Land Use and Land Cover

Over a long period of time, Korea has experienced various changes in its patterns of land use. Urban construction took root in basins and along major rivers, and cities gradually expanded with the growth of the population. Roads and railways were constructed to connect cities, leading to the further development of new metropolitan centers in surrounding areas. Farmlands for crop production and pastures for livestock also increased throughout the years. Hills were cultivated for upland farming fields, many of which have been converted into rice paddies through modern irrigation methods. In recent years, however, there have been instances where rice paddies are converted into upland farming fields in order to grow more lucrative products such as ginseng, fruits, and highland vegetables. In coastal regions, new land was created by reclaiming land from the sea.

Although land use has shifted in order to fit our demands throughout time, such changes have the potential to cause serious environmental problems. The expansion of urban and agricultural areas inevitably led to the decrease of forest areas, which in turn triggered an increase in greenhouse gas emissions and the risk of natural hazards. Forest fragmentation resulting from the construction of residential areas, roads, and railways is threatening the livelihood of plants and animals living in the forest ecosystem. Environmental problems such as odor and leachate arise due to waste landfills in metropolitan areas. Coastal land reclamation has caused a decrease in tidal flats, leading to biodiversity loss and an increased danger of nearshore disasters.

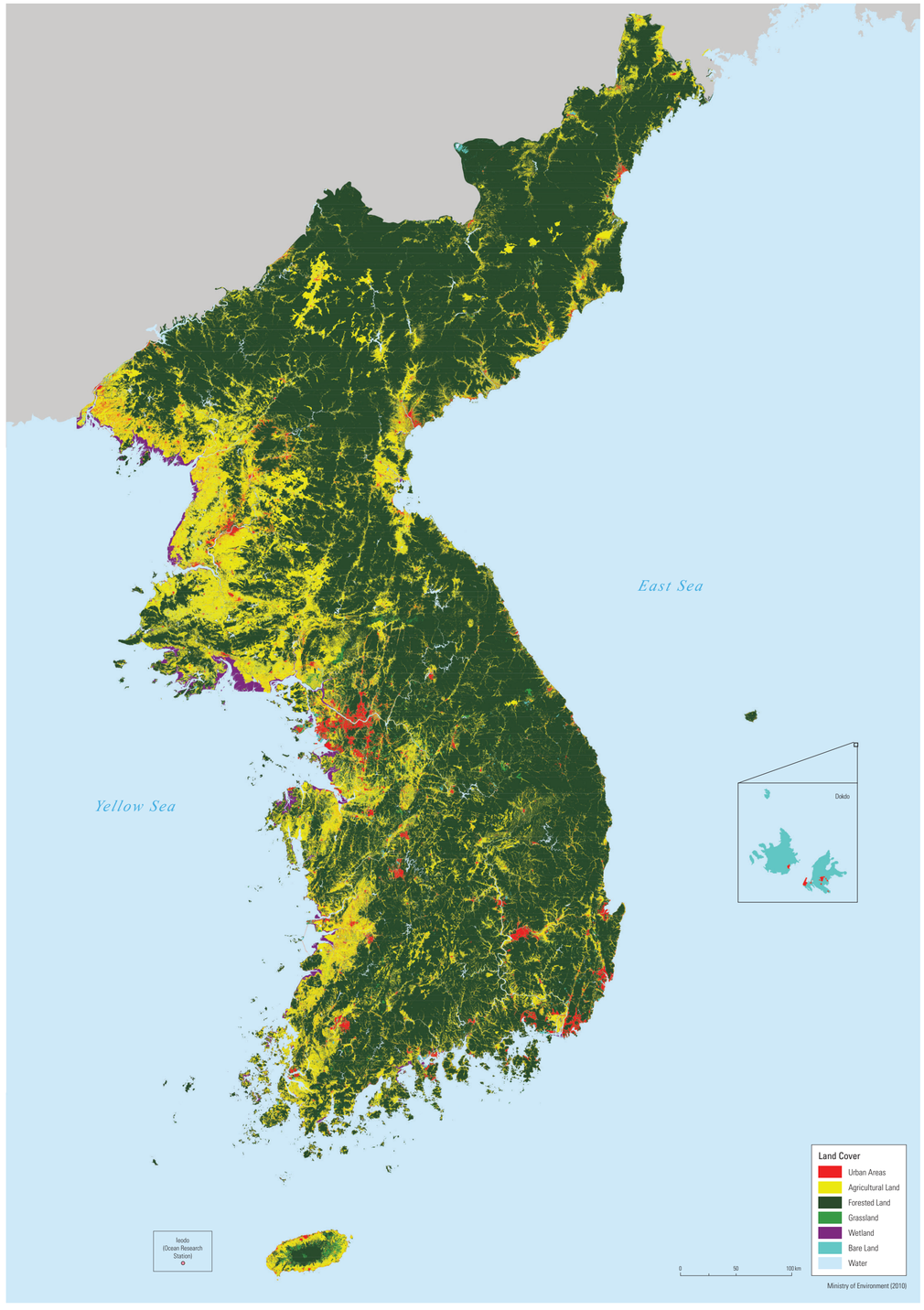
Korea has been making various efforts to minimize environmental problems and achieve sustainable land use. Land cover and land use maps have been developed to understand the status of the earth's surface and analyze the best land use practices accordingly. Along coastal shorelines, surveys are in progress to assess and monitor the restoration of marine organism habitats that have been destroyed by public water reclamation. Waste landfill areas that are located near big cities are being developed into parks in order to minimize odor and leachate. Furthermore, Korea aims to prevent mal-development practices with the launch of the National Environmental Zoning Map, and also encourage eco-friendly land use by sharing regulatory information with the public.

South Korea and North Korea display a large difference in land use and land cover patterns. South Korea has an area of approximately 100,000 km^2, while the area of North Korea is about 120,000 km^2. According to a land cover map from the late 2000s (2008 – 2010) produced by the Ministry of Environment, the total size of all urban and developed areas of South Korea is approximately twice that of North Korea. The urban and developed areas in South Korea amount to 3,700 km^2, which represents 4% of the total area; North Korea's urban and developed areas comprise 2% of the total area at approximately 1,900 km^2. These areas are generally located in basins or estuaries. By contrast, the agricultural areas of North Korea are more extensive than those of South Korea. In South Korea, 20% of the total area (20,000 km^2) is used as agricultural land, compared to 24% in North Korea (30,000 km^2).

Over the Korean Peninsula, approximately 70% of the total land is composed of forest areas. High mountain areas are mostly located in the eastern and northern regions, while low elevations and gentle slopes primarily appear in the western region. Due to these topographical features, agricultural areas are mainly distributed in western regions and forest areas are located towards eastern regions.

Land Use and Cover

Land Cover Map of the Korean Peninsula

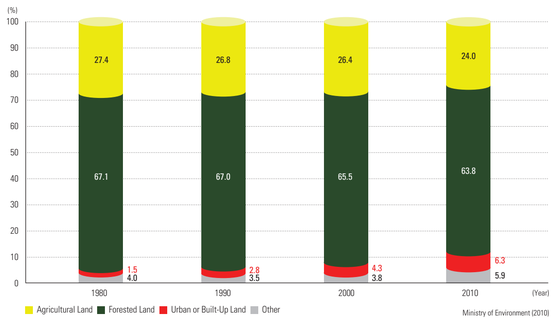


Ministry of Environment (2010)

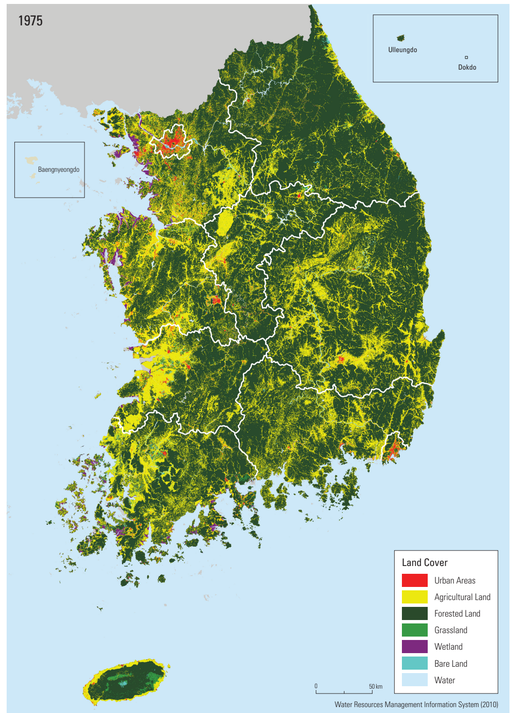
Land Cover Changes

Since 1975, urbanized areas have gradually been expanding around major cities such as Seoul, Busan, Incheon, Gwangju, Daejeon, and Ulsan. Areas surrounding the transportation networks between such metropolitan regions have also become increasingly urbanized. While agricultural lands have shrunk in mountain areas due a decrease in rural population, they expanded in coastal plains and hilly areas as a result of active land reclamation. Urban and agricultural expansion has also led to deforestation, which may cause various environmental issues such as global warming and flood hazards. Significant efforts are being made in order to minimize these potential environmental problems and also heighten the value of forest areas. As such, forest resources are closely monitored and forest protection areas are designated accordingly. In 2010, forested land was recorded as the largest land cover type, followed by cropland, urbanized and developed land, and others.

