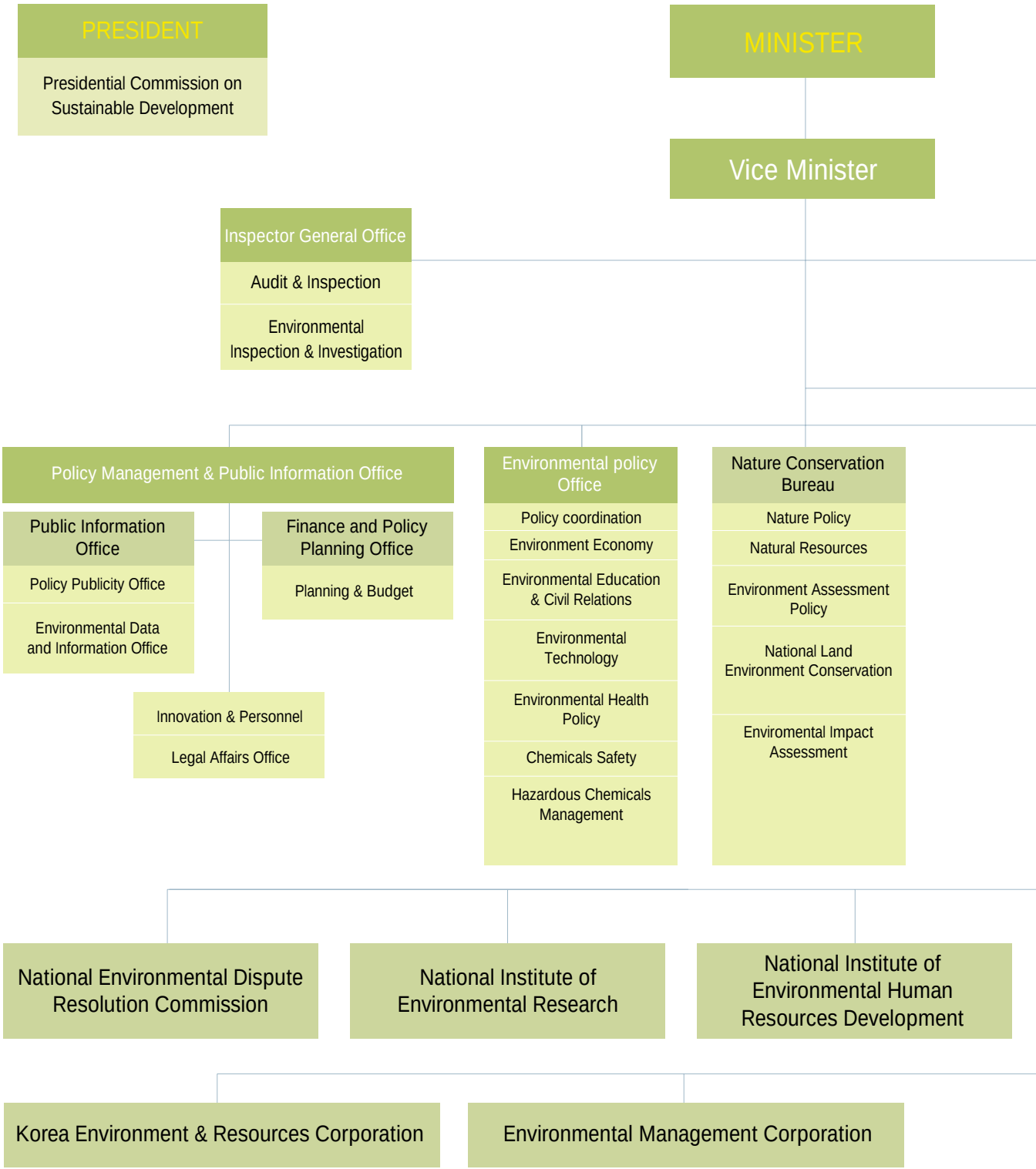
- Organization Chart
- Personnel
- 2006 Budget
- MOE Headquarters & Functions
- Regional Offices & Subsidiary / Affiliated Organizations

