

# Environmental Status and Outlook

As one of the most densely populated countries, South Korea is a global powerhouse of economic growth and development. The nation ranks 27th in the world for its population size of 51 million residents (2015), and has a density of 505 people per square kilometer. After Bangladesh (1,067 people/km<sup>2</sup>) and Taiwan (646 people/km<sup>2</sup>), Korea has the third largest population density among countries with over 10 million in population.

Fueled by high population density, the nation has undergone large-scale development and economic advancement at unprecedented rates within the last few decades. More specifically, growing numbers of land development and urbanization projects have led to an increase in environmental issues and serious degradation of ecosystems. The urbanization rate of Korea stands at 85.4% (OECD), which is double the average of 47.1% for 34 OECD member states. Such high rates of urbanization have accelerated the deformation and destruction of natural ecosystems, leading to key environmental problems that have recently come to light.

From the 1980s, however, environmental issues have taken a promising turn with broader public awareness and participation. Various networks have been forged between the government and civil society to prevent further degradation and improve the nation's environmental status. With combined efforts from non-profit environmental organizations and the government, progress continues to be made, from the reduction of water and atmospheric pollution to the restoration and

improvement of environmental quality.

In order to monitor changes in national environmental status, the government conducts periodic surveys on the atmosphere, water quality, forests, and other ecosystems. National environmental status has further become a public agenda as various environmental organizations have also been continuously contributing input. This has led to an expansion of environmental education programs and a boost in the number of associated organizations. By the end of December 2014, 172 groups registered as nonprofit-nongovernmental organizations and have been participating in public service assistance projects promoted by the central and local governments.

After the UN Conference on Environment and Development in 1992, Korea established a national strategy to pursue sustainable development in the spirit of the Rio Declaration and Agenda 21. Korea's national agenda for action was declared in the 1994 Ministerial Planning Committee for Earth Environmental Problems. In March 1996, the Agenda 21 plan for national action was drafted and executed, while on June 5, 2000, a comprehensive strategic plan, the "New Millennium Vision for the National Environment," was announced. Soon after in September 2000, the Presidential Committee for Sustainable Development (PCSD) was declared. Comprised of various stakeholders, this committee has spearheaded national sustainable development strategies in economic, social, and environmental fields to set up viable national objectives and policy directions.

With 5-year intervals from 2006 to 2015, Korea established and implemented the first and second rounds of the "Basic Plan for Sustainable Development." Following changes in domestic and international social, economic, and environmental status, the nation has taken action to meet the main objectives of the Sustainable Development Goals adopted by the 70th UN General

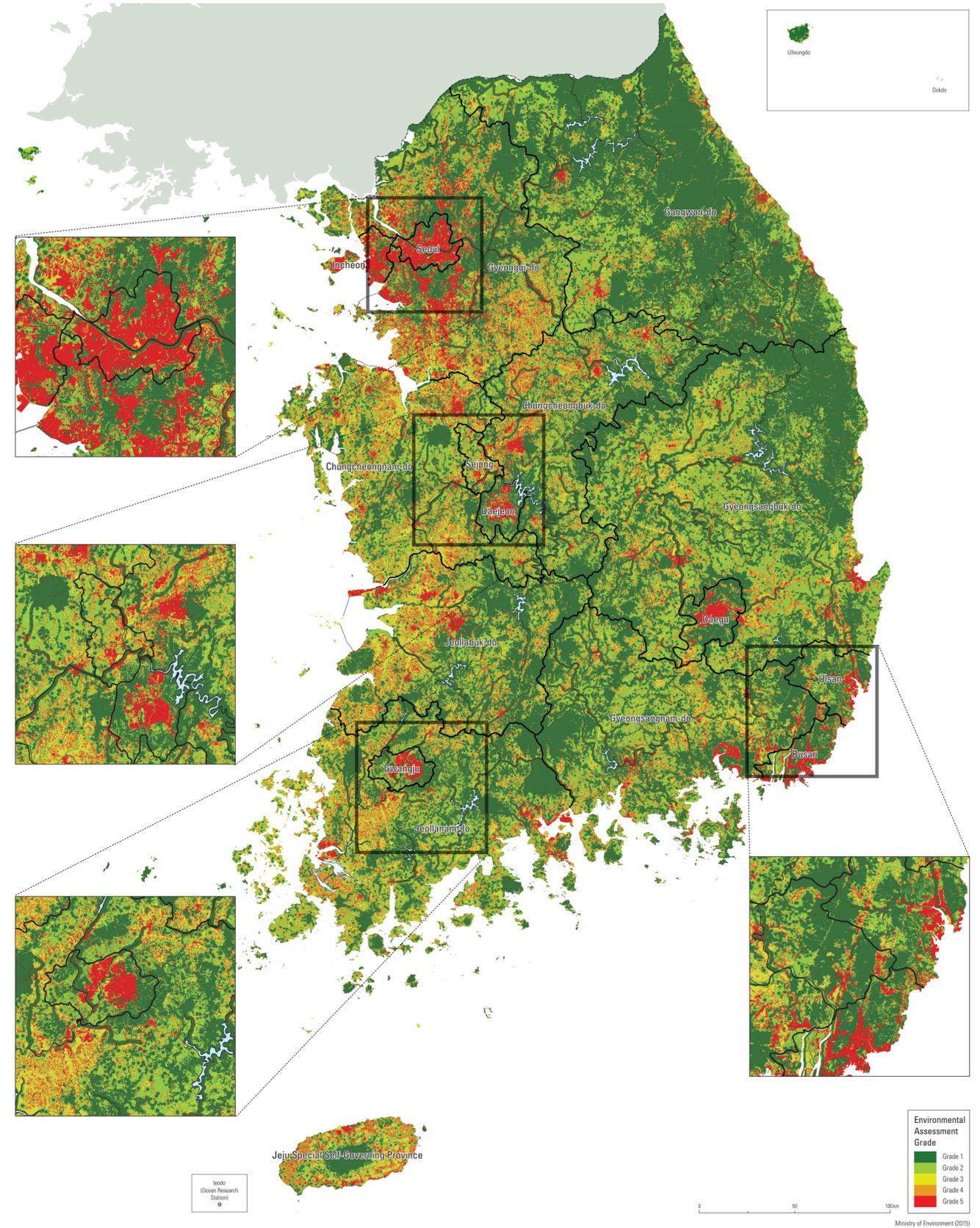
Assembly in September 2015. In order to guarantee the national sustainable development plan and to strengthen global partnerships, Korea has launched the third round of the "Basic Plan for Sustainable Development (2016 – 2035)" for the next 20 years.

## National Plans for Sustainable Development

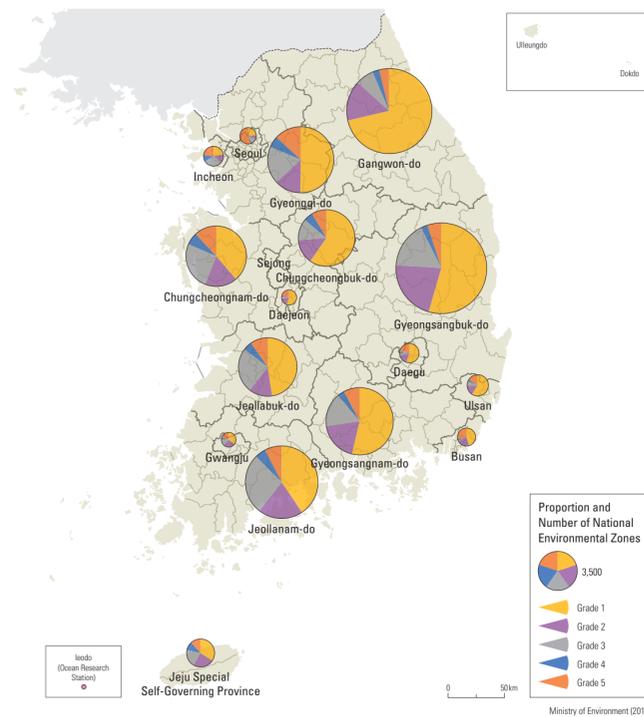
	1st Basic Plan for National Sustainable Development (2006 – 2011)	2nd Basic Plan for National Sustainable Development (2011 – 2030)	3rd Basic Plan for National Sustainable Development (2016 – 2035)
<b>Vision</b>	Balanced development of economy, society, and environment 21C model of developed countries Co-prosperity of present and future generations	Sustainable development by 2030 Obtain global leading nation standards	Harmonious development of economy, society, and environment
<b>Strategies</b>	<ul style="list-style-type: none"> <li>Continuous management of natural resources</li> <li>Social integration and enhancement of national health</li> <li>Sustainable economic development, climate change response, and global environment conservation</li> </ul> (48 tasks in total)	<ul style="list-style-type: none"> <li>Enhancing the sustainability of natural resources and the environment</li> <li>Establishing climate change adaptation and response systems</li> <li>Improving social equity and national health</li> <li>Enhancing the sustainability of the economy and industry</li> </ul> (25 tasks in total)	<ul style="list-style-type: none"> <li>Establishing a healthy land environment</li> <li>Establishing a safe society</li> <li>Establishing an inclusive and innovative economy</li> <li>Developing into a globally responsible nation</li> </ul> (46 tasks in total)
<b>Goals</b>	Enhance economic, social, and environmental policy integration	Build national sustainability up to G20 standards	Healthy land and environment Safe and integrated society Inclusive economic growth Globally responsible nation

## National Land Environment Assessment

### National Environmental Zoning Map



National Environmental Zones by Province

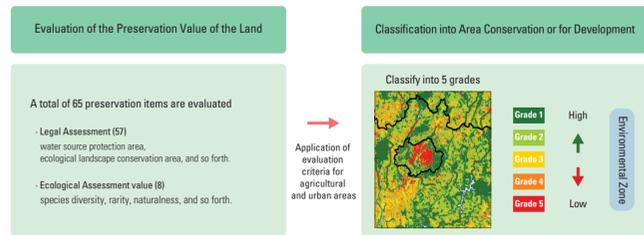


South Korea devised the National Environmental Zoning Map (NEZM) for environmental land use planning. This national map classifies land into five grades according to different environmental value. It provides an overall evaluation on diverse environmental data of the land, making it easier to identify the existing status of the environment and locate critical environmental factors. It is expected to promote eco-friendly land use and prevent social conflicts that may result from environmental issues or socio-economic losses from inappropriate site selections.