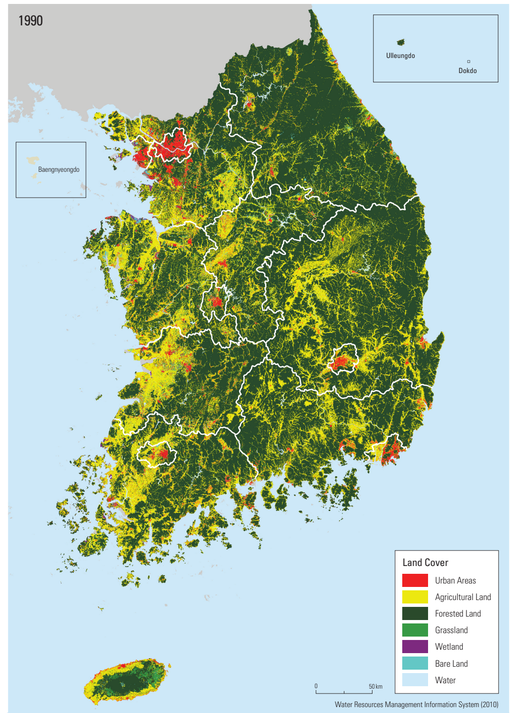
Changes in the Cumulative Proportions of Land Cover



Ministry of Environment (2010)



Water Resources Management Information System (2010)



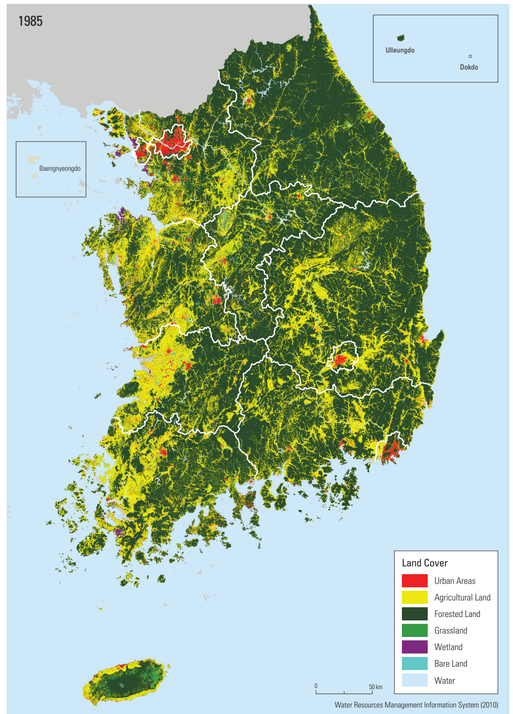
Water Resources Management Information System (2010)



Water Resources Management Information System (2010)



Water Resources Management Information System (2010)



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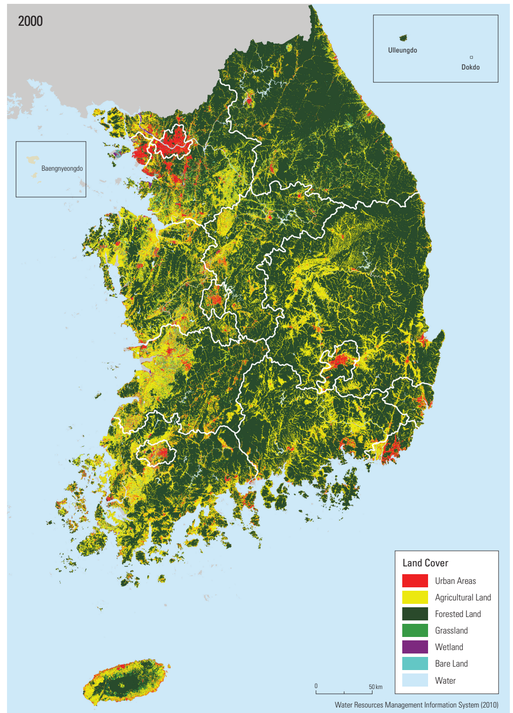
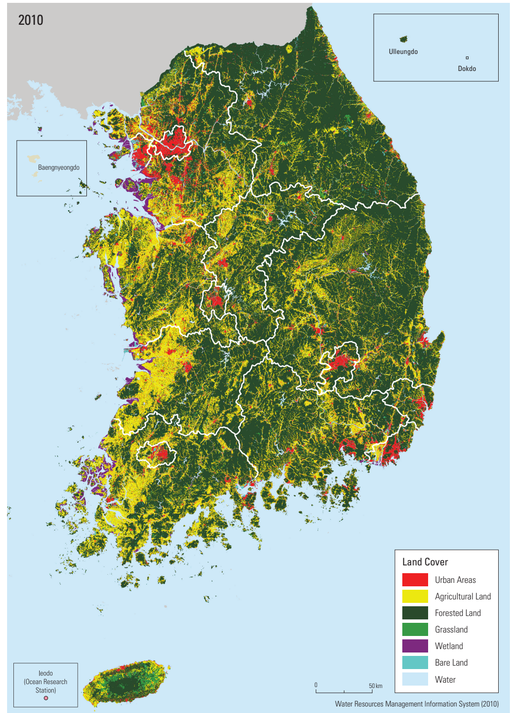


Water Resources Management Information System (2010)



Water Resources Management Information System (2010)

Production of National Land Cover Maps

Production Process





Ministry of Environment (2015)

The Ministry of Environment created a national land cover map to encourage effective land management and environment-friendly land usage. The map is constructed with data collected from satellites and aircrafts; in particular, information compiled by the Korea Multi-Purpose Satellite (KOMPSAT) has widely been used for mapping land cover types. Satellite images are also utilized to build a land cover map of North Korea.

The national land cover map – which is available to the public through the Environmental Geographic Information Service (http://egis.me.go.kr) – consists of three levels. The level-1 land cover map includes the entirety of the Korean Peninsula and incorporates 7 land cover types. It was first created in 1998 and continues to be revised every 10 years. The level-2 land cover map, consisting of 22 land cover types, was first produced between 2000 and 2004 and underwent revisions in 2007, 2009, and 2013. The latest revision completed the entire land of South Korea with the inclusion of the cross-border region between the two Koreas. The level-2 map is useful for identifying the status of land use at a regional scale. It is also utilized for calculating the size of impervious areas and canopies in order to estimate stream flow. Additionally, it contributes to research for urban development and expansion, location selection for various facilities, and evaluation of potential natural hazards.

The level-3 land cover map includes 41 land cover types. Initially created in February 2010, its land coverage continues to be expanded each year. The level-3 map analyzes land use at a local level within cities, districts, and provinces, and is particularly useful for biotope evaluation, assessment of green space in cities, and community mapping.

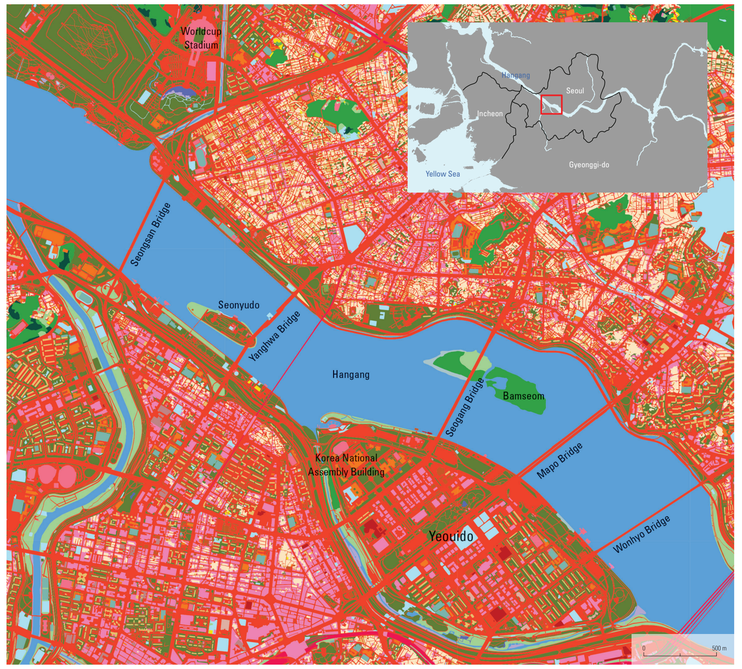
Development of National Land Cover Maps

Level	Year	Areas	Raw Data
Level-1	Late 1990s	Korean Peninsula (South and North Korea)	Landsat TM/IRS-1C
	Late 1990s	South Korea	Landsat TM
		North Korea	Landsat TM/IRS-1C
	Late 2000s	Korean Peninsula (South and North Korea)	Landsat 7
Level-2	2000 – 2004	Capital Region (Seoul, Gyeonggi-do, Incheon)	IRS-IC/Landsat TM
		Hangang and Geumgang Basins	IRS-ID/Landsat ETM+ / IKONOS
		Nakdonggang Basin	SPOT-5
		Yeongsangang Basin and Jejudo	SPOT-5
	2006 – 2007	South Korea	SPOT-5
	2008 – 2009	Capital Region (Seoul, Gyeonggi-do, Incheon), Parts of Chungcheong-do	KOMPSAT-2
	2010 – 2011	Seoul, Incheon, Gyeonggi-do, Gangwon-do, Chungcheong-do, Daejeon, Jeolla-do, Gwangju, Jejudo, DMZ	Aerial Orthoimage / KOMPSAT-2
Level-3	2009 – 2010	Bukhangang and Namhangang Basins	KOMPSAT-2
	2007 – 2010	Upper Nakdonggang Basin	KOMPSAT-2
	2010 – 2012	Middle and Lower Nakdonggang Basin	KOMPSAT-2
	2010	Some Parts of Nakdonggang and Hangang Basins	Aerial Orthoimage
	2012	Middle and Lower Hangang Basin	Aerial Orthoimage
		Bukhangang and Namhangang Basins (1st Update)	Aerial Orthoimage
	2014	Sejong, Daejeon, Chungcheongnam-do	Aerial Orthoimage
	2015	Sejong	KOMPSAT-2