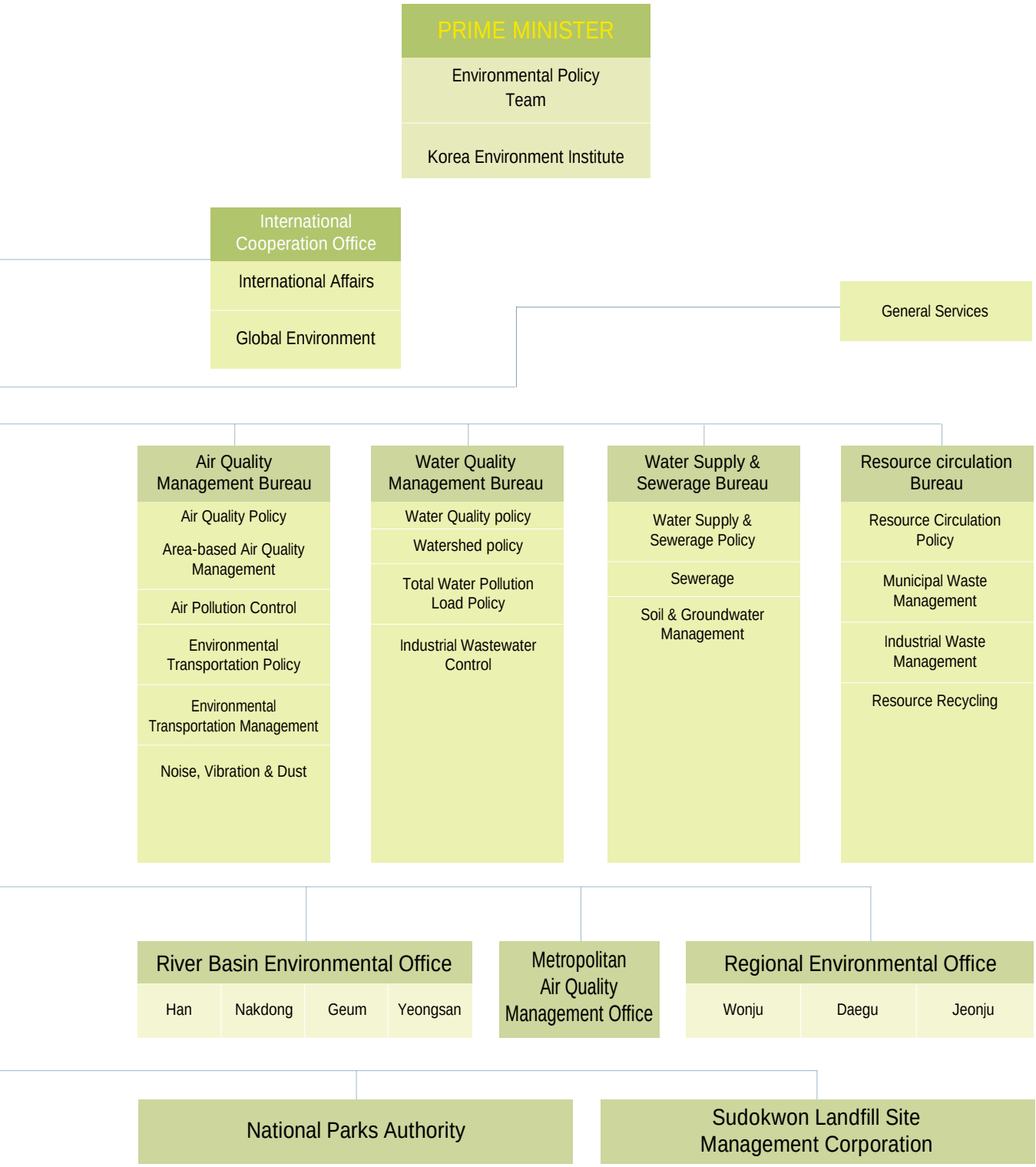
MOE Environmental Laws

Environmental Quality Standards

- Air
- Noise
- Water (river & stream, lake, groundwater)
- Drinking Water (tap water, bottled water, public well)
- Soil

MOE Organization Chart




PRIME MINISTER
Environmental Policy Team
Korea Environment Institute
International Cooperation Office
International Affairs
Global Environment
General Services
Air Quality Management Bureau
Air Quality Policy
Area-based Air Quality Management
Air Pollution Control
Environmental Transportation Policy
Environmental Transportation Management
Noise, Vibration & Dust
Water Quality Management Bureau
Water Quality policy
Watershed policy
Total Water Pollution Load Policy
Industrial Wastewater Control
Water Supply & Sewerage Bureau
Water Supply & Sewerage Policy
Sewerage
Soil & Groundwater Management
Resource circulation Bureau
Resource Circulation Policy
Municipal Waste Management
Industrial Waste Management
Resource Recycling
River Basin Environmental Office
Han
Nakdong
Geum
Yeongsan
Metropolitan Air Quality Management Office
Regional Environmental Office
Wonju
Daegu
Jeonju
National Parks Authority
Sudokwon Landfill Site Management Corporation

MOE Personnel (1,596)

(Oct.2006)

MOE	Subsidiary Organization (1,124)										
	NEDRC	NIER	NIERD	River Basin Environmental Office (413)				Metropolitan Air Quality Management Office	Regional Environmental Office (182)		
				Han	Nakdong	Geum	Yeongsan		Wonju	Daegu	Jeonju
472	21	274	27	142	146	114	124	53	72	96	55

2006 MOE Budget

(KRW million, %)

Area	Budget	Projects
Total	2,999,150(100)	
Waterworks and sewerage / Water Quality Management	1,789,511(59.7)	• Local waterworks development • Municipal water development for rural and fishing area • Drinking water development for islands • Sewage water treatment plant • Sewage pipeline repair • Industrial wastewater treatment plant • Water quality improvement of four rivers, etc
Waste management	275,915 (9.2)	• Landfill site • Public food waste treatment facility • Incinerator • Recycling facility • Loan for fostering recycling industry, etc
Air quality improvement	324,905 (10.8)	• Metropolitan air quality improvement • Natural gas vehicles • Tele-monitoring system • Monitoring equipment • Comprehensive measures for municipal noise, etc
Nature	157,566 (5.3)	• National biological resources center • Conservation of Donggang watershed ecology • Conservation of ecology-protected areas • National parks projects • Natural environment conservation facility, etc
Others	451,253 (15.0)	• Core environmental technology for next-generation • Environmental improvement funds • Preventive system on environmental disease • International cooperation for climate change • Salary and others