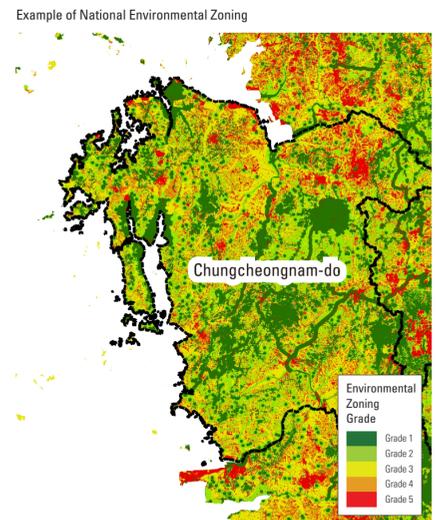
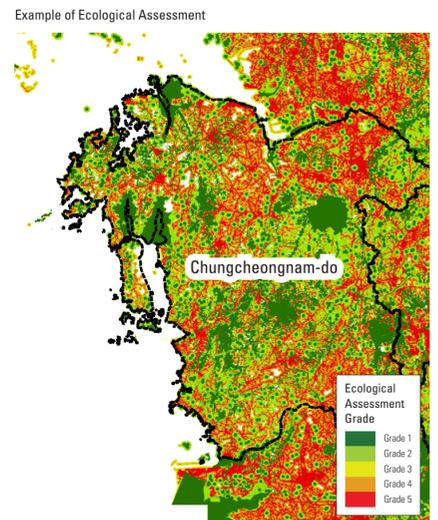
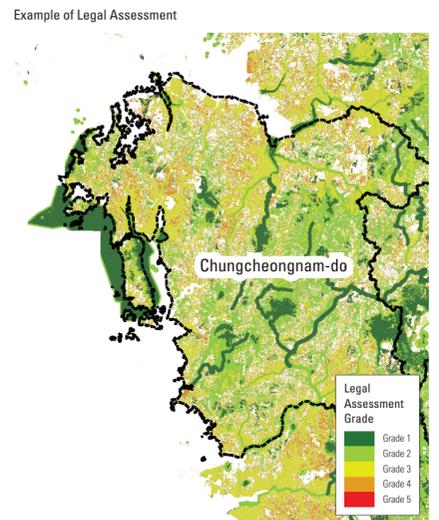
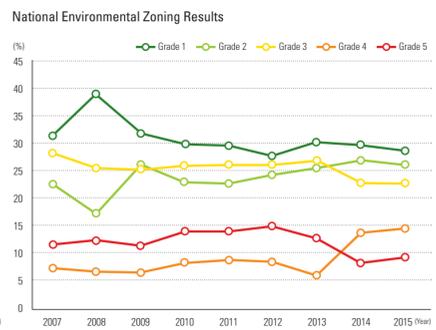
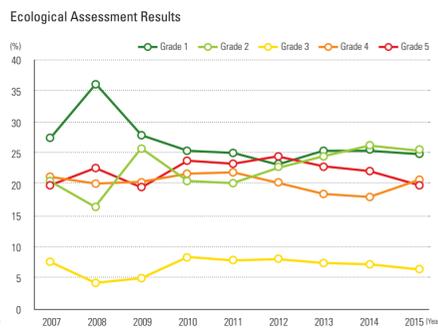
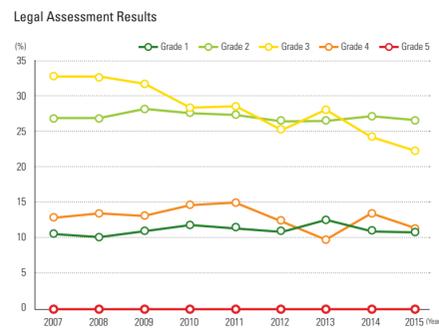
In the process of creating and updating the NEZM, thematic maps of 65 evaluation criteria (57 legal criteria and 8 environmental/ecological criteria) are overlain and analyzed. The highest grade of the resulting analysis is then designated as the grade of a particular area. The legal criteria items refer to the official conservation zones that include water conservation zones, ecological landscape preservation areas, and so forth. The environmental

and ecological criteria items correspond to their respective values, such as biodiversity, natural ecology status, and distribution of protected and endangered species. The land is classified into five grades according to preservation value, with the first grade representing an area of high conservation value and the fifth referring to a region that is undergoing pre-development.

The full survey for the NEZM was first completed in 2005. Since 2005, it has been continuously updated and upgraded to improve spatial resolution and utilization. The NEZM is open to the public and utilized in pre-environmental investigation and environmental impact assessment. This is to avert social conflict that may arise if any high-impact facilities are to be located in an environmentally critical area. Therefore, the NEZM effectively prevents socio-economic losses in advance and restricts inappropriate site selections by developers.

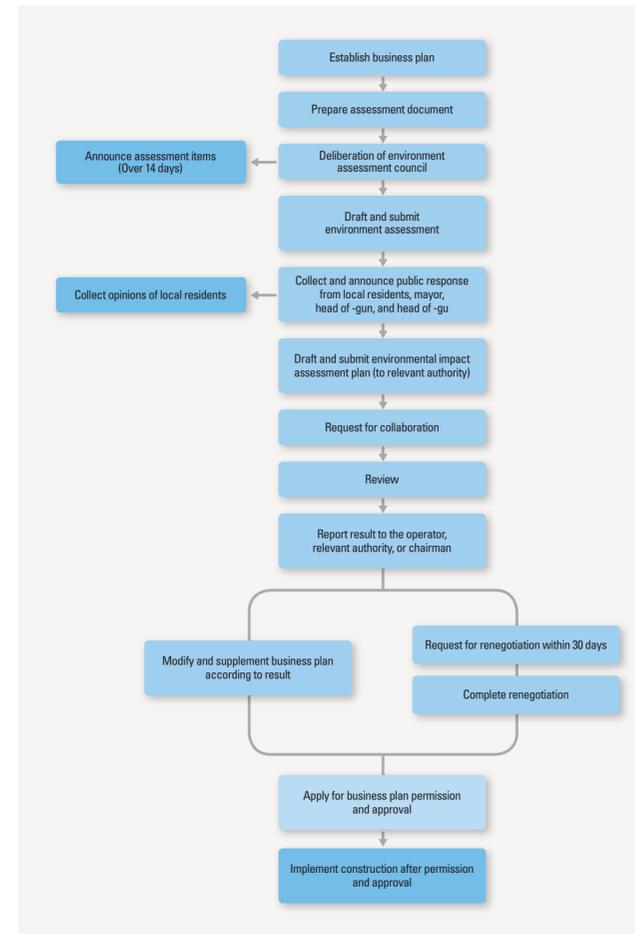


National Environmental Zoning of Chungcheongnam-do

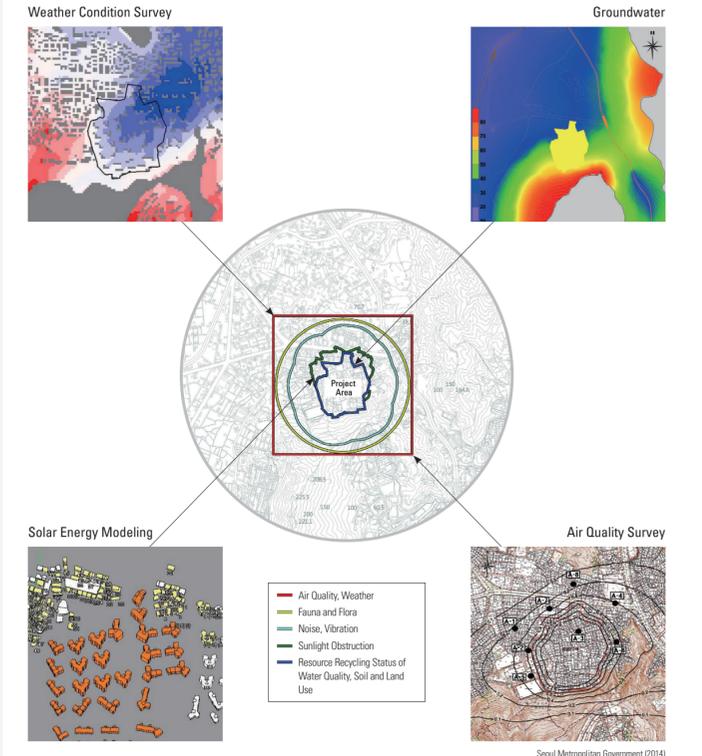


General Outline of Environmental Impact Assessment

Procedure of Environmental Impact Assessment



Example of Environmental Impact Assessment (Housing Development Project in Eungam-dong, Seoul)



Number of Environmental Impact Assessments

Year	Cases	Headquarters	Hangang Office	Nakdonggang Office	Gyeongang Office	Yeongsangang Office	Wonju Office	Daegu Office	Saemangeum Office
1982 - 2008	3,951	977	718	497	418	421	332	390	198
2009	305	55	67	49	37	32	32	20	13
2010	288	32	56	55	39	24	31	43	8
2011	189	32	36	20	30	23	15	17	16
2012	219	33	36	51	27	21	15	23	13
2013	157	39	23	25	19	15	11	19	6
2014	179	48	21	35	27	11	18	12	9
2015	168	34	23	26	25	18	17	19	6
2016	40	7	10	6	3	5	2	5	2
2017	69	9	10	7	10	15	5	12	1
Ongoing	69	9	10	7	10	15	5	12	1
<b>Total</b>	<b>5,565</b>	<b>1,264</b>	<b>1,000</b>	<b>771</b>	<b>635</b>	<b>585</b>	<b>478</b>	<b>560</b>	<b>272</b>

Ministry of Environment (2015)

Number of Strategic Environmental Impact Assessments

Year	Cases	Headquarters	Hangang Office	Nakdonggang Office	Gyeongang Office	Yeongsangang Office	Wonju Office	Daegu Office	Saemangeum Office
2012	357	35	85	59	45	36	24	54	19
2013	826	73	143	150	112	114	67	103	64
2014	811	74	163	124	119	112	66	100	53
2015	926	59	189	138	124	127	113	104	72
2016	175	6	37	33	27	16	22	25	9
2017	1	0	0	0	0	1	0	0	0
<b>Total</b>	<b>3,096</b>	<b>247</b>	<b>617</b>	<b>504</b>	<b>427</b>	<b>406</b>	<b>292</b>	<b>386</b>	<b>217</b>

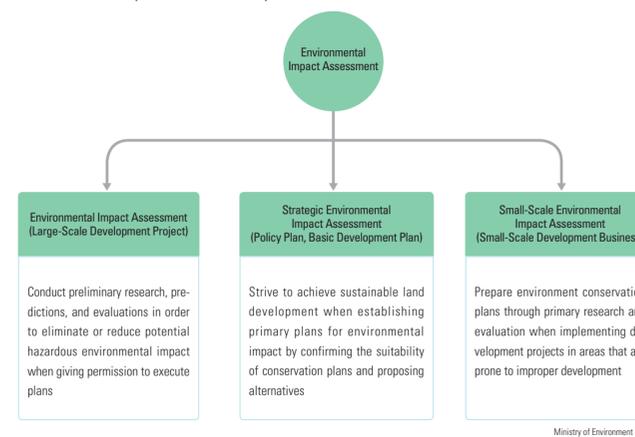
Ministry of Environment (2015)