Ministry of Environment (2015)

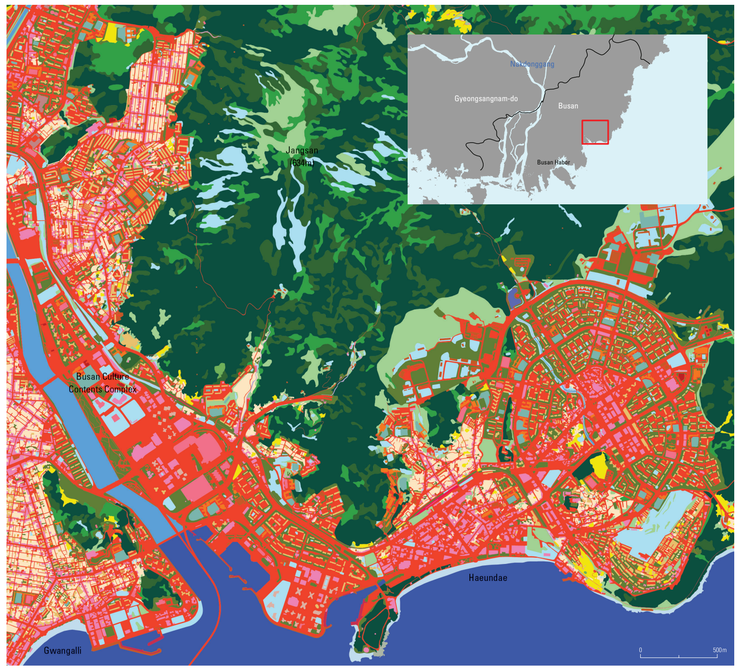
Major Land Use Patterns

Land Use of Seoul (2010)



Ministry of Environment (2010)

Land Use of Busan (2010)



Ministry of Environment (2010)

Seoul is located in a basin on the lower region of Hangang. There are more than 30 bridges within the Seoul section of the river that connect the surrounding urban and developed areas. Yeouido is a mid-channel bar of Hangang that was first developed in the 1960s. Now it has become a major central business district of Seoul that includes the Korea National Assembly Building and the 63 Building. Bamseom, a pair of islets in Hangang, was demolished in 1962 to widen the river and collect materials for the construction of Yeouido. It has since shifted to take the form that can be seen now, and was added to the list of Ramsar wetlands in 2012.

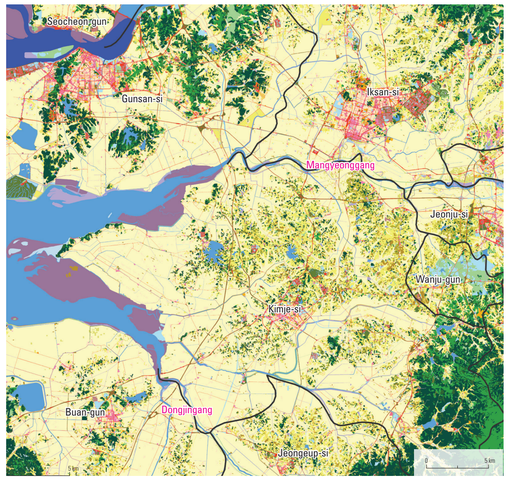
Land Cover Classification by the Ministry of Environment

Level-1	Level-2	Level-3
Urban or Built-Up Land	Residential	Single-Family Units
		Multi-Family Units
	Industrial	Industrial
	Commercial	Commercial
		Complexes
	Communication	Communication
	Transportation	Airport
		Harbor
		Railroad
		Road
		Other
	Public Utilities	Environmental
		Educational
		Other
Agricultural Land	Paddy Field	Readjustment
		Non-Readjustment
	Non-Irrigated Land	Readjustment
		Non-Readjustment
	Protected Cultivation	Protected Cultivation
	Orchard	Orchard
	Other Cropland	Ranch or Farm
		Other
Forested Land	Deciduous Forest Land	Deciduous Forest Land
	Coniferous Forest Land	Coniferous Forest Land
	Mixed Forest Land	Mixed Forest Land
Grassland	Natural Grassland	Natural Grassland
	Non-Natural Grassland	Golf Course
		Cemetery
		Other
Wetland	Inland Wetland (Wetland Vegetation)	Inland Wetland (Wetland Vegetation)
	Coastal Wetland	Tidal Flat
		Salt Field
Barren Land	Natural Barren Land	Beach
		Riverside
		Exposed Rock
	Non-Natural Barren Land	Quarry
		Playground
		Other
Water	Inland Water	Stream and Canal
		Lake and Reservoir
	Seawater	Seawater

Ministry of Environment (2010)

Busan was first established as a port city, and its urban area gradually took place and expanded around Busan Harbor. Located at the distal end of Taebaeksanmaek, the region is dominated by mountains, narrow plains, and a jagged coastline. These topographical characteristics caused difficulties in the process of building roads and furthering urban development. Consequently, the residential areas of Busan were established on steep slopes along coastlines and valleys, resulting in a unique landscape. Haeundae is the most recently developed district of Busan; as the first planned area within the city, it boasts a standardized radial road system. According to 2010 data, approximately 21 million tourists visit Haeundae each year, seeking out the popular attractions of Haeundae Beach, Busan International Film Festival, and Dongbaekseom.

Plain Area



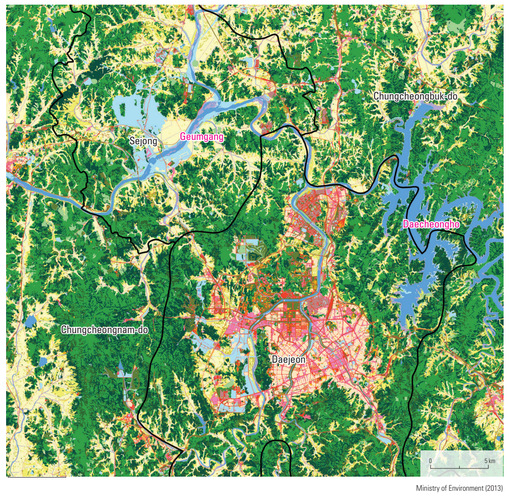
Ministry of Environment (2013)

Mountainous Area



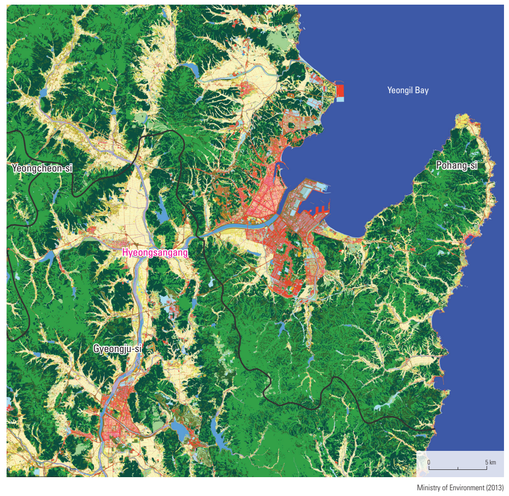
Ministry of Environment (2013)

Urban Area



Ministry of Environment (2013)

Coastal Area



Ministry of Environment (2013)

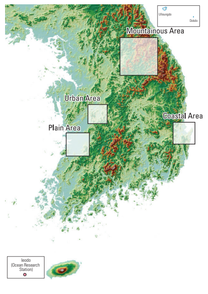
Urban or Built-Up Land		Agricultural Land		Forested Land	Grassland	Wetland	Barren Land	Water
Residential	Cultural	Paddy Field	Orchard	Deciduous Forest Land	Natural Grassland	Inland Wetland (Wetland Vegetation)	Natural Barren Land	Inland Water
Industrial	Transportation	Non-Irrigated Land	Other Cropland	Coniferous Forest Land	Non-Natural Grassland	Coastal Wetland	Other Barren Land	Seawater
Commercial	Public Utilities	Protected Cultivation		Mixed Forest Land				

Korea's major grain belts can be found across Mangyeongpyeongya and Gimjepyeongya. Collectively known as Honampyeongya, these alluvial plains are located in the lower regions of Mangyeonggang and Dongjingang. Located at the center of the plains is Gimje-si, which has the highest ratio of agricultural area among all local governments of Korea. Plains situated near streams or rivers are usually used as rice paddies, while forests and urban or developed areas are located on the hills.

The northeastern part of South Korea consists of Taebaeksanmaek and its surrounding mountainous areas. Cropland and roads developed along the many streams that run between the mountains. Although such geomorphological features make these areas difficult to access, they are also considered as ideal vacation destinations due to their clean mountains and creeks. Furthermore, high plantation surfaces that are located 1,000 meters above sea level are widely used for vegetable fields and pastures.