MOE Headquarters & Functions

Office / Bureau	Division	Functions
Policy Management and Public Information Office (82) 2-2110-6604	Innovation & Personnel	• Comprehensive support in creating an efficient working environment and administrative procedures • Coordination of subsidiary organizations and human resources allocation
	Legal Affairs Office	• Supervision of law making & enforcement plans • Publications on environmental laws, regulations and judicial precedents
Public Information Office (82) 2-2110-6519	Environmental Data & Information	• Establishment of the environmental information and data system • Publication of Environmental Statistics Yearbook and operation of MOE official website (Korean)
	Policy Publicity	• Coordination of public relations through press & mass media; press releases and policy information • Public service advertising campaigns & review on the Ministry's public relations activities
Finance & Policy Planning		• Establishment of the annual task list; tasks relating to the National Assembly and political parties • Appropriation, transfer, reallocation of budget and funds; Estimation of expenditures and revenues
Environmental Policy Office (82) 2-2110-6670	Policy Coordination	• Mid & long term plans for environmental preservation; operation of the Basic Environmental Law • Promotion of Local agenda 21; production of MOE Annual Report; cooperation with SOFA, USFK and DPRK
	Environment Economy	• Environment improvement charge system, Green construction material approval system, and environmentally-friendly corporation designation system • Support for environmental industry; operation of pollution prevention facilities
	Environmental Education & Civil Relations	• Promotion of environmental education (i.e. model environmental conservation schools) • Support towards civil environmental preservation activities; organizes environmental ceremonies
	Environmental Technology	• Management of environment technology centers, promotion of Eco-Technopia 21 • Comprehensive support towards the development and growth of environmental technology
	Environmental Health Policy	• Enforcement of the Toxic Chemicals Act; toxicity & risk assessment on new & existing chemicals • Measures to prevent environment-related diseases, management of Environmental Health Index
	Chemicals Safety	• Overall management of toxic & observation chemicals, production & import control • Setting standards, grouping and labeling of chemicals, toxic chemicals reduction measures
	Hazardous Chemicals Management	• Control measures on POPs; tasks relating to Stockholm and Basel Conventions • Research projects on endocrine disruptors, control over internationally restricted chemicals
Nature Conservation Bureau (82) 2-2110-6731	Nature Policy	• Establishment of framework policies on nature conservation; measures to raise ecological soundness • Deals with establishment of conservation/use facilities; conservation of wetlands and selected islands
	Natural Resources	• Endangered & protected wildlife protection, environmental status surveys, and data management • Designation of National Parks, establishment of National Park management plans
	Environment Assessment Policy	• Development of policies for land and enviroment conservation • Works related to Strategic Environment Assessment
	National Environment Conservation	• Operation of Prior Environmental Performance Review System • Negotiations on urban management planning, etc
	Environmental Impact Assessment	• Deals with general EIA issues, management and development of EIA guidelines • EIA-related negotiations; matters dealing with changes in negotiation items & re-negotiation
Air Quality Management Bureau (82) 2-2110-6781	Air Quality Policy	• Establishment of Framework Plan for Air Quality Preservation; deals with relevant laws and statutes • Operation of the air quality monitoring network, fuel quality control, and DSS related measures
	Area-based Air Quality Management	• Enforcement of the Special Act on Metropolitan Air Quality Improvement; emission standards & trading, total air pollution load management in the region • Task force operation; air pollution modeling; industry compliance supervision

Office / Bureau	Division	Functions
Air Quality Management Bureau (82) 2-2110-6781	Air Pollution Control	• Industrial emission control, operation of emission standards and emission charge system • Operation of Stack Telemetry Monitoring System, odor prevention measures
	Environmental Transportation Policy	• Establishment of mid and long-term plans for vehicle exhaust emission; promotion of low & zero emission vehicles and On-board diagnosis (OBD) system • Deals with international conventions on environmental transportation; control over manufactured/imported vehicles
	Environmental Transportation Management	• Operation of vehicle inspection system; vehicle recall & warnings; prevention of vehicle idling • Control over vehicles in operation (emission/noise standards); supply of DPF & catalytic converter
	Noise, Vibration & Dust	• Enforcement of noise/vibration control measures, traffic noise control • Enforcement of the Indoor Air Quality Act; deals with relevant laws and statutes
Water Quality Management Bureau (82) 2-2110-6826	Water Quality Policy	• Operation of 4 major rivers' comprehensive water quality improvement measures, setting of standards • Non-point source pollution and lacustrine management, livestock waste treatment & utilization
	Watershed Policy	• Riparian buffer zones designation & management • Enforcement of the special laws on the 4 major rivers(Han, Nakdong, Geum and Yoengsan) watershed • Water use charge, operation of Watershed Management Fund, and support for source-area residents
	Total Water Pollution Load Policy	• Total water pollution load management system • Enforcement of the special laws on the 4 major river watersheds
	Industrial Wastewater Control	• Operation of industrial wastewater management system, setting of allowable emission standards • Water pollution accident prevention and response, monitoring and regulation of polluting facilities
Water Supply & Sewerage Bureau (82) 2-2110-6866	Water Supply & Sewerage Policy	• Management and expansion of the waterworks system; deals with relevant laws & statutes • Tap water quality improvement, water utilities statistics
	Sewerage	• Establishment of framework policies on sewage and excreta disposal • Installation and maintenance of sewage & excreta treatment facilities
	Soil & Groundwater Management	• Measures for soil & groundwater preservation; conducts soil contamination surveys • Fountain water quality standards, preservation & management of groundwater
Resource Circulation Bureau (82) 2-2110-6916	Resource Circulation Policy	• Establishment of Framework Plan for Waste Management; deals with relevant laws and statutes • Development and promotion of waste reduction policies; operation of waste treatment charge system
	Municipal Waste Management	• Establishment of Framework Plan on Municipal Waste Treatment Facilities, site survey & management • Management & regulation of dioxin emissions at incinerators, food waste reduction and utilization
	Industrial Waste Management	• Deals with industrial waste collection, transport, storage, treatment standards & treatment facilities • Treatment and management of construction waste and infectious waste
	Resource Recycling	• Establishment of Framework Plan for Resource cycling; deals with relevant laws and statutes • Recycling standards & methods; promotion of recycling industry and recycled products use
Inspector-General Office (82) 2-2110-6530	Audit & Inspection	• Audit & Inspection of MOE and subsidiary organizations • Investigation and settlement of petitions and illegal acts
	Environmental Inspection & Investigation	• Comprehensive coordination of investigation and regulation activities on pollutant emission sources • Mandate the Quasi-Prosecutor authority to environmental officials
International Cooperation Office (82) 2-2110-6550	International Affairs	• Cooperation with international organizations; multilateral & bilateral environmental cooperation • Hosting of and participation at international conferences; international environmental affairs; production of publications and MOE website in English
	Global Environment	• Establishment of framework policies on global environment preservation; environmental trade • Tasks relating to UNCSD, WTO/DDA, UNFCCC, and other international conventions