Number of Small-Scale Environmental Impact Assessments

Year	Cases	Headquarters	Hangang Office	Nakdonggang Office	Gyeongang Office	Yeongsangang Office	Wonju Office	Daegu Office	Saemangeum Office
2012	1,096	21	335	101	174	117	134	111	103
2013	1,924	53	331	201	331	258	287	252	211
2014	1,941	32	306	181	375	344	244	255	204
2015	1,962	15	387	184	371	329	281	249	146
2016	551	3	101	49	111	86	81	75	45
<b>Total</b>	<b>7,474</b>	<b>124</b>	<b>1,460</b>	<b>716</b>	<b>1,362</b>	<b>1,134</b>	<b>1,027</b>	<b>942</b>	<b>709</b>

Ministry of Environment (2015)

Environmental Impact Assessment System



The Environmental Impact Assessment (EIA) predicts, analyzes, and evaluates environmental impacts of various policies and development projects. Ultimately, as a policy for preventing environmental destruction and pollution ahead of time, the EIA aims to create and maintain a pleasant environment by guiding environmentally

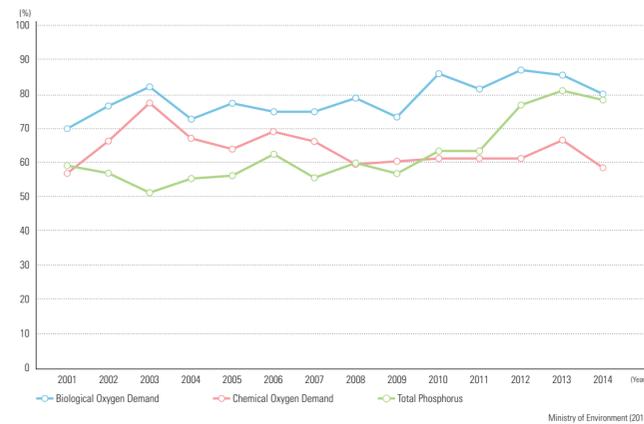
sound and sustainable development. The Korean government operates the assessment procedures, targeting initiatives such as large-scale development projects or specific programs under the Environmental Impact Assessment Act to minimize the destruction of nature and environmental pollution. As a means

of proactive protection, the EIA is designed to consider not only economic and technical aspects but also environmental factors when establishing or conducting a development project, allowing for environmentally healthy planning. According to the Act as amended on July 22, 2012, Korea carries out environmental impact assessments that

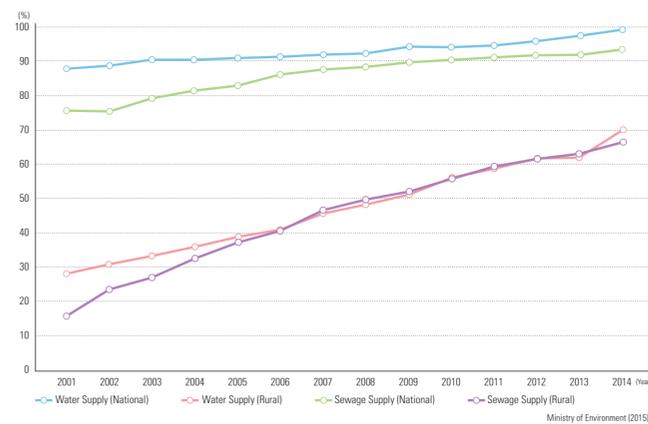
are divided into the following three areas: "Strategic Environmental Impact Assessment," "Environmental Impact Assessment," and "Small-Scale Environmental Impact Assessment."

Indicators for Environmental Improvement

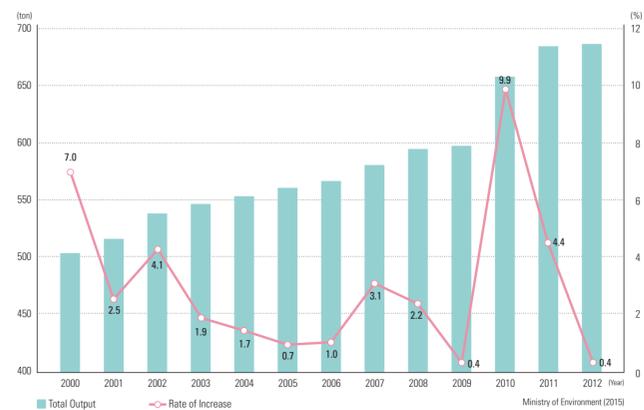
Water Quality by Year



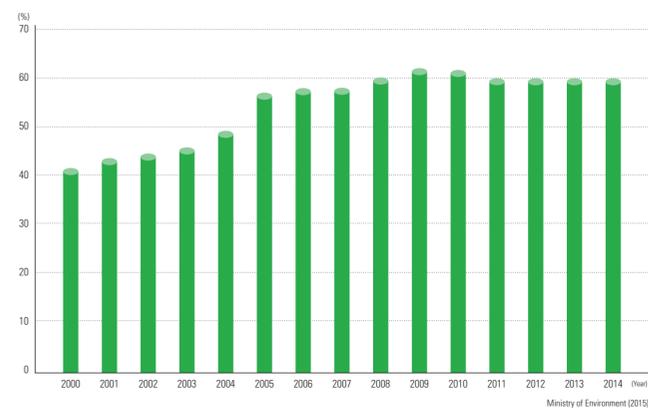
Supply Rates of Water and Sewage by Year



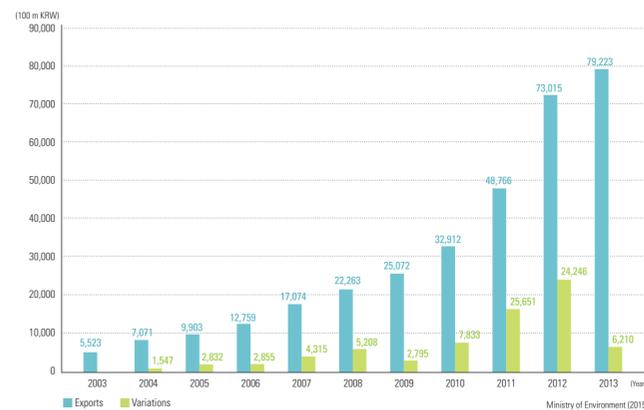
Greenhouse Gas Emissions by Year



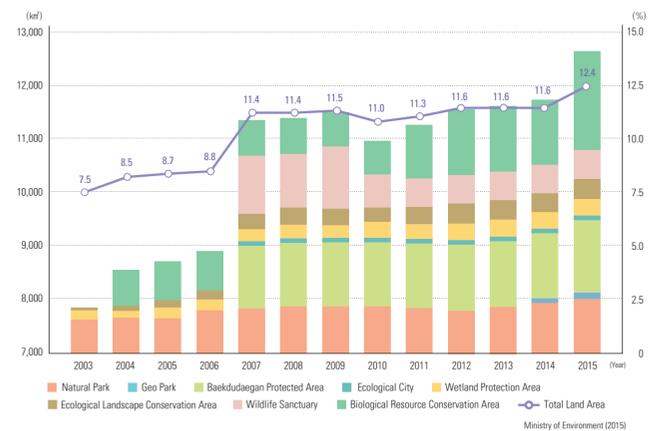
Municipal Waste Recycling Ratio by Year



Status of Exports in Environmental Industries by Year



Expansion in Ecological Spaces by Year



Many environmental indicators in South Korea are steadily improving due to the efforts of the citizens, public organizations, and the government. With an aim to shape a healthy and safe environment for the nation, these entities are collectively strengthening preventive measures for environmental management. They are developing efficient land utilization techniques, strictly controlling the use of chemical substances, and creating response systems to environmental diseases. Since 2014, the establishment of the Integrated

Approach to Environmental Management has individualized environmental management of industries by acknowledging the specificity of each business type. In addition, water supply distribution systems have been enhanced, supplying clean water to farming and fishing villages. The sewer system supply rate is also increasing, while the concentration of water pollutants is continuously decreasing. Global concerns regarding climate change have led to proactive efforts on the local level to

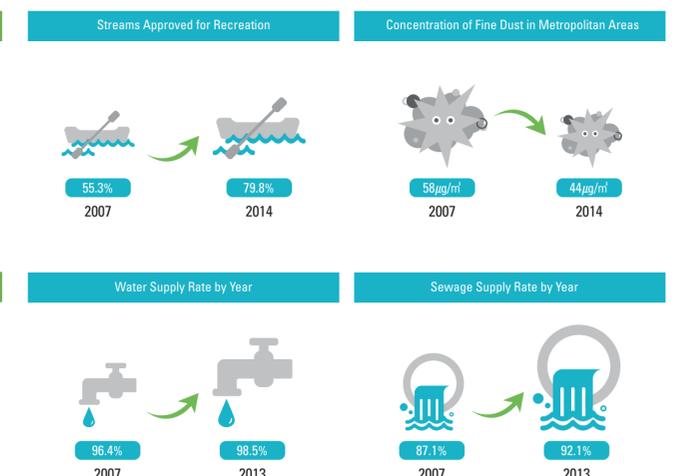
reduce greenhouse gas emissions. Maintaining pace with the international society, Korea aims to reduce 30% of greenhouse gas emissions by 2020 while instituting a low-carbon socio-economic structure. The government is also maximizing resource circulation by recycling wastes and continues to cultivate the environmental industry as the nation's new growth engine. Since the export volume for Korea's environmental industry has increased from 0.7 trillion KRW in 2004 to 7.9 trillion in 2014, the industry is expected to create

new job opportunities and increase revenue. Other enhancements of environmental indicators include the expansion of ecological space, advancement in biodiversity management, restoration of stream ecosystems, and tightened regulations on ultra-particulate matter, noise, and odor. Parks and protected areas are steadily expanding as more natural parks are designated and managed as places of relaxation and ecological exploration.