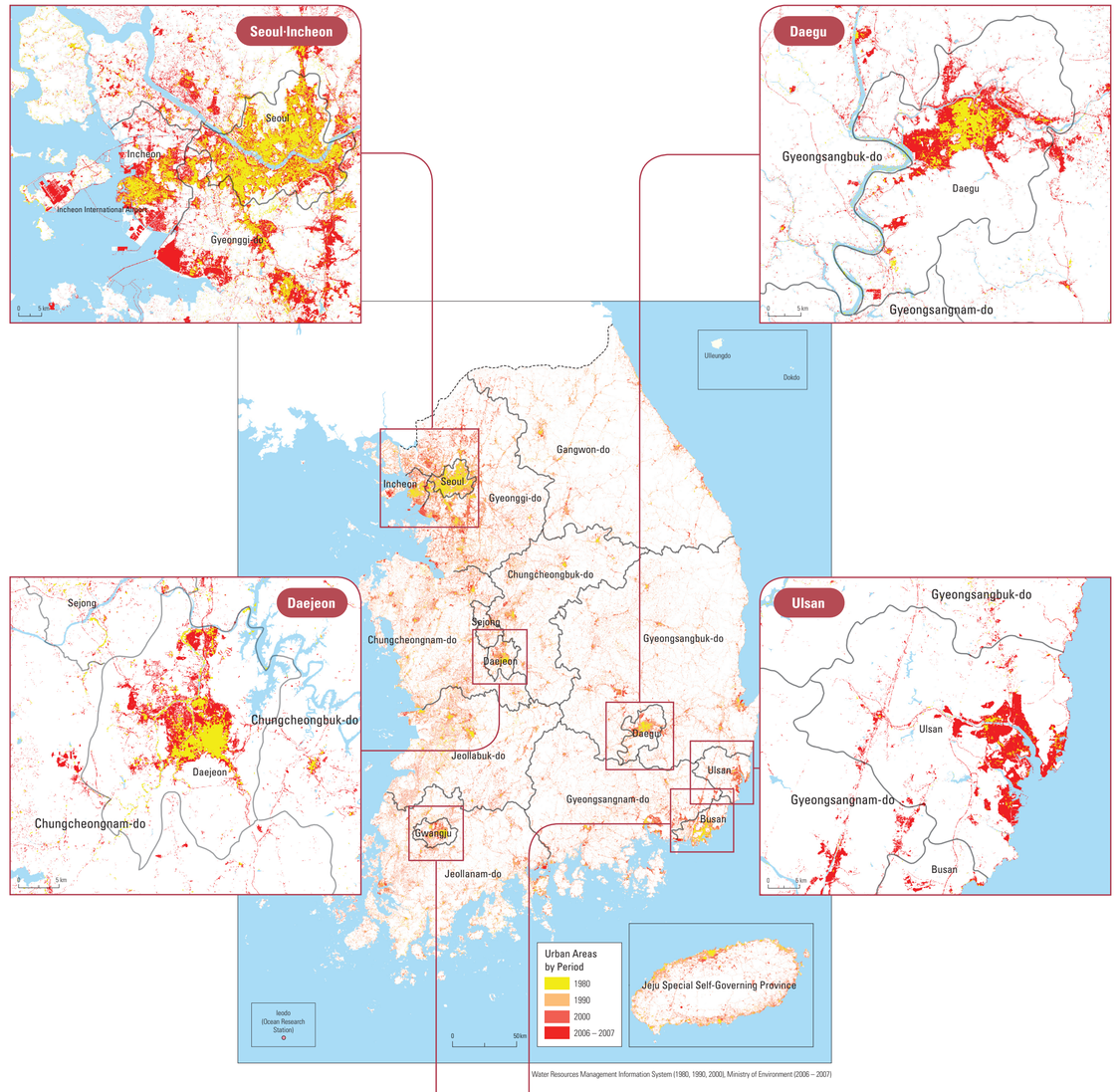
Many cities such as Seoul, Chuncheon-si, Hongcheon-gun, Wonju-si, and Daejeon developed in erosional basins near large flowing rivers. Due to the availability of water from rivers and underground sources along with a natural drainage system, these regions are typically seen as suitable locations for human habitation. Alluvial plains are also highly populated, as they possess fertile soil that is advantageous for farming.

Taebaeksanmaek runs parallel to the east coast, resulting in narrow coastal plains and small-scale ports. Wider plains can be found in areas where rivers flow into the sea. Pohang-si—a relatively wide urban area located near Yeongil Bay—has established itself as one of Korea's major steel industrial centers since the 1970s.



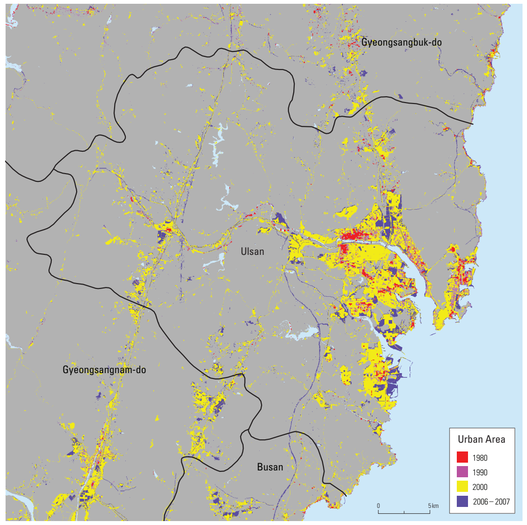
Urban Expansion

Expansion of Urban Areas (1980s – 2000s)



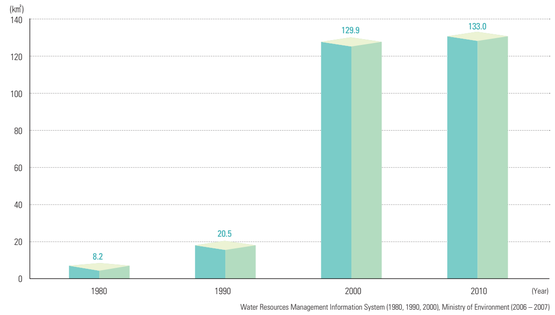
Water Resources Management Information System (1980, 1990, 2000), Ministry of Environment (2006 – 2007)

Urban Expansion in Ulsan



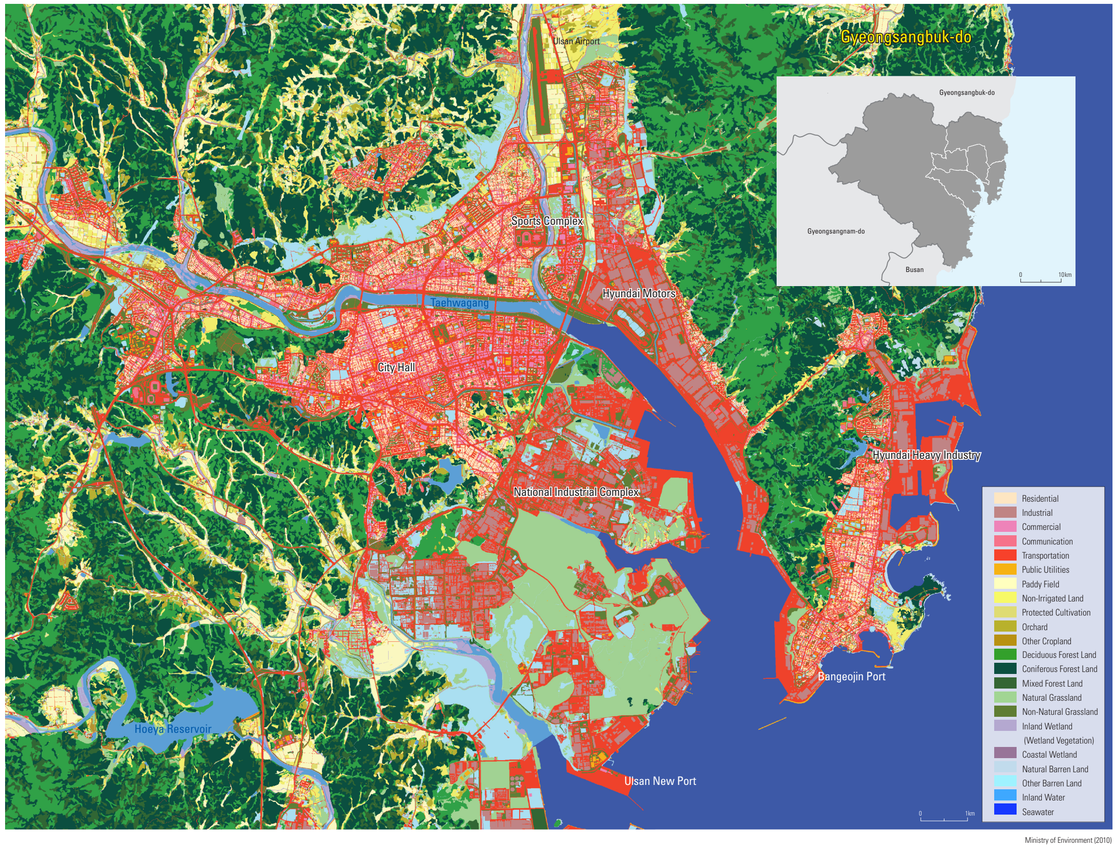
Ulsan is one of Korea's leading industrial cities. After the establishment of heavy industrial and petrochemical complexes during the 1970s, residential areas began to develop as more people gathered to the region. In the 1990s, population peaked at over 1,000,000 and urbanized areas surged as well. However, such rapid development triggered serious environmental problems. Beginning in the 2000s, significant efforts have been made to restore and preserve the natural environment, followed by positive results. For example, water pollution in Taehwagang was once so severe that mass fish deaths occurred multiple times; in recent years, the water quality has improved enough for salmon to return.