Regional Offices & Subsidiary / Affiliated Organizations

Organization	Telephone / Website	
National Env' l Dispute Resolution Commission (NEDRC)	(82) 2-2110-6980	http://edc.me.go.kr/
National Institute of Environmental Research (NIER)	(82) 32-560-7714	http://nier.go.kr/
National Institute of Environmental Human Resources Development(NIERD)	(82) 32-560-7751	http://nierd.go.kr/
Han River Basin Environmental Office	(82) 31-790-2420	http://hg.me.go.kr/
Nakdong River Basin Environmental Office	(82) 55-211-1611	http://ndg.me.go.kr
Geum River Basin Environmental Office	(82) 42-865-0800	http://gg.me.go.kr/
Yeongsan River Basin Environmental Office	(82) 62-605-5114	http://yeongsan.me.go.kr
Metropolitan Air Quality Management Office	(82) 31-481-1312	http://mamo.me.go.kr
Wonju Regional Environmental Office	(82) 33-764-0982	http://wonju.me.go.kr
Daegu Regional Environmental Office	(82) 53-760-2502	http://daegu.me.go.kr
Jeonju Regional Environmental Office	(82) 63-270-1810	http://jeonju.me.go.kr
Korea Environment & Resources Corporation	(82) 32-560-1588	http://www.envico.or.kr
Environmental Management Corporation	(82) 32-560-2151~3	http://www.emc.or.kr/
National Parks Authority	(82) 2-3272-7931~3	http://www.npa.or.kr/
Sudokwon Landfill Site Management Corporation	(82) 32-562-2549	http://www.slc.or.kr
Presidential Commission on Sustainable Development	(82) 2-2100-8286	http://www.pcsd.go.kr
Korea Environment Institute	(82) 2-380-7777	http://www.kei.re.kr

Relevant Governmental Bodies

Organization	Telephone / Website	
Ministry of Science & Technology	(82) 2-504-0333	http://www.most.go.kr
Ministry of Culture and Tourism	(82) 2-3704-9114	http://www.mct.go.kr
Ministry of Agriculture & Forestry	(82) 2-503-7200	http://www.maf.go.kr
Ministry of Commerce, Industry & Energy	(82) 2-503-9410	http://www.mocie.go.kr
Ministry of Labor	(82) 2-2110-7000	http://www.molab.go.kr
Ministry of Construction& Transportation	(82) 2-504-9114	http://www.moct.go.kr
Ministry of Maritime Affairs and Fisheries	(82) 2-3674-6990	http://www.momaf.go.kr
Rural Development Administration	(82) 31-299-2200	http://www.rda.go.kr
Korea Meteorological Administration	(82) 2-2181-0900	http://www.kma.go.kr
Korea Forest Service	(82) 42-481-4080	http://www.foa.go.kr

MOE Environmental Laws

(Total of 42 laws in effect)