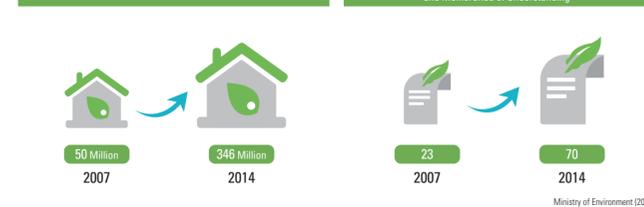
Promotion of Eco-Friendly Lifestyle and Environmental Industries



Everyday Environmental Improvements



Number of Households Joining the Carbon Points System



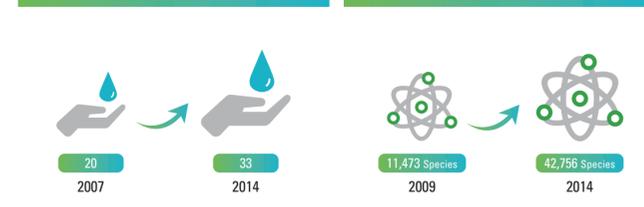
Number of Children with Atopic Diseases



Improvement in National Land Environmental Value



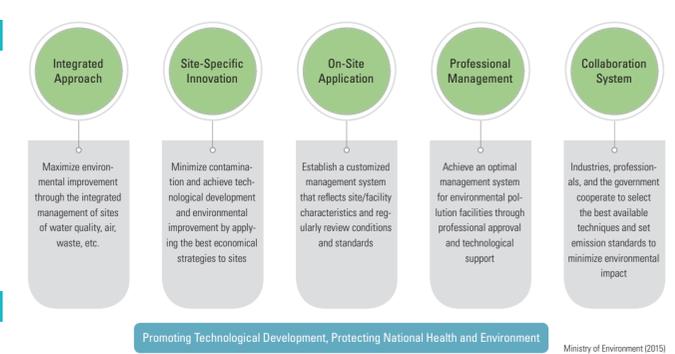
Wetland Protection Areas



Natural Environment Protection Areas



Major Components of the Integrated Environmental Management System



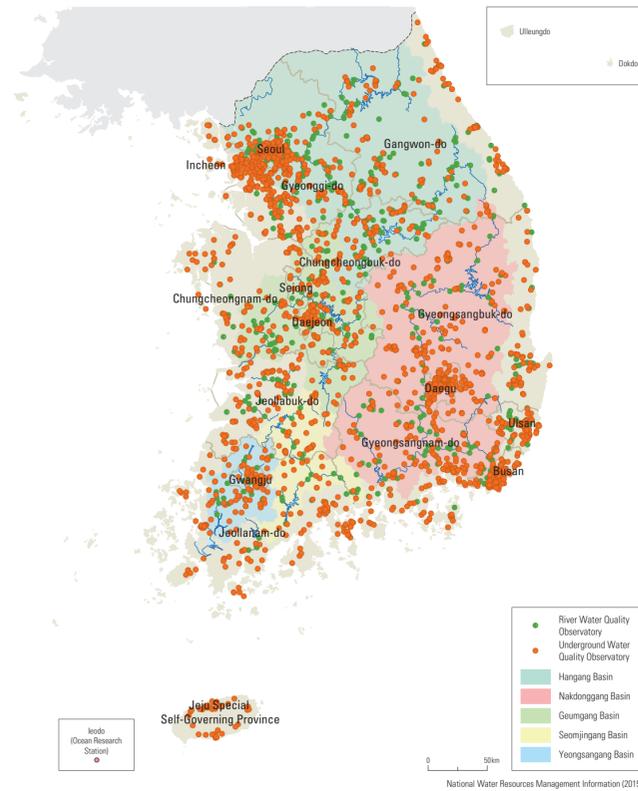
Over the last 40 years, Korea's environmental management has taken on the approach of dividing environmental components and managing them separately to reduce industrial pollution. However, this method has been met with limitations as it failed to flexibly address circumstantial changes within each industrial sector or facility. While the government continues to limit the amount of pollution through the separate management of water, air, and waste, such partial improvements are insufficient for holistic recovery effects. Furthermore, the divided and standardized pollution management system results in complex and often repetitive regulations that do not efficiently meet individualistic challenges posed in industrial workplaces. As such, it is imperative to permit open environmental policies to satisfy industrial, resi-

dential, and governmental sectors, and to secure environmental safety. To minimize the impact on the environment, the government has introduced the "Act on Integrated Management of Environmental Pollution Facilities," which assists big industries in opting for the best available technology (BAT) that guarantees an economically and environmentally viable control system. In this manner, the nation is pursuing comprehensive and effective environmental management, which mitigates the burden of obtaining multiple environmental licensing for industries and advances their application of BAT. This leads not only to a parallel improvement of environmentally sound technology and restoration in environmental quality, but also the cultivation of industries and their competitive edge.

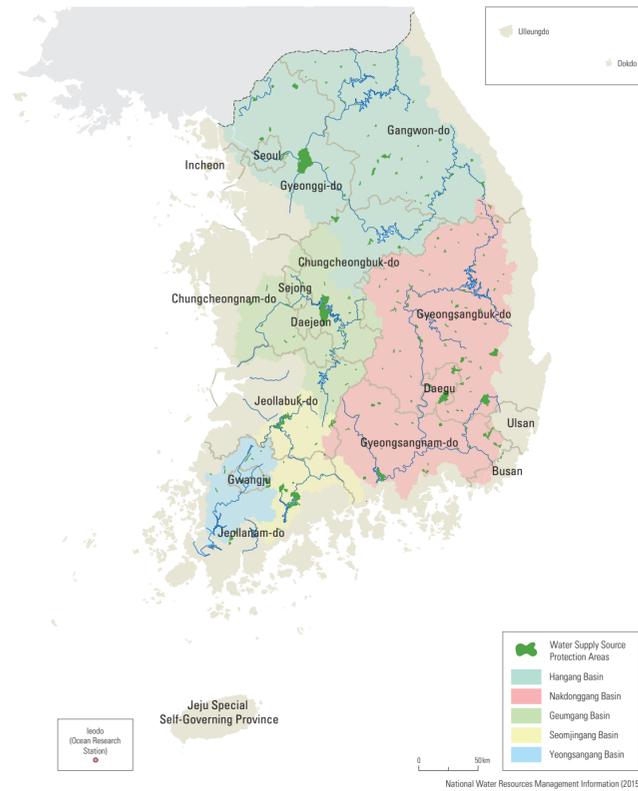


Water Pollution Monitoring

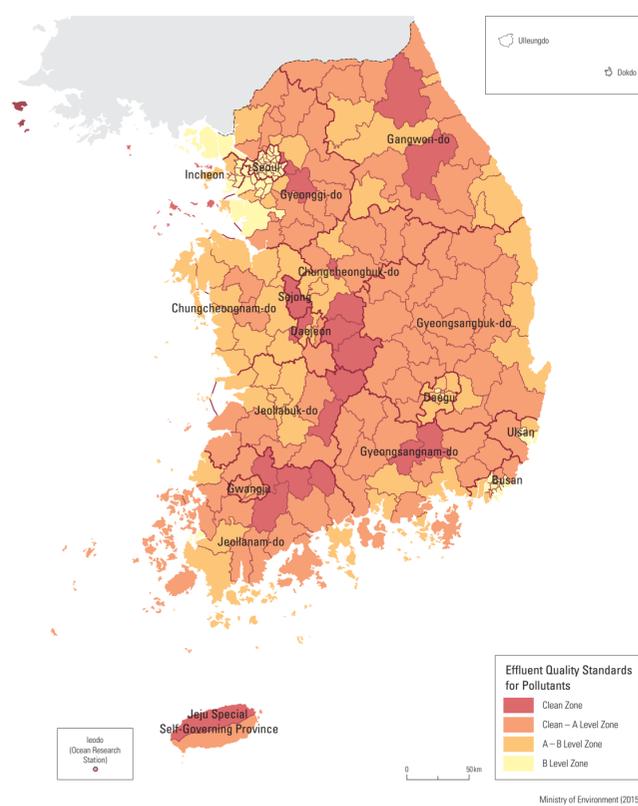
Distribution of Water Quality Observatories



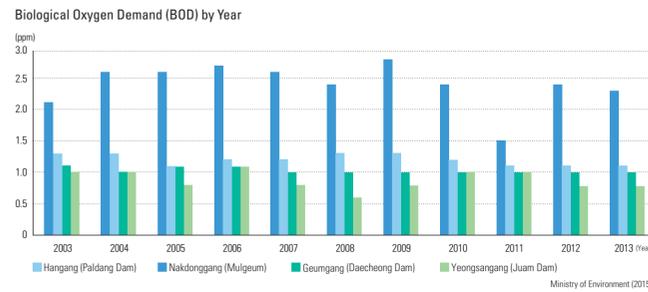
Water Supply Source Protection Area



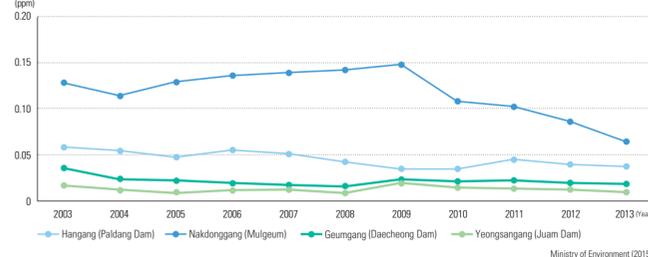
Effluent Quality Standards for Pollutants by Province