Changes in Urbanized Area in Ulsan



Water Resources Management Information System (1980, 1990, 2000), Ministry of Environment (2006 – 2007)

Land Use of Ulsan (2010)



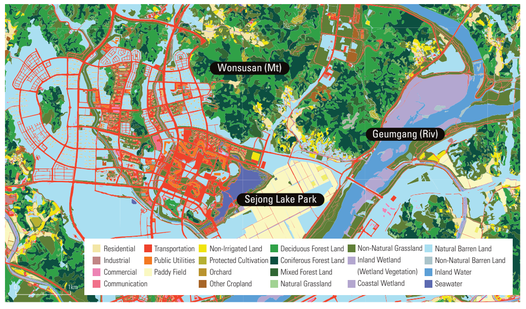
Ministry of Environment (2010)

Aerial Photo of Sejong Special Self-Governing City (2014)



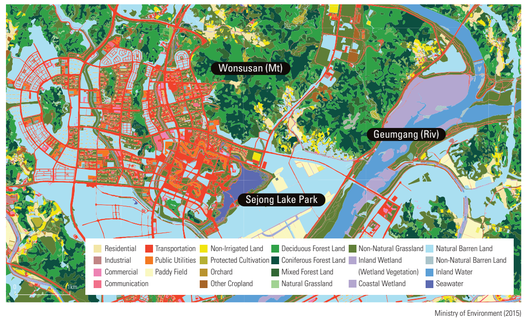
National Geographic Information Institute (2014)

Land Use of Sejong Special Self-Governing City (2014)



Ministry of Environment (2014)

Land Use of Sejong Special Self-Governing City (2015)



Ministry of Environment (2015)

Urban Development and Land Use Change of Sejong Special Self-Governing City

Sejong Special Self-Governing City, more commonly known as Sejong-si, is an administrative city near Geumgang that covers an area of 72.91 km^2. To balance national development and solve the overcrowding problem in Seoul, the city was conceptualized in 2003 and concrete measures began to take place in 2005. From 2007 to 2015, the peripheral areas of government buildings located northwest of Geumgang underwent intensive development, which involved drastic changes in land use as well as the landscape. For instance, many hills were converted into flatland and Sejong Lake – the largest man-made lake in South Korea – was created. However, extensive efforts are also being made to build Sejong-si as an environmentally friendly city. 52% of the planned development area has been designated for parks, green space, and water fronts, and a Green-Blue Network linking green corridors and stream corridors will be established. The government is also planning a wedge-shaped park system consisting of a central park connecting the green spaces of the city, and aims to reduce energy consumption by introducing a resource circulation system and promoting renewable energy.

Aerial Photos of Sejong Special Self-Governing City (2015)







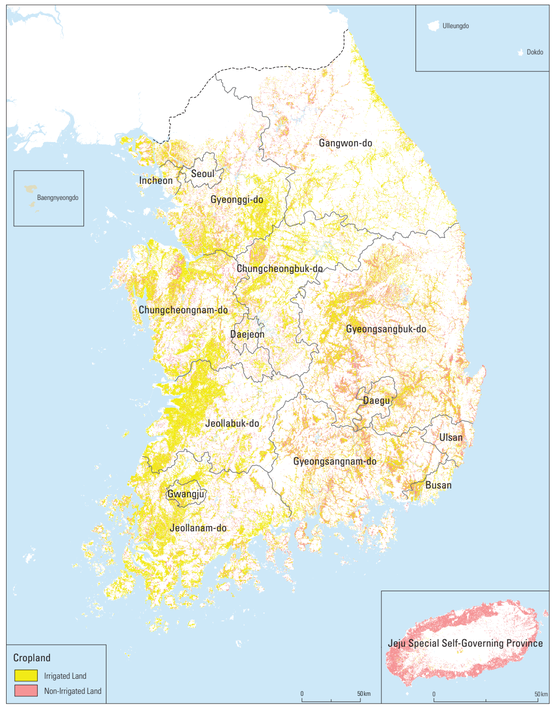




Sejong Metropolitan Autonomous City (2015)

Changes in Cropland

Cropland (1990)



Water Resources Management Information System

Cropland (2006 – 2007)



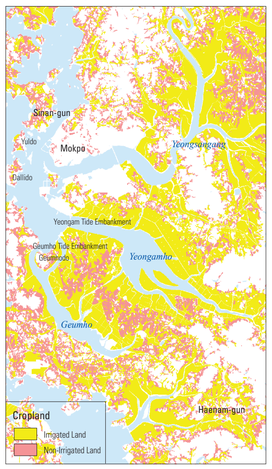
Ministry of Environment (2006 – 2007)

Yeongsangang Estuary (1990)



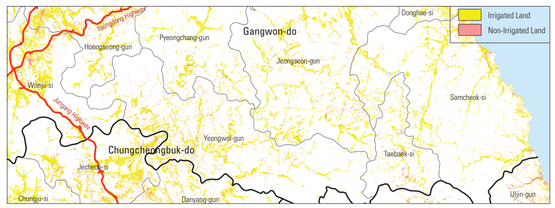
Water Resources Management Information System

Yeongsangang Estuary (2006 – 2007)



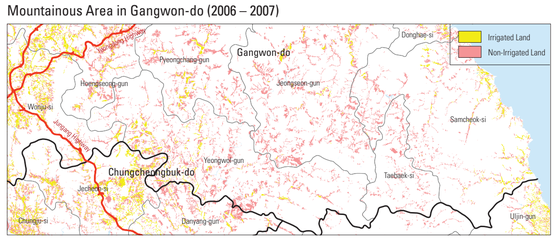
Ministry of Environment (2006 – 2007)

Mountainous Area in Gangwon-do (1990)



WAMIS or Water Resources Management Information System

Mountainous Area in Gangwon-do (2006 – 2007)



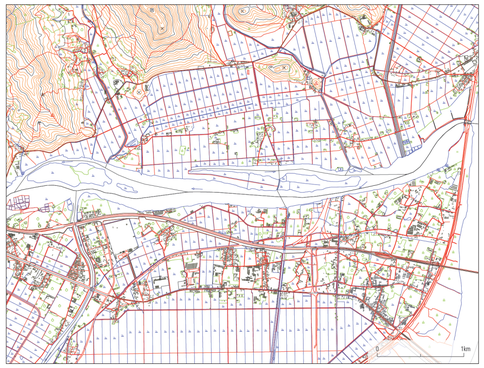
Ministry of Environment (2006 – 2007)

Since 1990, agricultural land has been decreasing in Korea due to urban expansion, industrialization, and agricultural population decrease. However, as the drop in agricultural population was more dramatic in comparison to the decrease of agricultural land, cultivated area per farmer increased as a result.

Along the southwest coast, croplands have experienced a growth rather than a decrease over the same time period. This can be attributed to extensive reclamation projects that included the Yeongsangang, Hwaong, Sihwaho, and Saemangeum reclamations. In the case of Yeongsangang, tidal flats were converted to cropland through the construction of the Yeongam (1993) and Geumho (1994) seawalls. The filled areas of Yeongamho and Geumhoho are 12,800 ha and 7,400 ha, respectively, and the reclaimed tidal lands are 7,960 ha and 4,540 ha, respectively. Additional reclamation plans for a filled area of 34,000 ha have since been withdrawn due to the recognition of the environmental role of estuarine tidal flats and wetlands.

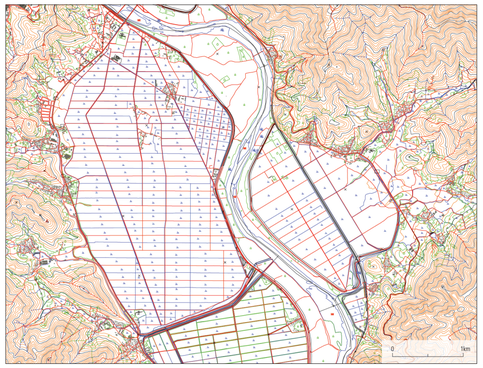
Another characteristic of cropland use change is the conversion of rice paddies to upland farming fields. This process is especially pronounced in the mountainous area of Gangwon-do, as a growing number of farmers have given up rice farming in order to plant more lucrative crops, such as ginseng and vegetables.

Gimhae Topographic Map (2012)



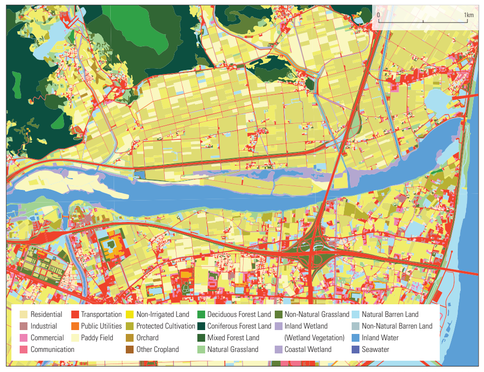
National Geographic Information Institute (2012)

Miryang Topographic Map (2012)



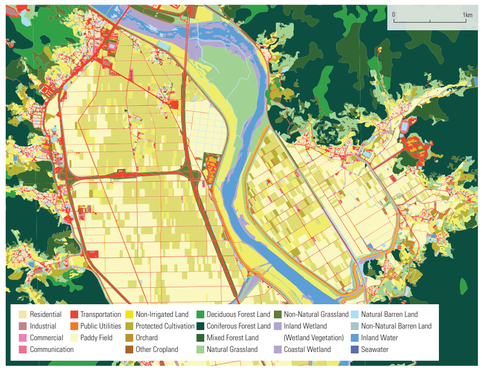
National Geographic Information Institute (2012)

Land Use of Gimhae (2012)



Ministry of Environment (2012)

Land Use of Miryang (2012)



Ministry of Environment (2012)

Aerial Photo of Gimhae (2012)



National Geographic Information Institute (2012)

Aerial Photo of Miryang (2012)



National Geographic Information Institute (2012)

Greenhouse cultivation refers to all cultivation methods that artificially control the environment for ideal crop growth. Although not common until the 1970s, such cultivated lands rapidly increased from an area of 4,971 ha (0.23%) in 1997 to 90,468 ha (5.39%) in 2015 as they guaranteed higher productivity than raising crops outdoors. Natural and economic conditions must be considered when installing a glass or PVC greenhouse. Since sunlight and temperature conditions directly influence crop growth, a flatland environment with long hours of sunlight, sufficient insulation, and a low heating load is favorable, especially during the winter. Also, areas that have easy access to irrigation water and fertile soil with good drainage are ideal. Greenhouse cultivation requires convenient traffic conditions or close proximity to warehouses, markets, airports, or container ports, and also needs an abundance of labor. The Nakdonggang midstream and estuary areas satisfy such conditions and have consequently displayed rapid changes in cropland use as a result of greenhouse cultivation.