Period	Law Name	Enacted on
1960s (6 laws)	Waste Cleaning Act (Repealed on 12.31.1986)	12.30.1961
	Water Supply & Waterworks Installation Act (2003) *	12.31.1961
	Environmental Pollution Prevention Act (Repealed on 12.31.1977)	11.05.1963
	Act Relating to Toxic & Hazardous Substances (Repealed on 08.02.1999)	12.13.1963
	Sewerage Act (2005)	08.03.1966
	Act Relating to the Protection of Birds, Mammals & Hunting(Repealed on 02.09.2004)	03.30.1967
1970s-1980s (6 laws)	Environmental Conservation Act(Repealed on 12.30.2002)	12.31.1977
	Compound Waste Treatment Corporation Act(Repealed on 12.30.2003)	12.28.1979
	Natural Park Act (2005)	01.04.1980
	Environmental Management Corporation Act(2003)	05.21.1983
	Environmental Pollution Prevention Corporation Act(Repealed on 05.29.2003)	05.21.1983
	Waste Control Act (2003)	12.31.1986
1990s-Present (37 laws)	Clean Air Conservation Act (2005)	08.01.1990
	Environmental Dispute Adjustment Act (2002)	08.01.1990
	Framework Act on Environmental Policy (2005)	08.01.1990
	Noise & Vibration Control Act (2004)	08.01.1990
	Toxic Chemicals Control Act (2004)	08.01.1990
	Water Quality Conservation Act (2005)	08.01.1990
	Act on the Disposal of Sewage, Excreta & Livestock Wastewater (2002)	03.08.1991
	Act on Special Measures for the Control of Environmental Offenses (1999)	05.31.1991
	Environmental Improvement Expenses Liability Act (1999)	12.31.1991
	Act on the Control of Transboundary Movement of Hazardous Waste & Their Disposal (2004)	12.08.1992
	Act on the Promotion of Saving and Recycling of Resources (2005)	12.28.1992
	Act Relating to the Special Accounting for Environmental Improvement (1996)	01.05.1994
	Development of & Support for Environmental Technology Act (2004)	12.22.1994
	Management of Drinking Water Act (2005)	01.05.1995
	Promotion of Waste Disposal Facilities & Assistance, etc. to Adjacent Areas Act (2004)	01.05.1995
	Soil Environment Conservation Act (2004)	01.05.1995
	Special Act on the Ecosystem Preservation of Islands such as Dokdo Island (2003)	12.31.1997
	Act Relating to Han River Water Quality Improvement & Community Support (2001)	02.08.1999
	Wetland Conservation Act (2005)	02.08.1999
	Act on Assessment of Impacts of Works on Environment, Transportation, Disasters, etc (2003)	12.31.1999
	Natural Environment Conservation Act (2004)	12.31.1999
	Sudokwon Landfill Site Management Corporation Act	01.21.2000

Period	Law Name	Enacted on
1990s-Present (37laws)	Act on Yeongsan & Sumjin River Watershed Management & Community Support	01.14.2002
	Act on Nakdong River Watershed Management & Community Support	01.14.2002
	Act on Geum River Watershed Management & Community Support	01.14.2002
	Indoor Air Quality Management Act(2005) (Amended from Underground Air Quality Management Act enacted in 12.30.1996)	05.29.2003
	Korea Environment & Resources Corporation Act (Amended from Korea Resource Recovery & Reutilization Corporation Act 12.27.1993)	12.30.2003
	Act on the Promotion of Construction Waste Recycling	12.31.2003
	Act on the Protection of Baekdu Daegan Mountain System	12.31.2003
	Special Act on Metropolitan Air Quality Improvement	12.31.2003
	Foul Odor Prevention Act	02.09.2004
	Wildlife Protection Act (2005)	02.09.2004
	Act on Antarctic Activities and Environmental Protection	03.22.2004
	Act on Promotion of the Purchase of Environment-Friendly Products	12.31.2004
	National Trust Act on Cultural heritage and natural environment assets	03.24.2006
	Act on the management and use of livestock manure	09.27.2006
	Act on Environmental Test and Examination	10.04.2006

Environmental Quality Standards

Air

Pollutants	Standard	Average time
SO_2	0.02ppm	Annual
	0.5ppm	24-hr
	0.15ppm	1-hr
CO	9ppm	8-hr
	25ppm	1-hr
NO_2	0.05ppm	Annual
	0.08ppm	24-hr
	0.15ppm	1-hr
PM10	70㎍/㎥	Annual
	150㎍/㎥	24-hr
O_3	0.06ppm	8-hr
	0.1ppm	1-hr
Pb	0.5㎍/㎥	Annual

Noise

(Leq dB(A))

Region	Subject area	Standard	
		Day (06:00~22:00)	Night (22:00~06:00)
General Area	Exclusively residential Zone	50	40
	General residential Zone	55	45
	Commercial area Zone	65	55
	Industrial Zone	70	65
Roadside Area	General residential Zone	65	55
	Commercial area Zone	70	60
	Industrial Zone	75	70

Water

River and stream

Classification	Class	Water use	Standard				
			pH	BOD (㎎/ℓ)	SS (㎎/ℓ)	DO (㎎/ℓ)	Total coliform (No. of total coliforms/100㎖)
Living Environment	Ⅰ	Tap water source(class 1) Conservation of natural environment	6.5~8.5	≤1	≤25	7.5≥	50≤
	Ⅱ	Tap water source(class2) Fishery(class1) Swimming	6.5~8.5	≤3	≤25	5≥	≤1,000
	Ⅲ	Tap water source(class3) Fishery(class2) Industrial water(class1)	6.5~8.5	≤6	≤25	5≥	≤5,000
	Ⅳ	Industrial water(class2) Agricultural water(class2)	6.5~8.5	≤8	≤100	2≥	-
	Ⅴ	Industrial water(class3) Conservation of living environment	6.5~8.5	≤10	No floating matter such as garbage	2≥	-
Protection of human health	All water-sheds	Cd: ≤0.01㎎/ℓ, As: ≤0.05㎎/ℓ, CN: ND, Hg: ND, Organic phosporus: ND, Pb≤0.1㎎/ℓ, Cr^{+6}≤0.05㎎/ℓ, PCB:ND, ABS:≤0.5㎎/ℓ					