Water Pollution Level at the 4 Major Rivers



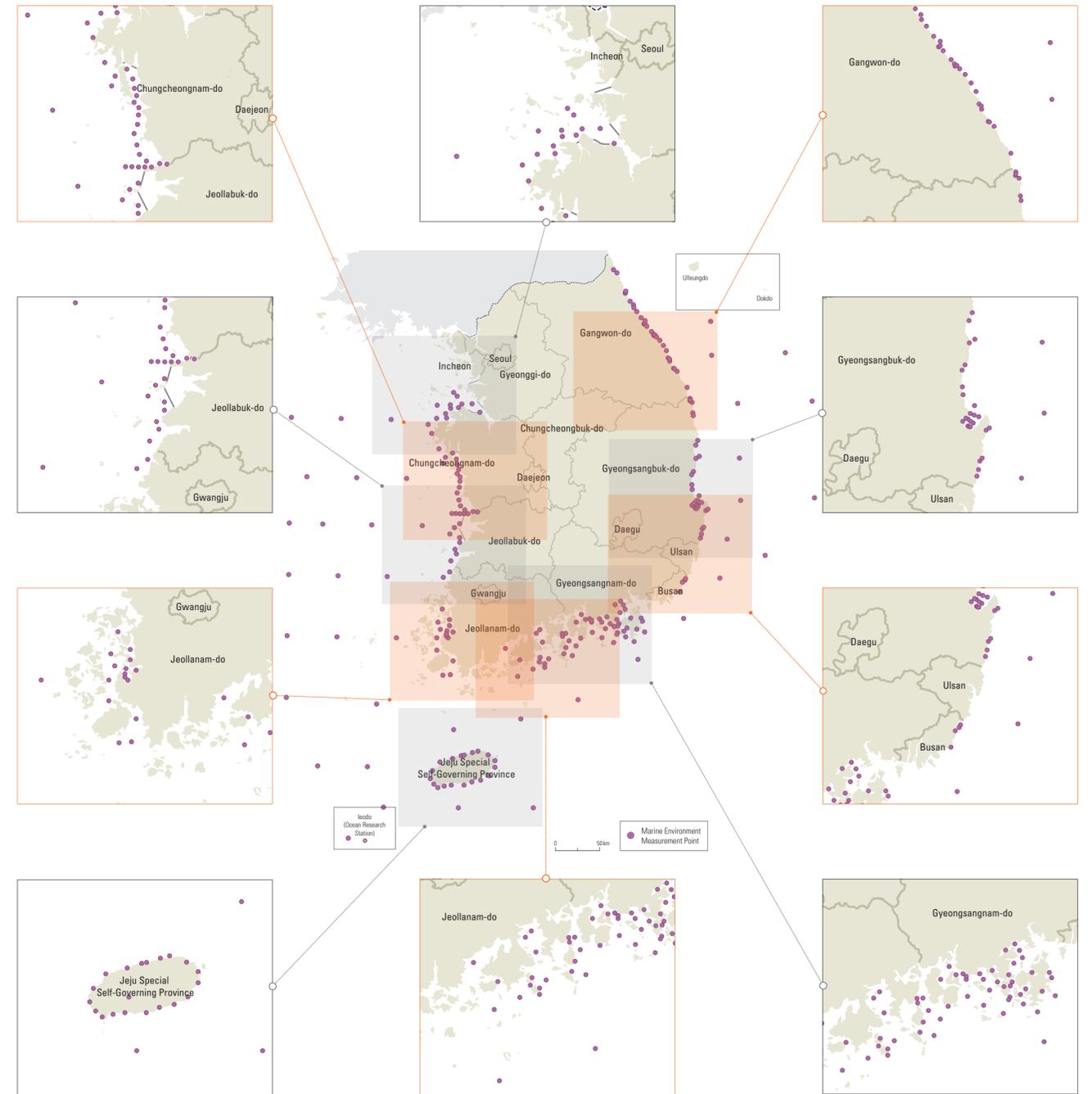
Total Phosphorous (T-P) by Year



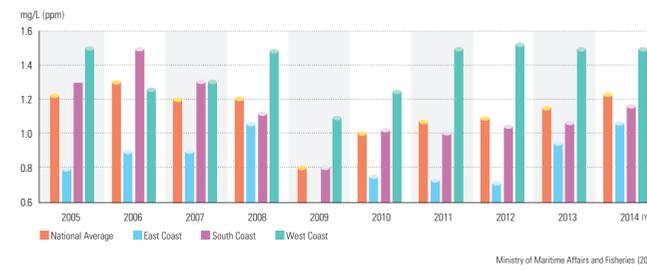
The water quality monitoring network is operated to understand the status of water quality and aquatic ecosystems in public water bodies such as rivers and lakes. Water quality monitoring sites are selected based on the following criteria: sites for which water quality conditions must be addressed, sites to preserve good water quality, sites to identify changes in water quality status and pollution trends, sites to analyze contaminant in-

flow into rivers and their effects on the rivers, or sites to investigate pollution load due to freshwater at the mixing point of freshwater and seawater. Currently, water quality monitoring is carried out at a total of 2,188 sites. Data on water pollution is publicized through the "Water Resources Management Information System (www.wamis.go.kr)."

Distribution of Marine Environment Observatories



Chemical Oxygen Demand (COD) of National Coasts by Year



Korea regularly monitors its marine environment and conditions of coastal waters, as well as the sources of marine pollution. The marine environment monitoring network aims to comprehensively understand the marine environment, and the collected information is used to establish national management and conservation policies. This monitoring network is composed of four different network types: port, coastal and offshore, environmental management waters, and estuaries. The monitoring is carried out in February, May,

August, and November of every year at a total of 417 stations. In addition, the automatic seawater quality monitoring network collects data from Sihwaho, Masanman, Ulsanman, Yeosu New Harbor, and the coastal areas of Busan in order to measure the water quality of estuaries and pollution hot spots, and to monitor coastal pollution. The information from these monitoring networks is provided through the "Marine Environment Information System (www.meis.go.kr)."

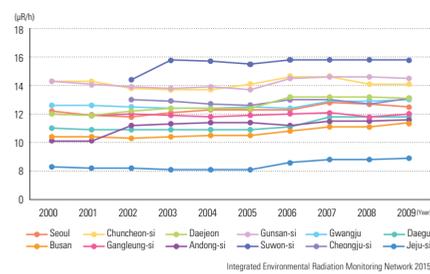
Other Environmental Monitoring

Distribution of Environmental Radiation Monitoring Stations

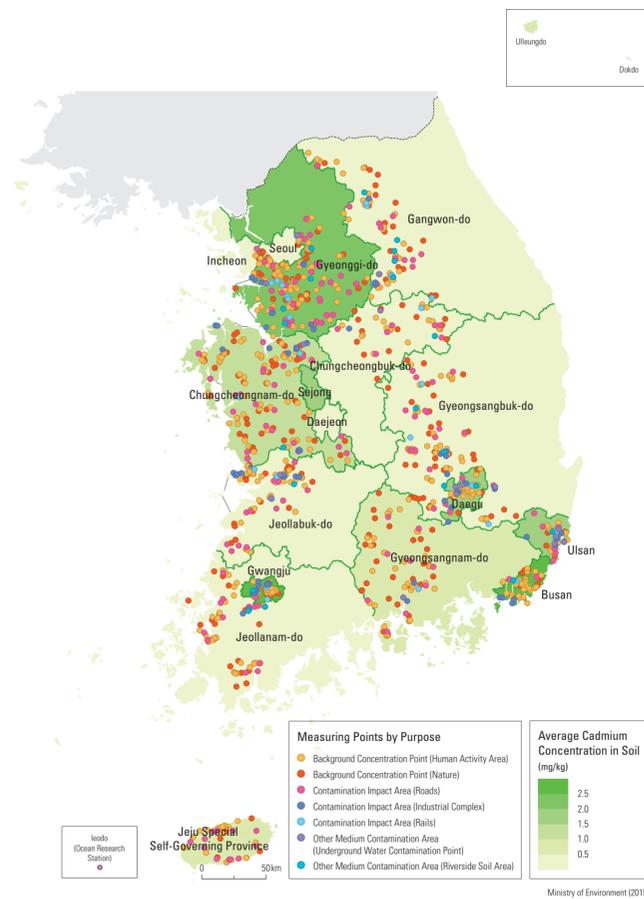


Environmental radioactivity refers to radioactive materials that are produced from nature as well as from man-made sources. It is monitored automatically by national environmental radioactivity monitoring stations, which control and manage disasters related to nuclear and radiation exposure and prepare responsive measures. The Korea Institute of Nuclear Safety monitors environmental radioactivity across the nation at all times and conducts radioactivity research on the living environment. There are 15 regional radioactivity monitoring stations and 128 central radioactivity monitoring stations that periodically measure particles, radioactive fallout, and beta and gamma nuclides from precipitation. Data is collected in real time to observe changes in radiation levels, and provided to the public through the "Integrated Environmental Radiation Monitoring Network (iernet.kins.re.kr)."

Average Annual Rate of Spatial Gamma Dosage by Year



Status of Cadmium Contamination in Soil by Province



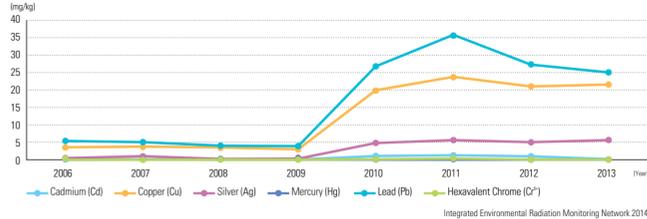
Number of Soil Contamination Measuring Points by Management Office (2013)

Total (%)	Hangang Office	Nakdonggang Office	Yeongsang Office	Geumgang Office	Wonju Office	Daegu Office	Saemangeum Office
1,521	272	216	240	228	206	228	131
100	17.9	14.2	15.8	15	13.5	15	8.6

Number of Measuring Points for Soil Contamination by Year



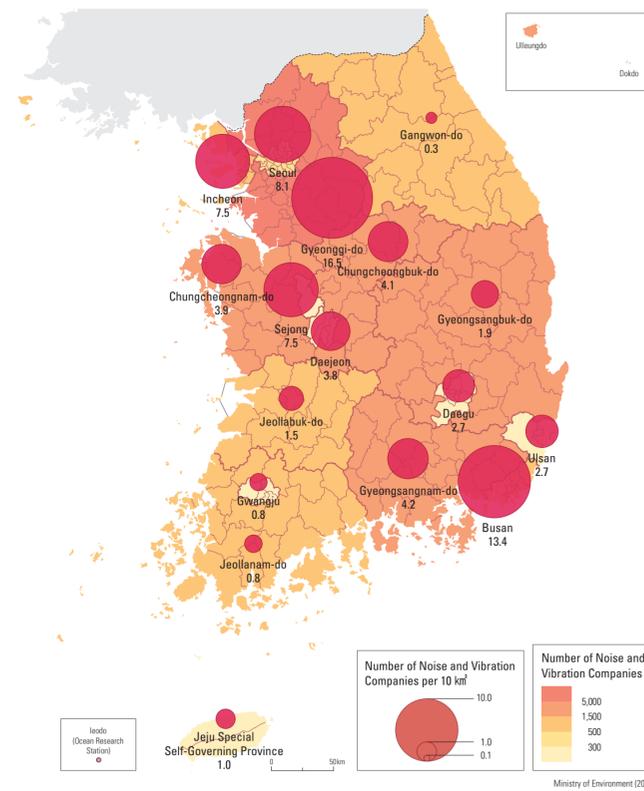
Soil Contamination by Year



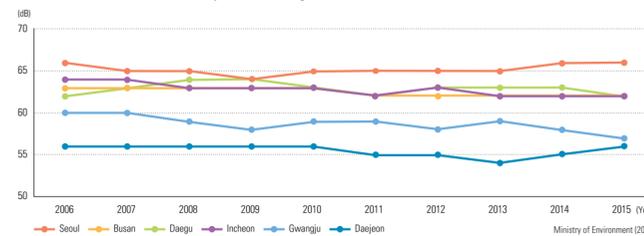
The Ministry of Environment has been monitoring national soil contaminants since 1987 as reference points to establish policies for soil contamination prevention, purification, and restoration. The soil monitoring network was expanded from 250 locations (5 stations in each location) in 1987 to 3,000 in 1998, and the number of items of data collection, such as cadmium (Cd) levels and soil acidity (pH), were increased from 9 items to 12 over the same time period. The soil

monitoring network is operated as a dual system, with the national network and regional network centered on pollution sources. The national network – operated by the central government – is based on specific land uses, such as agricultural land, industrial complex, and residential sites. The regional networks are operated by local governments and their monitoring locations are selected by the distribution of soil contaminants and their areas of influence.