Major Land Reclamation

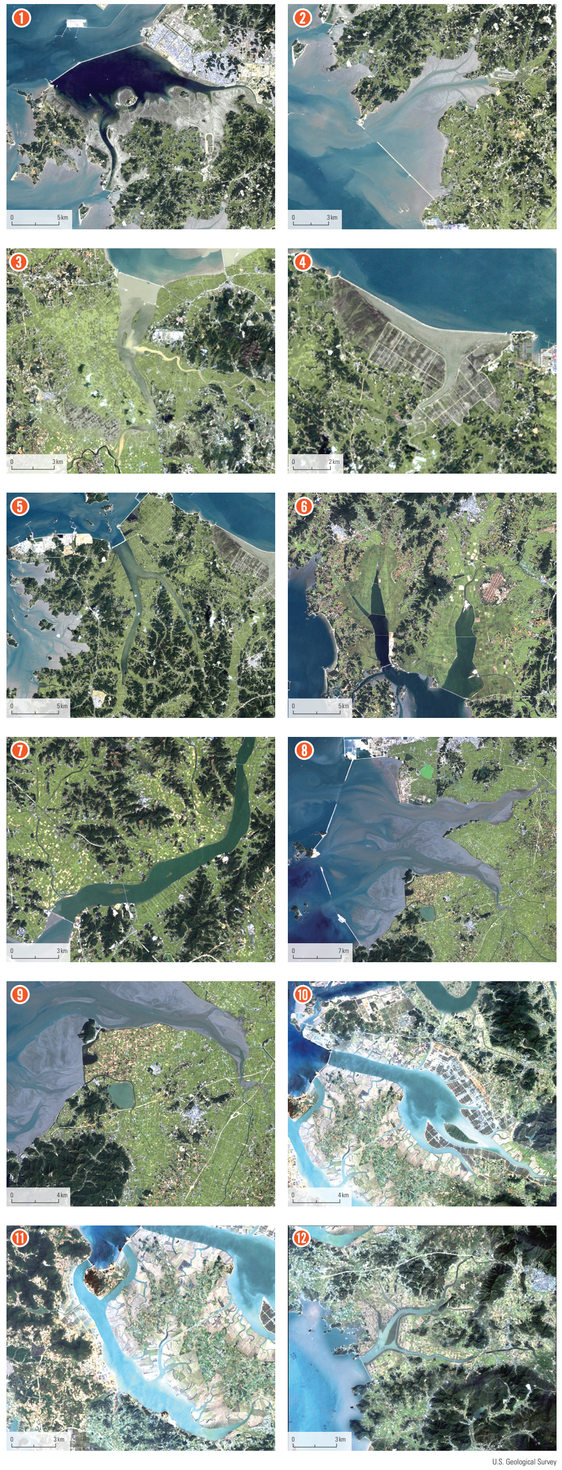
The southwest seashore, which is a rias coast with a shallow marine environment, is favorable for reclamation due to its extensive well-developed inner tidal flats. Land reclamation work was undertaken throughout history: for grain production and military provisions during the Goryeo and Joseon Dynasties, and for rice production and land development during Japanese colonization. After liberation from Japanese rule, small scale land reclamation projects were carried out to enhance the food supply and abolish famine. Further projects were pursued for comprehensive agricultural development after the 1970s, and for multi-purpose development after the 1990s.

Large-scale reclamation has completely destroyed the marine habitat; pollutants from the land have damaged the marine ecosystem and its diversity. Unlike other developed nations, Korea has not been making extensive shore restorations to repair affected regions. Only some small-scale restorations have been carried out by central and local governments and organizations since the 2000s. Restoring the coastal ecosystem is an essential task in order to maintain the ecological and social-economic capacity of the shores and promote further economic sustainability.

Satellite Images of Major Reclaimed Lands

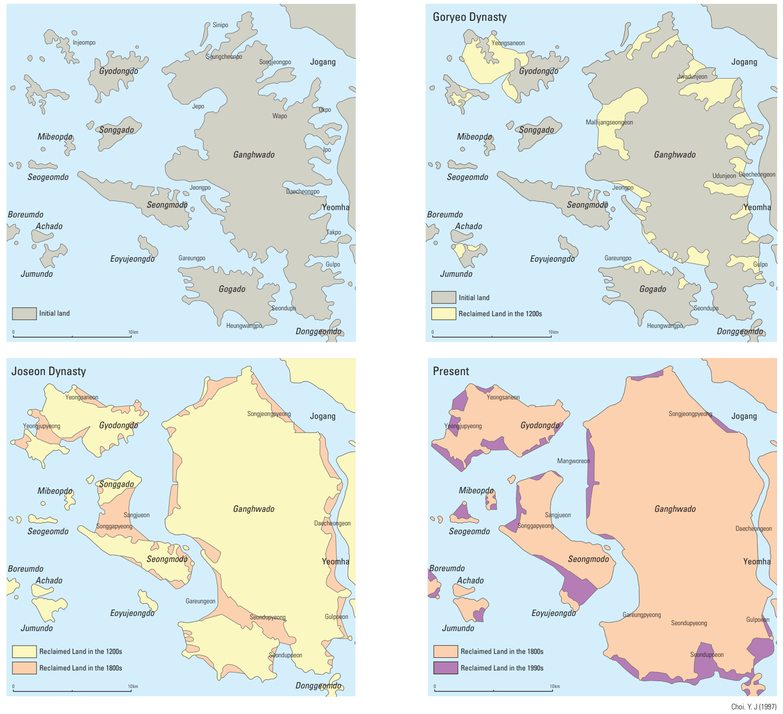
1. Sihwa District
2. Pyeongtaek District
3. Sapgyocheon District
4. Seokmun District
5. Daeho District
6. Seosan Reclaimed Land
7. Geumgang District
8. Saemangeum District
9. Gyehwado Reclaimed Land
10. Yongsangang District 2
11. Yongsangang District 3
12. Haenam District





U.S. Geological Survey

Land Reclamation by Ruling Powers (Ganghwado)

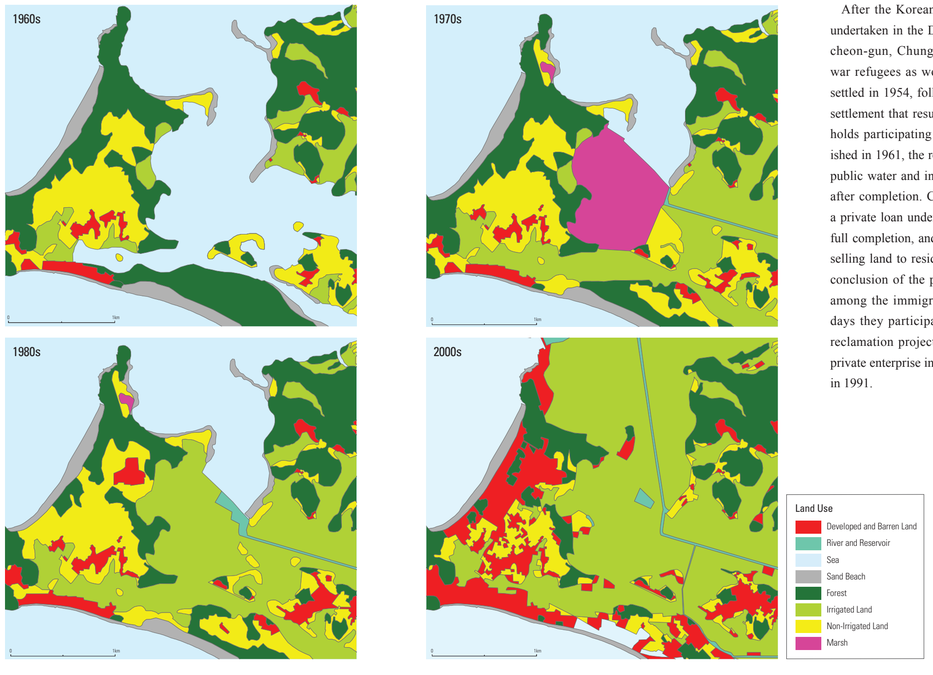


Choi. Y. J (1997)

When the capital was transferred to Ganghwa in the 11th year of King Gojong of the Goryeo Dynasty (A.D. 1232) due to the Mongolian invasion, the sudden surge in immigrants necessitated an enormous provision of food. As the war continued, the Royal Court planned a systematic reclamation project on coastal lowlands as its foremost agenda. In 1256, *Jwadunjeon* was reclaimed by building a dike in Jepo and Wapo, while *Woodunjeon* was reclaimed by blocking off Ipo and Choro of Yumha. During the period of King Gongmin, a new method of construction allowed for the blockage of deep tidal channels for wider land reclamation, as can be seen in the development of Yeongsaneon in the Injeompo area of Northern Gyodongdo.

Over the next 200 years (from the Joseon Dynasty to the 1592 Japanese Invasion of Korea), no further large-scale reclamation projects were carried out. Afterwards, Bipoeon, Bukjeokeon, Garieon, and Seondupoeon were built during the period of King Sukjong, with Seondupoeon being the largest reclamation project on Ganghwado. Reclamation on Ganghwado was completed in the late 18th century and there was no longer any reclaimable land until the 1910s (except for the remaining salt ponds in southern Gulgotpo and Choji). Modern civil engineering technology in the 20th century has allowed for the resumption of reclamation work on some coasts, including the southern part of Ganghwado.