Lake

Classification	Class	Water use	Standard						
			pH	COD (㎎/ℓ)	SS (㎎/ℓ)	DO (㎎/ℓ)	Total coliform (No. of total coliforms /100㎖)	T-P (㎎/ℓ)	T-N (㎎/ℓ)
Living Environment	Ⅰ	Tap water source(class1) Conservation of natural environment	6.5~8.5	≤1	≤1	7.5≥	≤50	≤0.010	≤0.200
	Ⅱ	Tap water source(class2) Fishery(class1) Swimming	6.5~8.5	≤3	≤5	5≥	≤1,000	≤0.030	≤0.400

Classification	Class	Water use	Standard						
			pH	COD (㎎/ℓ)	SS (㎎/ℓ)	DO (㎎/ℓ)	Total coliform (No. of total coliforms /100㎖)	T-P (㎎/ℓ)	T-N (㎎/ℓ)
Living Environment	Ⅲ	Tap water source(class3) Fishery(class2) Industrial water(class1)	6.5~8.5	≤6	≤15	5≥	≤5,000	≤0.050	≤0.600
	Ⅳ	Industrial water(class2) Agricultural water	6.5~8.5	≤8	≤15	2≥	–	≤0.100	≤1.0
	Ⅴ	Industrial water(class3) Conservation of living environment	6.5~8.5	≤10	No floating matter such as garbage	2≥	–	≤0.150	≤1.5
Protection of human health	All water-sheds	Cd≤0.01㎎/ℓ, ≤0.05㎎/ℓ, CN:ND, Hg:ND, Organic phosphorus:ND, PCB:ND, Pb≤0.1㎎/ℓ, Cr^{+6}≤0.05㎎/ℓ, ABS≤0.5㎎/ℓ							

Groundwater

(Unit:㎎/ℓ)

Classification	Water use	Domestic water	Agricultural water/ Fishery water	Industrial water
General pollutants (5)	pH	5.8~8.5	6.0~8.5	5.0~9.0
	E-Coli	≤5,000(MPN/100㎖)	-	-
	NO_3-N(Nitrate Nitrogen)	≤20	≤20	≤40
	Cl^- (Chloride)	≤250	≤250	≤500
	Total colony count	≤100CFU/1㎖	-	-
Specific hazardous substances (15)	Cd(Cadmium)	≤0.01	≤0.01	≤0.02
	As(Arsenic)	≤0.05	≤0.05	≤0.1
	CN(Cyanide)	ND	ND	≤0.2
	Hg(Mercury)	ND	ND	ND
	Organic phosporus	ND	ND	ND
	Phenol	≤0.005	≤0.005	≤0.01
	Pb(Lead)	≤0.1	≤0.1	≤0.2
	Cr^{+6}(Hexachromium)	≤0.05	≤0.05	≤0.1
	TCE(Trichloroethylene)	≤0.03	≤0.03	≤0.06
	PCE(Tetrachloroethane)	≤0.01	≤0.01	≤0.02
	1.1.1-Trichloroethane	≤0.15	≤0.3	≤0.5
	Benzene	≤0.015	–	–
	Toluene	≤1	–	–
	Ethyl Benzene	≤0.45	–	–
	Xylene	≤0.75	–	–