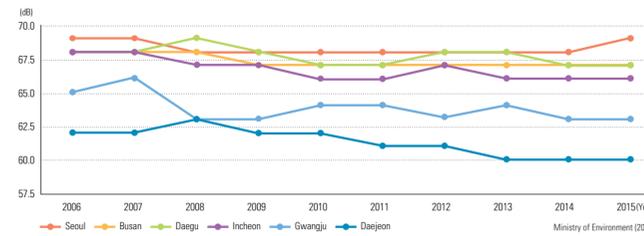
Noise and Vibration Companies by Province



Level of Ambient Noise in Major Cities (Night)



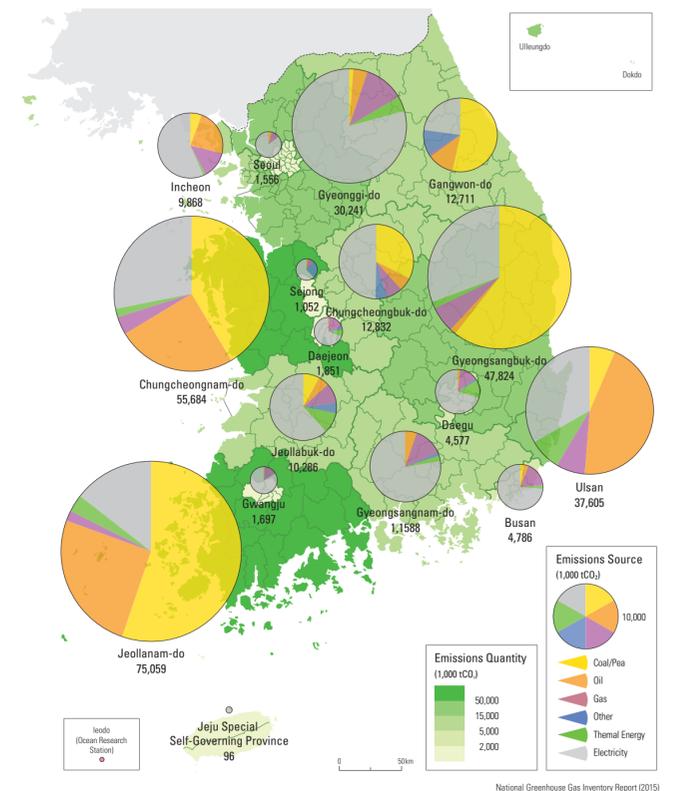
Level of Ambient Noise in Major Cities (Day)



Noise pollution is a growing concern for city dwelling residents who are vocalizing their demands for a quieter environment. In a 2014 evaluation, only Daejeon and Gwangju met the daytime environmental standard of 65 dB, whereas for the night time standard (55 dB), all metropolitan areas excluding Daejeon failed to conform. In the last 3 years, the noise level has either shown a slight fluctuation within 1dB, or has re-

mained constant throughout urban areas. This is the result of continued noise mitigation efforts, despite a steady increase of motor vehicles, roads, urban construction sites, and other noise polluting factors. Sound proof infrastructures, traffic noise management policies, and other noise-reducing measures have been introduced to suppress noise pollution.

Greenhouse Gas Emissions by Province



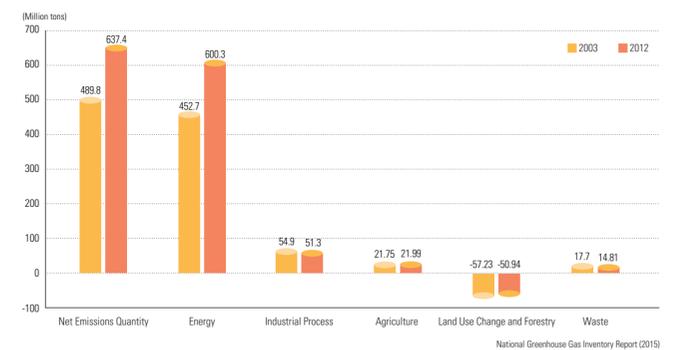
The 1996 and 2006 Intergovernmental Panel on Climate Change (IPCC) guidelines for national greenhouse gas inventories have provided international standards for national greenhouse gas (GHG) emissions estimations. Korea's current national GHG inventory has been formulated according to the 1996 IPCC guidelines. The government established the Greenhouse Gas Inventory and Research Center of Korea (GIR), which conducts monitoring and research on GHG emissions and reduction strategies.

The total GHG emissions in 2013 were recorded at 694.5 million tons CO<sub>2</sub> eq. This represents an increase of 137.6% compared with 292.3 mil-

lion tons CO<sub>2</sub> eq. in 1990, and 1.5% compared with 684.3 million tons CO<sub>2</sub> eq. in 2012. Net emissions were recorded at 651.7 million tons CO<sub>2</sub> eq. as of 2013, representing an increase of 152.5% compared with 258.1 million tons CO<sub>2</sub> eq. in 1990, and 1.9% compared with 639.5 million tons CO<sub>2</sub> eq. in 2012.

The energy sector accounted for the largest portion in 2013 at 606.2 million tons CO<sub>2</sub> eq. (87.3% of total GHG emissions), followed by the industrial processes sector at 52.6 million tons CO<sub>2</sub> eq. (7.6%), the agricultural sector at 20.7 million tons CO<sub>2</sub> eq. (3.0%), and the waste sector at 15.0 million tons CO<sub>2</sub> eq. (2.2%).

National Greenhouse Gas Emissions by Year



Environmental Issues and Actions

Chronological Table of Environmental Issues

Year	Major Environmental Issues
1969	Ulsan Samsan Plain: Crop damage
1979	Ulsan Yecheon-dong: Outbreak of skin disease
1985	Outbreak of the Onsan disease
1987	Hwasong-si: Outflow of pollutants from industrial waste landfill
1989	Seoul Metropolitan Area: Heavy metals in drinking water
1991	Wonjin Rayon occupational disease
1991	Gunsan: Dongyang Chemical TDI spill
1991	Nakdonggang: Phenol spill incident
1993	Anmyeondo: Nullification of nuclear waste disposal site
1994	Sihwaha incident
1994	Model implementation of a volume-rate system for waste disposal
1995	National implementation of a volume-rate system for waste disposal
1995	Sinking of the Sea Prince
1998	Maehyangil Shooting Range issue
2000	Donggang Dam annulled
2001	Campaign against construction of road through Bukhansan
2003	Buan-gun nuclear waste site annulled
2007	Hebei Spirit oil spill accident
2012	Gumi: Hydrofluoric gas leakage

Gunsan Dongyang Chemical TDI Spill

On September 7, 1991, concentrated waste fluids were leaked from Dongyang Chemical plants located in Gunsan-si due to the inexperienced operation of water sealing tanks. Substances assumed to be TDA and TAR were discharged along with hydrogen and water vapor. The leak resulted in the pollution of surrounding areas, thus triggering an environmental movement for the demolition of the chemical plants. Along with the Nakdonggang phenol spill, this incident was the driving force behind an early settlement in policies concerning hazardous substance management.

Hebei Spirit Oil Spill Accident

The Hebei Spirit oil spill (also known as the Taean oil spill) occurred on December 7, 2007 when the Hebei Spirit, a Hong-Kong-registered oil tanker, collided with a barge owned by Samsung C&T Corporation off the coast of Taean-gun, Chungcheongnam-do. 78,918 barrels of crude oil leaked into the waters as a result, spreading out across the entire western coastal area. The Korea government declared six regions in Chungcheongnam-do as special disaster areas along with the enactment of a Special Act. Meanwhile, about 2 million volunteers took part in the efforts to clean up the crude oil spillage.

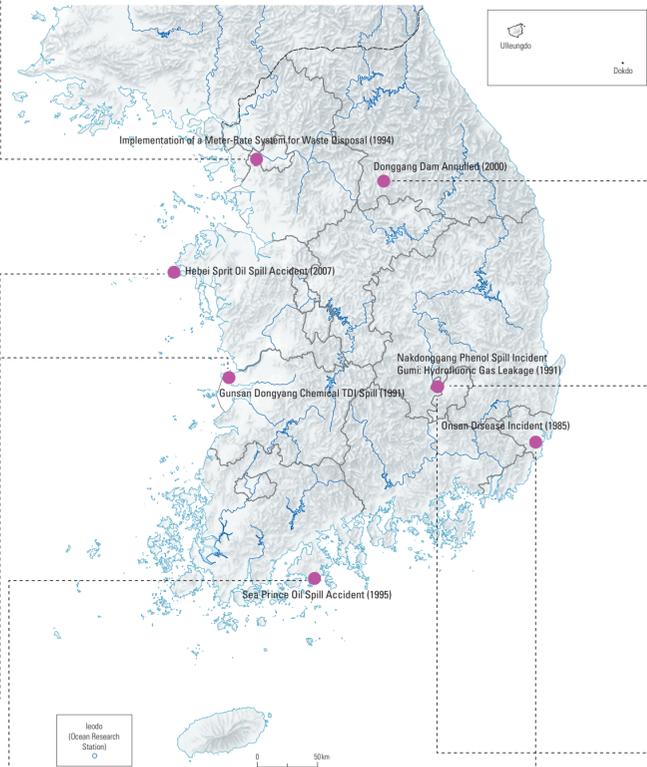


Implementation of a Volume-Rate Garbage Disposal System

The volume-rate garbage disposal system was implemented in January 1995 as part of a waste minimization policy. It was introduced to reduce the amount of garbage generation and to promote the separate discharge of recyclable wastes. The system was based on the polluter-pays principle, under which liabilities

are proportional to the amount of waste that is discharged. Although the system has managed to achieve the desired outcomes—reduced garbage discharge and increased recycling rates—problems such as illegal incineration and dumping of wastes have also emerged.

Major Environmental Issues



Sea Prince Oil Spill Accident

The Sea Prince oil spill occurred on July 23, 1995 at a point 8 km east of Nam-myeon, Yecheon-gun, Jeollanam-do. While attempting to evade the A-class typhoon Faye, the Sea Prince (a Cypriot crude oil tanker) collided with Jakdo Island, causing consecutive explosions that damaged the engine room, the engine, and the bridge. The tanker eventually ran aground on Sorado, about 8 km west of Jakdo. The accident resulted in 5,000 tons of bunker A/C oil and crude oil being spilled, polluting an area of 32.95 km<sup>2</sup> and 204 km at sea and 73 km of shoreline. This incident called attention to the grave repercussions of marine pollution and served as a turning point for developing preventive action on a national scale.



Onsan Disease Incident

Onsan disease, the first pollution-related disease outbreak in Korea, stems from the Onsan National Industrial Complex constructed near Onsan-eup, Ulju-gun, Ulsan-si in 1974. Local residents living near the complex of refinement plants for nonferrous metals began to show unusual health symptoms in the early 1980s. The incident gained public attention through media coverage in 1985, and vigorous local environmental movements led the government to officially recognize the harmful consequences of pollution. Beginning in 1986, the government designated the complex and its surrounding areas as a special countermeasure area to pollution and relocated the residents.

Gumi: Hydrofluoric Gas Leakage

On September 27, 2012, hydrofluoric gas was leaked from Hube Global plants located in the 4th National Industrial Complex in Gumi-si, Gyeongsangbuk-do. The accident resulted in 23 casualties and also caused extensive damage to humans, animals, and plants in neighboring towns. The incident highlighted the lack of national response capacity for chemical accidents or disasters.