Land Reclamation for Population Relocation (Seo-myeon, Seocheon-gun)



After the Korean War, a reclamation project was undertaken in the Dodun-ri area of Seo-myeon, Seocheon-gun, Chungcheongnam-do, which recruited war refugees as workers. 3 – 4 households initially settled in 1954, followed by a steady rise of migrant settlement that resulted in approximately 100 households participating in the embankment project. Finished in 1961, the reclamation covered 614,876 m^2 of public water and introduced farming just three years after completion. Construction costs were paid with a private loan under the condition of repayment after full completion, and other liabilities were fulfilled by selling land to residents in nearby regions. Upon the conclusion of the project, the land was apportioned among the immigrants according to the number of days they participated in the reclamation. The last reclamation project (Busa district) was started by a private enterprise in the late 1980s and was completed in 1991.

Korea's First Large-Scale Reclamation: Seosan Reclamation Project

Since the 1970s, Korea has been utilizing independent technology to carry out extensive reclamation projects. The Seosan reclamation, launched in 1980 and completed in 1995, was the first large-scale project to be organized by a private enterprise in Korea. Although initial embankment work was completed in 1984, the large tidal range combined with a fast flow rate hindered the final stages. The project was successfully concluded in 1982 by sinking a discarded oil tanker to block the current.

The total length of the breakwater is 7,686 m, including both districts A and B. The reclaimed area is 15,409 ha, among which 9,626 ha of land was reclaimed in Seosan district A, while 5,783 ha was reclaimed in Seosan district B. The reclaimed land is mostly used as agricultural land; the rice paddies in Seosan have become the largest administrative district in Korea. This project also created the Ganwol reservoir (district A) and Bunam reservoir (district B). Ganwoldo, which has been connected to the mainland, has become a tourist attraction known for its oyster production.

The Seosan reclamation project contributed to the development of Seosan-si and provided a habitat for winter migratory birds. As a large-scale agricultural zone, it is not easily accessible to humans and also has lots of flattened grain, making it an attractive location for birds. Typical migratory birds are the Baikal teal, bean goose, and buzzard. However, after the construction of the breakwater, species such as the longbill have decreased and there has been a decline in the water quality of the reservoir. Currently, various plans are underway to improve the quality of the water.





Dike Construction at Seosan Reclaimed Land (1984)



Panoramic View of Seosan Reclaimed Land (2007)



Group Dance of Migratory Birds (2011)

Satellite Image of Seosan Reclaimed Land (1983)



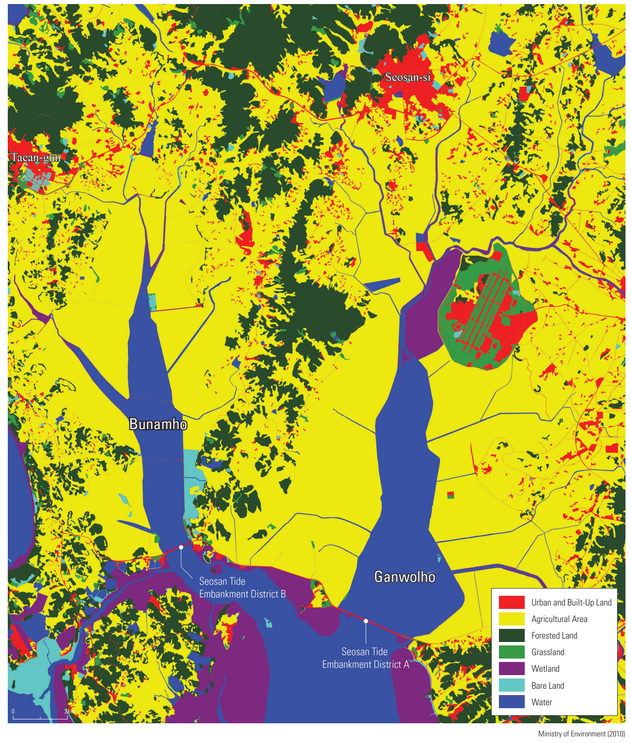
U.S. Geological Survey (USGS)

Satellite Image of Seosan Reclaimed Land (2015)



U.S. Geological Survey (USGS)

Land Cover Map of Seosan Reclaimed Land (2010)

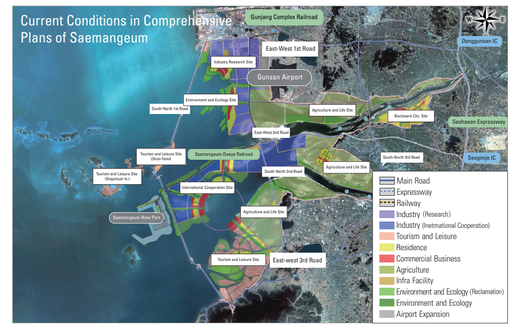


Ministry of Environment (2010)

World's Largest Reclamation: Saemangeum Reclamation Project

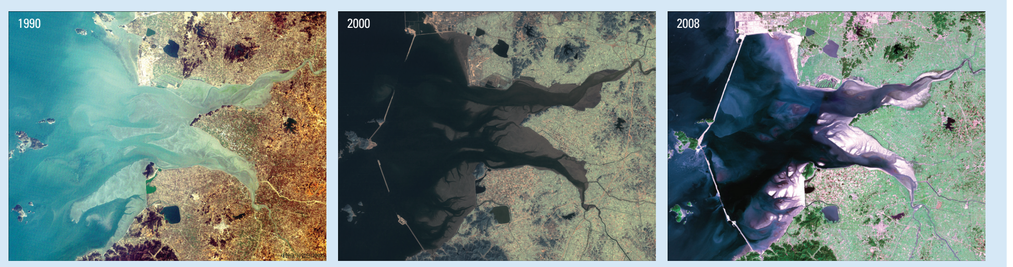
The Saemangeum embankment project began in 1991 and was completed in 2006. The total length of the embankment is 33.9 km; 28,300 ha of land and 11,800 ha of lake were created from the project. As the world's longest embankment, Saemangeum got its name by combining the first characters of Mangyeongpyeongya and Gimjepyeongya. As such, "Saemangeum" refers to the desire to establish new fertile lands that are similar to the Mangyeong and Gimje plains.

The land use plans of Saemangeum have been modified four times since 1991, with the latest plan being determined in September 2014. According to this plan, 6 types of land are to be developed: industrial/research, international cooperation, tourism/leisure, agricultural, urban, and nature/ecosystem. The Saemangeum project is expected to help the local economy by extending its land, creating rich agricultural space, securing water resources, and creating a tourism district. However, problems have risen during the development process, including damage to mud flats and water pollution.



Saemangeum Development and Investment Agency (2014)

Satellite Images of Saemangeum Reclaimed Land



U.S. Geological Survey (USGS)

Satellite Images of Saemangeum Reclaimed Land (2015)



U.S. Geological Survey (USGS)

Coastal Restoration

For the past 50 years, Korea has been focusing on the intensive development of its coastal areas. Decades of continuous reclamation have resulted in the devastation of the marine habitat, and the discharge of various pollutants has been detrimental to the biodiversity of the ecosystem. Unfortunately, domestic techniques related to coastal restoration have not yet been fully developed. Although research has been conducted on the restoration and preservation of marine organisms since 2006, it is still very much in the nascent stages of focusing mainly on monitoring services. Marine ecosystems are considered to be twice as valuable as land ecosystems; in particular, mud flats, marine plants, and coral reefs contribute greatly to the value of coastal ecosystems.

In 2009, the Ministry of Land, Transport and Maritime Affairs selected 81 marine ecosystems in 17 cities as subjects to be restored. Considering criteria such as distance, restoration types, and regional distribution, 17 of the ecosystems were further designated as priority targets for restoration. Gochang-gun in Jeollabuk-do, Suncheon-si in Jeollanam-do, and Sacheon-si in Gyeongsangnam-do were chosen as target model areas. So far, restoration projects have been completed in Gochang-gun and Sacheon-si, and Suncheon-si is undergoing the process of monitoring its physical environment and ecosystem before project implementation.

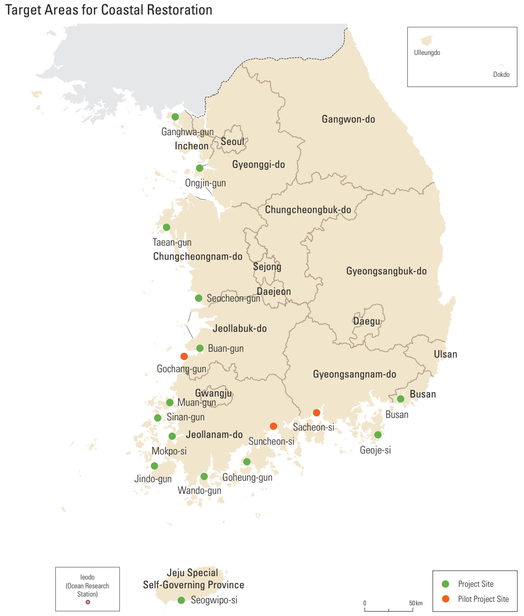
Restoration Area (Sacheon-si, Gyeongsangnam-do)