Drinking Water

Tap Water

Concentration Standard

Classification		Water pollutants	Standard	Classification		Water pollutants	Standard
		55 substances		Hazardous Organic substances	Organic substances	Dichloromethane	0.02 ㎎/ℓ
Microorganism		Total Colony Counts	ND/100 ㎖			Benzene	0.01 ㎎/ℓ
		Total Coliforms	ND/100 ㎖			Toluene	0.7 ㎎/ℓ
		Fecal Coliforms	ND/100 ㎖			Ethyle Benzene	0.3 ㎎/ℓ
		Escherichia Coli	0.05 ㎎/ℓ			Xylene	0.5 ㎎/ℓ
Hazardous Inorganic Substances		Pb;Lead	0.05 ㎎/ℓ			1.1Dichloroethylene	0.03 ㎎/ℓ
		F:Fluoride	1.5 ㎎/ℓ			Carbontetrachloride	0.002 ㎎/ℓ
		As;Arsenic	0.05 ㎎/ℓ		Pesticide	Diazinon	0.02 ㎎/ℓ
		Se;Selenium	0.01 ㎎/ℓ			Parathion	0.06 ㎎/ℓ
		Hg;Mercury	0.001 ㎎/ℓ			Fenitrothion	0.04 ㎎/ℓ
		CN;Cyanide	0.01 ㎎/ℓ			Carbaryl	0.07 ㎎/ℓ
		Cr^{+6};Hexachromium	0.05 ㎎/ℓ			1,2-Dibromo-3-Chloropropan	0.003 ㎎/ℓ
		NH_3-N;Ammonium Nitrogen	0.5 ㎎/ℓ		Disinfection residues	Free Residual Chlorine	4.0 ㎎/ℓ
		NO_3-N;Nitrate Nitrogen	10 ㎎/ℓ			THMs;Trihalomethanes	0.1 ㎎/ℓ
		Cd;Cadmium	0.005 ㎎/ℓ			Chloroform	0.08 ㎎/ℓ
		B;Boron	0.3 ㎎/ℓ			Chloroalhydrate	0.03 ㎎/ℓ
Hazardous organic Substances	Volatile organics	Phenol	0.005 ㎎/ℓ			Dibromoacetonitrile	0.1 ㎎/ℓ
		1.1.1-Trichloroethane	0.1 ㎎/ℓ			Dichloroacetonitrile	0.09 ㎎/ℓ
		PCE;Tetrachloroethylene	0.01 ㎎/ℓ			Trichloroacetonitrile	0.004 ㎎/ℓ
		TCE;Trichloroethylene	0.03 ㎎/ℓ			HAA;Haloacetic acid	0.1 ㎎/ℓ
Aesthetic standard		Hardness	300 ㎎/ℓ	Aesthetic standard		Zn;Zinc	1 ㎎/ℓ
		Consumption of KMnO4	10 ㎎/ℓ			Cl^-;Chloride	250 ㎎/ℓ
		Odor	ND			Total Solids	500 ㎎/ℓ
		Taste	ND			Fe;Iron	0.3 ㎎/ℓ
		Cu;Cooper	1 ㎎/ℓ			Mn;Manganese	0.3 ㎎/ℓ
		Color	5			Turbidity	0.5 NTU
		ABS;Alkyl Benzene Sulfate	0.5 ㎎/ℓ			SO_4^{-2};Sulfate	200 ㎎/ℓ
		pH	5.8~8.5			Al:Aluminium	0.2 ㎎/ℓ

Treatment Technique Standard

Substances	Standard	Detailed standard
Virus	Remove 99.99% or more, or inactivate	• Keep the inactivity ratio 1 or more • Measure turbidity and residual chlorine six times or more in consecution taken 4 hr apart - the average value of two samples measured in consecution should not be greater than 0.5NTU, and each sample not greater than 1.0NTU - strengthen the turbidity standard according to the capacity of water treatment plant(100,000ton ≤:from July 2004, 50,000ton ≤: from July 2005, 5,000ton ≤: from January 2007) * More than 95% samples measured monthly should not exceed 0.3NTU (0.5NTU in the case of slow filtration), and each sample not 1.0NTU. * Continuous monitoring on water quality of individual filter every 15 minutes.
Giardia Cyst	Remove 99.9% or more, or inactivate	

Bottled Water

Classification	Pollutants		Standard	Classification		Pollutants	Standard
	51 substances			Hazardous organic substances	Volatile organics	Toluene	0.7 ㎎/ℓ
Microorganism	Total Colony Counts	Total Colony Counts -21℃	100CFU/㎖			Ethyle Benzene	0.3 ㎎/ℓ
		Total Colony Counts -35℃	20CFU/㎖			Xylene	0.5 ㎎/ℓ
						1.1Dichloroethylene	0.03 ㎎/ℓ
						Carbontetrachloride	0.002 ㎎/ℓ
	Total Coliforms		ND/100 ㎖		Pesticide	Diazinon	0.02 ㎎/ℓ
	Fecal Streptococci		ND/250 ㎖			Parathion	0.06 ㎎/ℓ
	Pseudomonas aeruginosa		ND/250 ㎖			Fenitrothion	0.04 ㎎/ℓ
						Carbaryl	0.07 ㎎/ℓ
	Spore-forming Sulfite-reducing anaerobes		ND/250 ㎖			1,2-Dibromo-3-Chloropropan	0.003 ㎎/ℓ
	Salmonella		ND/250 ㎖	Aesthetic standard		Hardness	500 ㎎/ℓ
	Shigella		ND/250 ㎖			Consumption of $KMnO_4$	10 ㎎/ℓ
Hazardous inorganic substances	Pb; Lead		0.05 ㎎/ℓ			Odor	ND
	F; Fluoride		1.5 ㎎/ℓ			Taste	ND
	As; Arsenic		0.05 ㎎/ℓ			Cu;Cooper	1 ㎎/ℓ
	Se;Selenium		0.01 ㎎/ℓ			Color	5unit
	Hg;Mercury		0.001 ㎎/ℓ			ABS;Alkyl Benzene Sulfate	0.5 ㎎/ℓ
	CN;Cyanide		0.01 ㎎/ℓ				
	Cr^{+6};Hexachromium		0.05 ㎎/ℓ				
	NH_3-N:Ammonium Nitrogen		0.5 ㎎/ℓ			pH	5.8~8.5
	NO_3-N;Nitrate Nitrogen		10 ㎎/ℓ			Zn;Zinc	1 ㎎/ℓ
	Cd;Cadmium		0.005 ㎎/ℓ			Cl^-;Chloride	250 ㎎/ℓ
	B;Boron		0.3 ㎎/ℓ			Total Solids	500 ㎎/ℓ