Donggang Dam Annulled

The government officially designated the proposed site for the construction of Donggang Dam in September 1997, which received public objection with environmental movement organizations at its center. The Ministry of Construction and Transportation and Korea Water Resources Corporation (K-water) strongly addressed the inevitability of the construction, and the rift between local residents, municipalities, and environmental movement groups only deepened through pros-cons debates. In August 1998, the Ministry of Environment expressed concerns about the potential degradation of water quality due to the construction of the dam. It became a global environmental issue, wherein Greenpeace and the Sierra Club sent a clear message of objection to the Korean government. Consequently, a special investigation unit was organized to examine the validity of the Yeongwol Dam (Donggang Dam) construction. The unit split up into subgroups and led research on water supply and demand, floods, dam security, environment, and culture. The conclusion drawn from the research was in favor of preservation, and in August, 1999, even the President made a declaration against the construction. As a result, the plan for Donggang Dam was annulled, and the Donggang watershed was designated as an ecosystem reserve. This paved the way for the transition from controlling and using water to managing water at an ecosystem/environmental conservation level.



Nakdonggang Phenol Spill Incident

The first phenol pollution occurred on March 16, 1991 when underground pipes ruptured and spilled 30 tons of crude phenol at a Doosan Electronics plant in Gumi-si, Gyeongsangbuk-do. The leaked phenol was discharged into Dasa intake station, which served as the source of drinking water for almost all areas of Daegu. Some residents suffered from headaches and vomiting due to the contamination. The second phenol pollution incident happened on April 22 of the same year, merely five days after Doosan resumed operations. Poor construction caused phenol tanks to burst and crude phenol was leaked into Nakdonggang. Not only did the crisis disrupt the supply of drinking water in Daegu, it affected all areas of Yeongnam including Milyang, Haman, Busan, and Masan. Concerns were raised over the effectiveness of inspection criteria for drinking water standards and consequently triggered the enactment of the Act on Special Measures for the Control of Environmental Offenses.



Environmental Perception and Policy Changes

1960's

The Era of Emerging Environmental Problems and Initial Responses

Poverty was still rampant in Korea at the start of the 1960s. Heavy rainfalls and floods only heightened environmental destruction, and the use of coal briquettes (the main heating fuel in cities) caused carbon monoxide poisoning and pollution from coal dust. From the 1960s, Korea enjoyed rapid economic growth based on the five-year plan for economic development, and achieved the "Miracle of Hangang." However, the surge in urban population concentration caused environmental management problems in cities, while the increased use of pesticides and chemical fertilizers led to agricultural pollution in rural areas.

1970's

The Era of Increasing Environmental Pollution and Environmental Awareness

In 1967, the average concentration of bacteria and colon bacillus in Hangang was about 150 times higher than that of 1963. Deformed fish were caught in the river and the BOD level downstream of Jungnangcheon reached 374.9 mg/L in 1974. The first industrial pollution incident occurred in 1967 when sulfuric acid gas leaked from Yeongnam Chemical in the Ulsan Industrial Complex, causing respiratory diseases among local residents and a destruction of surrounding forests. In 1969, Korea Aluminum Co., Ltd. in the Ulsan Industrial Complex discharged fluorine and sulfuric acid gas, which devastated the rice crops of the Samsan Plain. The heavy chemical industry developed in the Yecheon and Gwangyang regions resulted in the contamination of Gwangyangman along with mass deaths of fish and shellfish. In 1978, children living in this area suffered from skin diseases of unknown causes. Victims of such environmental pollution incidents began to gain awareness of environmental issues.

1980's

The Beginning of Environment Management

The constitution of the Fifth Republic of Korea in the 1980s defined "Environmental Rights" as fundamental rights of the people to live in a healthy and pleasant environment. Thus, the environmental sector plan was established for the first time, breaking away from previous national development policies that focused solely on economic growth. In the 6th Five-Year Economic Development Plan (1987 - 1991), the objectives for environmental policy were set to "improve the achievement ratio of environmental standards." The main policies were strengthening environmental management in areas with a high possibility of pollution and improving urban living conditions in order to prepare for the 1988 Seoul Olympic Games.

1990's

The Advancement of Environmental Policies

As a departure from the 1980s policies of post-management and direct regulation, the government introduced a new paradigm for environmental policy that included a preventative management system and economic incentives. Following the Rio Conference in 1992, business organizations such as the Federation of Korean Industries proclaimed environmental management strategies. This elevated environmental conservation awareness and related activities in the industry, and led a trend for environmentally friendly business management practices.

2000's

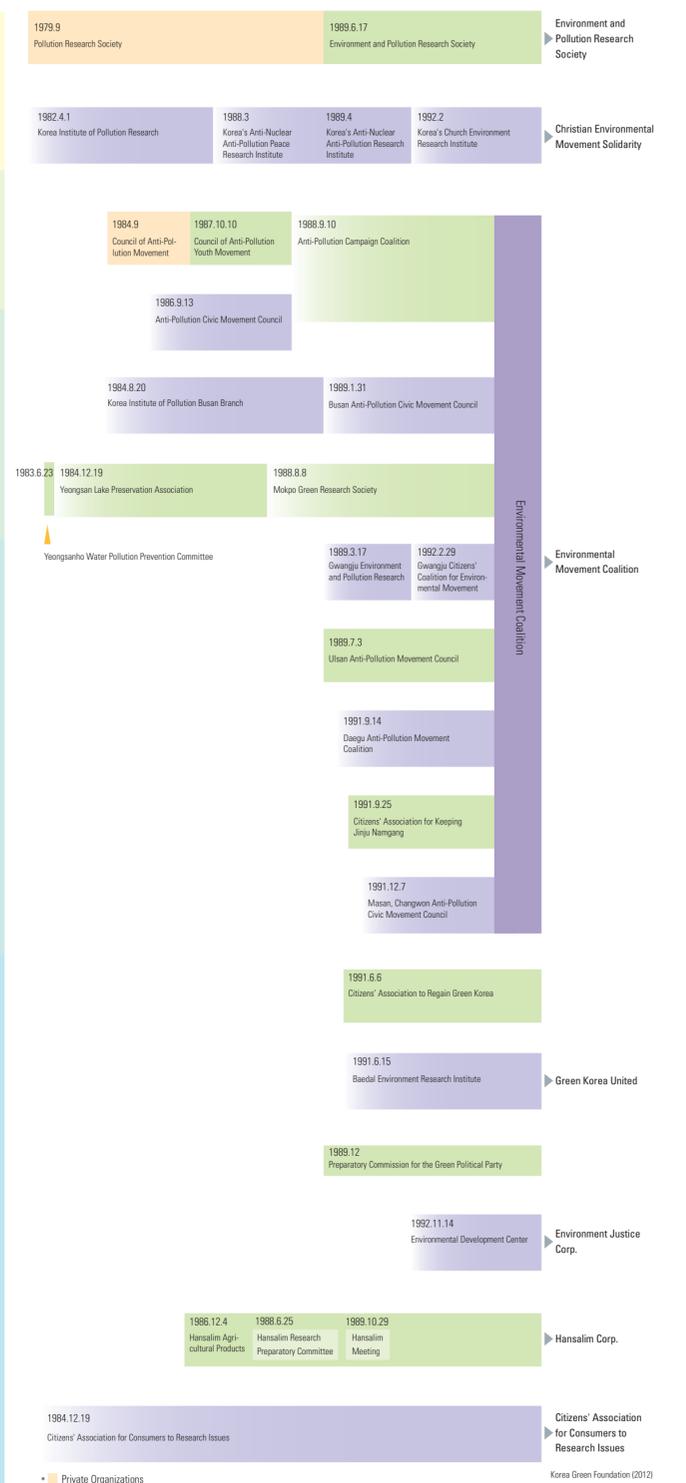
The Era of Practicing Sustainable Development Principles

In the 21st century, global management philosophies and development strategies have shifted away from economic growth to sustainable development. In particular, the World Summit on Sustainable Development (WSSD) held in Johannesburg in 2002 emphasized the need for the balanced development of environmental conservation, economic growth, and social development (the 3 major axes). Korea has also been pursuing a better quality of life and environment, accompanied by an increase of public interest and concern regarding new environmental diseases and safety control of hazardous chemicals. Moreover, the nation is accelerating the transition into a sustainable resource circulation society.

The natural environment of Korea was massively destroyed under Japanese colonial policy due to the reckless exploitation of Korean resources. Soil erosion and floods caused by the imprudent destruction of forests remained as serious issues after the independence, and the Korean War brought about the further devastation of life, property, and



History of Korean Civic Environmental Groups



International Cooperation

Sustainable development is the most frequently cited term at international conferences in the 21st century. As humans and the planet became at risk due to excessive development, global leaders, governmental representatives, international organizations, and NGOs gathered together under the supervision of the UN to discuss sustainable development.

This meeting, coined the Earth Summit (United Nations Conference on Environment and Development), was held in Rio de Janeiro in 1992. The agenda was to find measures to continue development without damaging the environment of the earth.

Countries that formerly prioritized economic

growth-oriented development and competition adopted the "Rio Declaration on Environment and Development" and "Agenda 21" as a step toward the peaceful coexistence of humans and nature. The Korean government is continuing its efforts to implement sustainable development through national laws and policies such as the "Framework Act on Sustainable Development" and the "Framework Act on Low Carbon Green Growth."

It is also flexibly responding to changes in international discussions through opportunities such as the subsequent "Sustainable Development Goals" and the "High-Level-Political Forum."