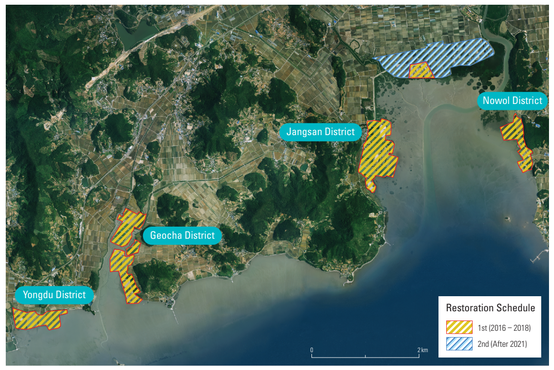
Target Areas for Coastal Restoration



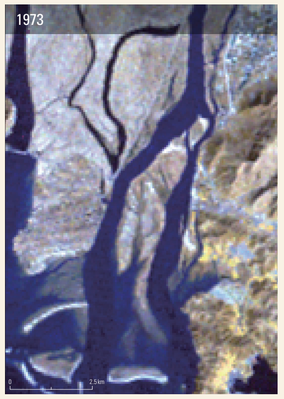
Restoration Area (Gochang-gun, Jeollabuk-do)



Restoration Target Areas (Suncheon-si, Jeollanam-do)



Satellite Images



U.S. Geological Survey (USGS)



U.S. Geological Survey (USGS)



U.S. Geological Survey (USGS)

Eulsukdo Aerial Photograph (2012)



National Geographic Information Institute (2012)

Eulsukdo Ecological Map



River Guide (www.riverguide.go.kr)

Satellite Images



U.S. Geological Survey (USGS)



U.S. Geological Survey (USGS)

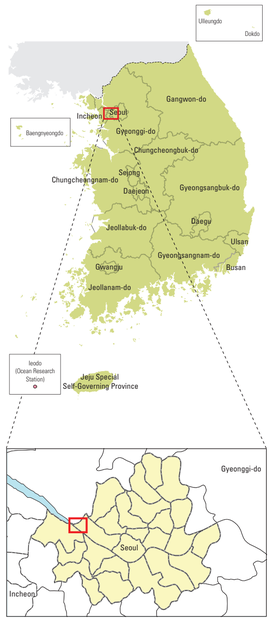


U.S. Geological Survey (USGS)

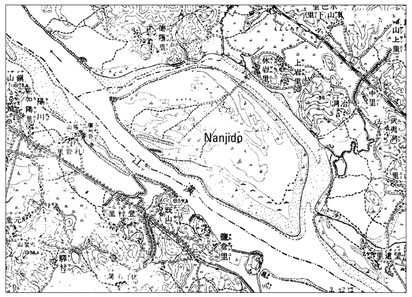
Eulsukdo was created by combining Ilwuldo and Eulsukdo, which were the upper and lower halves of the island that was separated by the construction of the Nakdonggang estuary bank. On July 13th, 1996, Eulsukdo was designated as Natural Monument #179 (Bird Sanctuary of the Nakdonggang Estuary). Originally, the island was at high risk of being submerged due to its low elevation, but the establishment of *Yunjungje* (underwater barrier) and active reclamation work encouraged many residents to move to the island. The island even became a horticulture supply center for Busan. With the completion of the Nakdonggang estuary bank in April 1987, however, the whole island transformed into a public park. The increase in the number of visitors resulted in damaged reed fields and intensified ecosystem degradation. In response, Busan nullified the development plan for Eulsukdo and instead designated it as a core preservation area. Effective restoration work over the next six years (1999 – 2005) successfully resulted in the creation of an ecological park.

Management of Landfill Sites

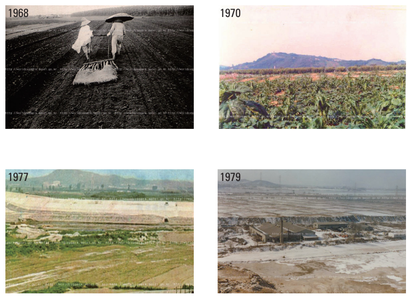
Location of Nanjido



Historical Features of Nanjido



Changes in Nanjido





Landfill in Nanjido



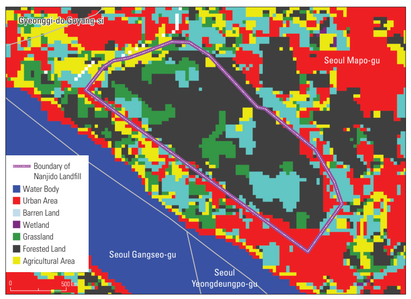
Landfill Leachate



After Landfill Covering

Ministry of Environment (1999)

Land Use in Nanjido (Late 1990s)



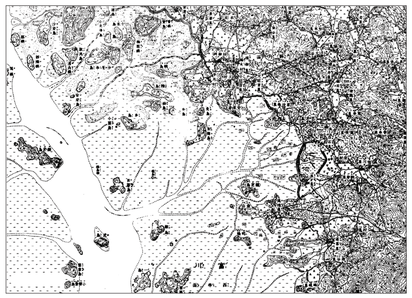
Aerial Photograph of Nanjido (2012)



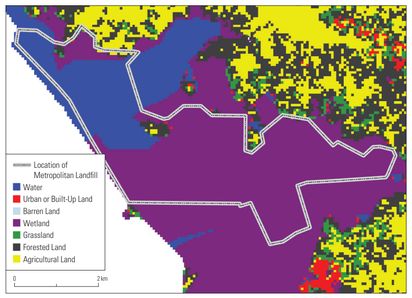
National Geographic Information Institute (2012)

Nanjido, formerly used as a landfill site for Seoul and northern Gyeonggi-do, is currently established as an ecological park. After it was first designated as a landfill on August 3rd, 1977, the site received 110.5 million tons of waste over the next 15 years until the landfill was finally terminated on March 19th, 1993. Within the landfill's area of 2.9 km², two huge waste mountains collectively spanning 1.75 km² were piled up by the waste. This changed the elevation of Nanjido from 8 m to 98 m. The Seoul government devised a plan to create an ecological park on the closed site, which is now known as the World Cup Park. This park features 5 theme parks: Pyounghwa Park, Haneul Park, Noeul Park, Nanjicheon Park, and Nanji Hangang Park. Noeul Park and Haneul Park are directed located upon former Nanjido landfills #1 and #2. Currently, stabilization work is in progress and is scheduled to continue until 2022. Methane gas and other substances released from the closed landfill are used as heat energy sources for facilities at World Cup Park and Seoul World Cup Stadium.

Historical Features of Metropolitan Landfill Area



Land Use at Metropolitan Landfills (Late 1980s)



Ministry of Environment (1999)

Location of Metropolitan Landfills





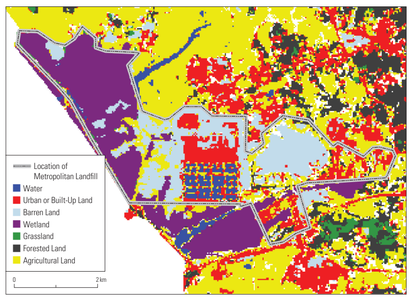


Waste Burial at Metropolitan Landfill Area



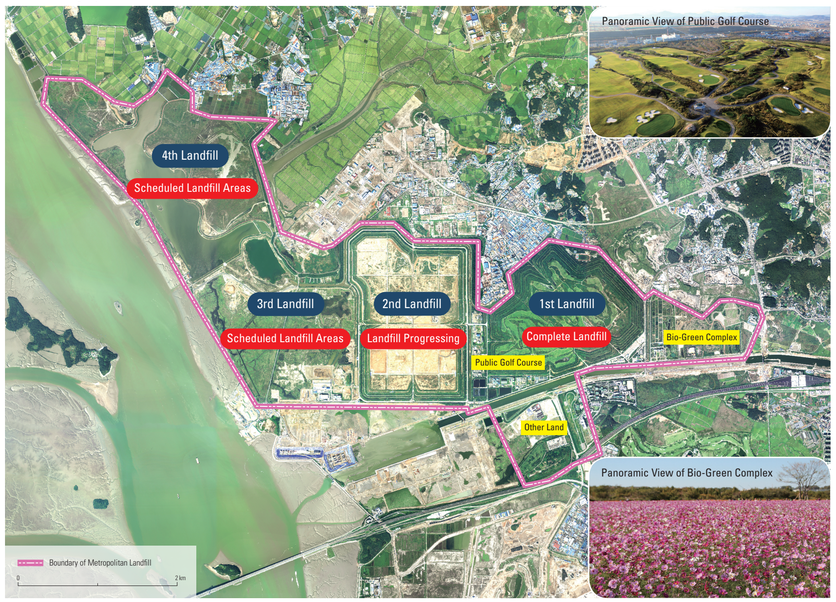
Soil Covering at Metropolitan Landfill Area

Land Use on and around Metropolitan Landfills (Late 2000s)



Ministry of Environment (2010)

Aerial Photograph of Metropolitan Landfills (2012)



National Geographic Information Institute (2012)

The metropolitan landfills—constructed from 1989 and opened in 1992—were established to substitute for the Najido landfill. Consisting of four landfills, this system is the world's largest waste landfill in terms of total area. The 1st, 2nd, and 3rd landfills are located in Geomdan-dong, Seo-gu in Incheon. The 1st landfill was closed in 2000 and the 2nd landfill is currently in use. The 4th landfill will be located in Daebeok-ri, Daegot-myeon and Hakun-ri, Yangchon-eup in Gimpo-si. Although the metropolitan landfills were initially scheduled to be terminated by 2016, measures such as the introduction of a volume-rate garbage disposal system and enhanced recycling greatly reduced the volume of waste that was processed during the 1990s and 2000s. Consequently, on June 29th, 2015, the local governments of Seoul, Incheon, and Gyeonggi-do agreed to extend the term for the metropolitan landfills to 2025. They also determined that substitute local landfills will be prepared before the end of the term. The closed 1st landfill has been converted to a wild flower garden and a sports park that now serves as a leisure site for local residents.