Classification		Pollutants	Standard	Classification	Pollutants	Standard
Hazardous organic substances	Volatile organics	Phenol	0.005 ㎎/ ℓ		Fe;Iron	0.3 ㎎/ ℓ
		1.1.1-Trichloroethane	0.1 ㎎/ ℓ		Mn;Manganese	0.3 ㎎/ ℓ
		PCE;Tetrachloroethylene	0.01 ㎎/ ℓ		Turbidity	1.0 NTU
		TCE;Trichloroethylene	0.03 ㎎/ ℓ		SO_4^{-2};Sulfate	200 ㎎/ ℓ
		Dichloromethane	0.02 ㎎/ ℓ			
		Benzene	0.01 ㎎/ ℓ		Al:Aluminium	0.2 ㎎/ ℓ

Public Well

Classification		Pollutants	Standard	Classification		Pollutants	Standard
		48 substances					
Microorganism		Total Colony Counts	100CFU/ ㎖			Xylene	0.5 ㎎/ ℓ
		Total Coliforms	ND/100 ㎖			1.1Dichloroethylene	0.03 ㎎/ ℓ
		Fecal Coliforms	ND/100 ㎖		Pesticide	Carbontetrachloride	0.002 ㎎/ ℓ
		Escherichia Coli	ND/100 ㎖			Diazinon	0.02 ㎎/ ℓ
		Yersinia	ND/2 ℓ			Parathion	0.06 ㎎/ ℓ
Hazardous inorganic substances		Pb; Lead	0.05 ㎎/ ℓ			Fenitrothion	0.04 ㎎/ ℓ
		F; Fluoride	1.5 ㎎/ ℓ			Carbaryl	0.07 ㎎/ ℓ
		As; Arsenic	0.05 ㎎/ ℓ			1,2-Dibromo-3-Chloropropan	0.003 ㎎/ ℓ
		Se;Selenium	0.01 ㎎/ ℓ				
		Hg;Mercury	0.001 ㎎/ ℓ			Hardness	300 ㎎/ ℓ
		CN;Cyanide	0.01 ㎎/ ℓ	Aesthetic standard		Consumption of $KMnO_4$	10 ㎎/ ℓ
		Cr^{+6};Hexachromium	0.05 ㎎/ ℓ			Odor	ND
		NH_3-N:Ammonium Nitrogen	0.5 ㎎/ ℓ			Taste	ND
		NO_3-N;Nitrate Nitrogen	10 ㎎/ ℓ			Cu;Cooper	1 ㎎/ ℓ
		Cd;Cadmium	0.005 ㎎/ ℓ			Color	5 unit
		B;Boron	0.3 ㎎/ ℓ			ABS;Alkyl Benzene Sulfate	0.5 ㎎/ ℓ
Hazardous organic substances	Volatile organics	Phenol	0.005 ㎎/ ℓ				
		1.1.1-Trichloroethane	0.1 ㎎/ ℓ			pH	5.8~8.5
		PCE;Tetrachloroethylene	0.01 ㎎/ ℓ			Zn;Zinc	1 ㎎/ ℓ
						Cl^-;Chloride	250 ㎎/ ℓ
		TCE;Trichloroethylene	0.03 ㎎/ ℓ			Total Solids	500 ㎎/ ℓ
						Fe;Iron	0.3 ㎎/ ℓ
		Dichloromethane	0.02 ㎎/ ℓ			Mn;Manganese	0.3 ㎎/ ℓ
		Benzene	0.01 ㎎/ ℓ			Turbidity	1.0 NTU
		Toluene	0.7 ㎎/ ℓ			SO_4^{-2};Sulfate	200 ㎎/ ℓ
		Ethyle Benzene	0.3 ㎎/ ℓ			Al:Aluminium	0.2 ㎎/ ℓ

Soil

(mg/kg)

Soil contaminants	Precautionary level		Regulatory level	
	'Ga' zone	'Na' zone	'Ga' zone	'Na' zone
Cadmium	1.5	12	4	30
Copper	50	200	125	500
Arsenic	6	20	15	50
Mercury	4	16	10	40
Lead	100	400	300	1,000
Hexachromium	4	12	10	30
Zinc	300	800	700	2,000
Nickel	40	160	100	400
Fluorine	400	800	800	2,000
Organic phosphorus compounds	10	30	-	-
PCB	-	12	-	30
Cyanide	2	120	5	300
Phenol	4	20	10	50
Oil(except animal & plant type) - Benzene • Toluene • Ethyle Benzene • Xylene(BTEX)	-	80	-	200
- Total Petroleum Hydrocarbon(TPH)	-	2,000	-	5,000
Trichloroethylene(TCE)	8	40	20	100
Tetrachloroethylene(PCE)	4	24	10	60

The cover image is the representation of the Ministry of Environment's innovative vision: A Beautiful Environment and A Healthy Future. Children's drawing symbolizes the Beautiful Environment in the making for future generations and their broad smile and laughter stands for the Healthy Future.
(Illustrator Son Jeong Ho)

MINISTRY OF ENVIRONMENT
REPUBLIC OF KOREA

GOVERNMENT COMPLEX GWACHEON, JUNGANG 1, GWACHEON-SI,
GYEONGGI-DO, 427-729 REPUBLIC OF KOREA
TEL.(822)2110-7910 FAX.(822)504-9206
HTTP://ENG.ME.GO.KR

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Sotdae:
A pole signifying the invocation for a good harvest and welfare of villagers originated in the Bronze Age.
Usually with a wooden duck on top, Sotdae is set up at the entrance to a village.