Environmental Cooperation with Europe and North America

In order to improve national environmental status, Korea has been promoting cooperation with Europe and North America to adopt advanced environmental policy, systems, and technology. Countries such as the United States, Canada, the United Kingdom, France, Denmark, the Netherlands, Germany, and Norway have signed MOUs with Korea, and exchanges have been conducted in

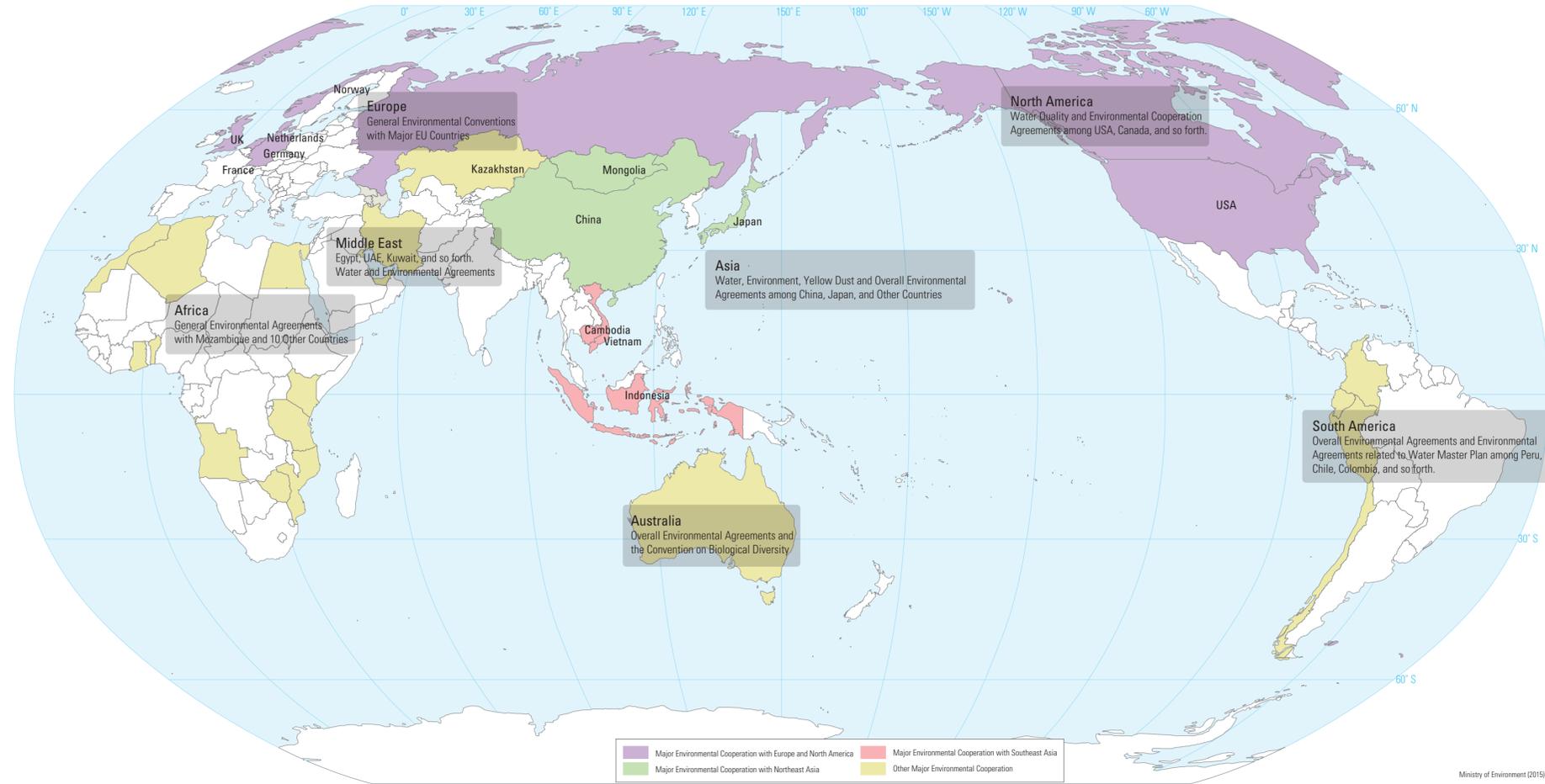
the form of joint seminars, collaborative projects, and the interchange of personnel. Since the signing of an MOU with the United States in March 1987, nine environmental technology cooperation tasks have been carried out, including a United States - Asia Environmental Partnership (US-AEP) project on the causes of poor visibility in large cities.

Environmental Cooperation with Southeast Asia

The environmental market of Southeast Asia has been increasing due to rapid industrialization and urbanization. As such, its importance has surged accordingly, and the Ministry of Environment has reinforced a cooperative relationship with countries in the region. The fundamental directions of such cooperation are firstly, to contribute to the environmental conservation of partner-countries in Southeast Asia; secondly, to promote the expansion of the Korean environmental

industry into the region; and thirdly, to pursue practical environmental diplomacy by establishing a support system for Korea on the international stage. Korea has been discussing sustainable development and environmental matters through the ASEAN+3 Environment Ministers Meeting, the Tripartite Environment Ministers Meeting among Korea, China, and Japan, and other cooperation initiatives with Vietnam, Cambodia, and Indonesia.

Countries Under Environmental Agreements

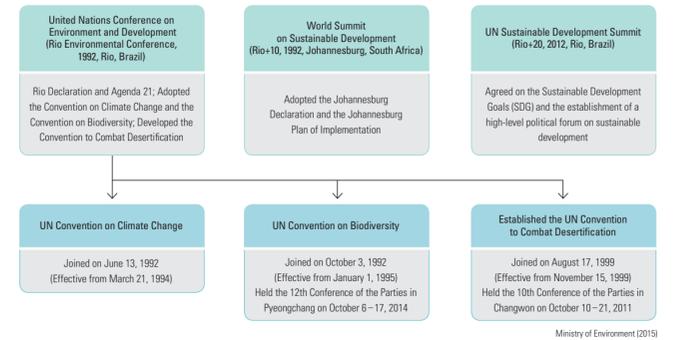


Participation in International Environmental Conventions and Treaties

Classification	Total	Air Climate	Clean Water Protection	Marine Fishery	Animal & Plant Conservation	Nuclear Security	Toxic Substances	Other
Adopted	57	8	-	23	9	7	3	7
Enforced	57	8	-	23	9	7	3	7
Joined	57	8	-	23	9	7	3	7

Ministry of Environment (2015)

Environment-Related International Cooperation



Ministry of Environment (2015)

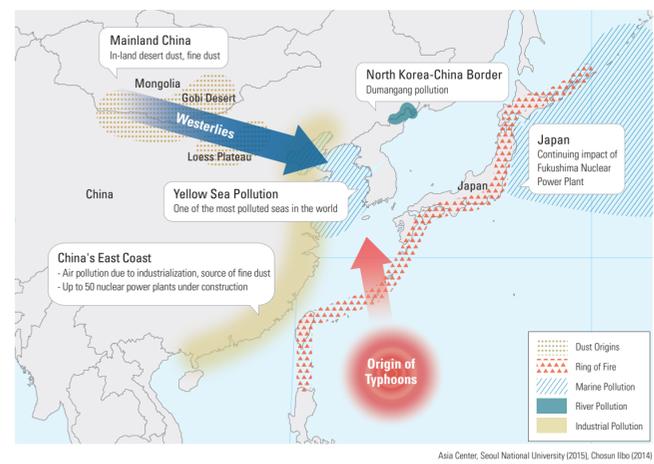
Every country in Northeast Asia faces different environmental challenges according to their natural environmental conditions and socio-economic factors. Korea and Japan share environmental problems that can generally be seen in developed countries; their advanced industrial structures have led to increases in energy consumption and the number of private vehicles. On the other hand, countries such as North Korea and Mongolia experience environmental problems that are brought about by poverty. In particular, North Korea is undergoing serious environmental damage as a consequence of forest degradation due to food and energy shortages. Mongolia and western China are affected by desertification and aridity due to their dry climate, while recent rapid industrial development in eastern China has caused serious air and water pollution.

Such environmental problems in Northeast Asia

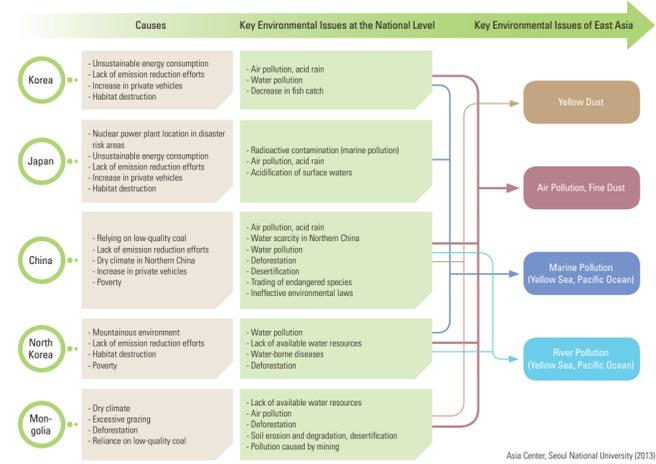
are linked in diverse ways, and their consequences are influential across countries. For instance, yellow dust originating from the Gobi Desert and the Loess Plateau picks up pollutants such as fine dust and nitrogenous compounds as it crosses the rapidly industrialized east coast of China. It then rides the westerly winds and reaches Korea and Japan. The pollution of international seas and streams such as the Yellow Sea and Dumangang is also being discussed as one of the most important environmental issues in this region.

Not only is Northeast Asia located on the same plate boundary, it also shares various disasters through westerly winds, currents, and typhoons. With an increase in risk factors such as the growing number of nuclear power plants in eastern China, the future of Northeast Asia is projected to be even more vulnerable to environmental disasters.

Environmental Issues in Northeast Asia



Key Environmental Causes and Issues in Northeast Asia



Asia Center, Seoul National University (2013)

Northeast Asian International Cooperation for Yellow Dust

Responding to yellow dust is an important environmental task for not only the nation, but also the entire Northeast Asian region. Korea has actively pushed for a collective response to this issue, regarding it as a major agenda in national summits such as the Tripartite Environment Ministers Meeting among Korea, China, and Japan and the Environmental Cooperation Channel in Northeast Asia. Experts from Korea, China, and Japan have gathered together to conduct collaborative research in two areas of Hulunbuir, Inner Mongolia, China. The first round of research was conducted from late of July to early August 2013, with a follow up in July 2014. This research will be used as a foundation for ecological restoration efforts in areas undergoing desertification.

Tripartite Environment Ministers Meeting among Korea, China, and Japan

The Tripartite Environment Ministers Meeting among Korea, China, and Japan (TEMM) is an annual meeting that was first proposed by the Korean government in 1992. Its objective is to devise cooperative measures to tackle East Asian environmental issues such as yellow dust, acid rain, atmospheric pollution and hazardous waste management, and to raise a sense of environmental community among the three countries. This meeting is the only minister-level conference in the East Asian region and has served as the highest-level coordination mechanism on environmental cooperation. A total of 18 meetings have been held as of May 2016.

Environmental Cooperation with Africa

As environmental management in Africa is now in its infancy, investments in the environmental sector remain limited. Consequently, large-scale investments in infrastructure facilities are being requested, and people are accepting that the key to resolving regional poverty-related issues is to curtail economic growth in order to control environmental destruction.

The Ministry of Environment of Korea has been holding the Korea-Africa Environmental Cooperation Forum every year since the groundwork for discussions on environmental cooperation between the two countries was laid in November 2010. In May 2014, Korea hosted a joint workshop with Tunisia along with the 5th Korea-Africa Forum,

in which the vice-minister and director of the Tunisian Ministry of Environment, officials from Nigeria and Côte d'Ivoire, and Water and Sanitation for Africa discussed ways to share environmental policy and technology for atmospheric and waste management sectors.

Bilateral cooperation with individual countries is gradually extending as well. As of May 2015, the Korean government has signed MOUs on environmental cooperation with 11 African countries. Korea has also been working on a variety of projects —such as an environmental improvement program —in order to strengthen bilateral cooperation with African countries.