Soils

Korea has a fairly homogenous climate and vegetation pattern throughout its territory, but its soil distribution pattern is quite complex. This can be attributed to the country's long history of intensive land use, diversified geological features, and rough terrain. Current classifications are generally made by utilizing the Soil Taxonomy established by the United States Department of Agriculture (USDA). For forest soil, a different three-stage forest soil classification method is applied that considers soil color, moisture conditions, and shape of a soil profile.

According to the Soil Taxonomy (which categorizes 14 orders of soil recognized globally), Korea has seven orders, 14 suborders, and 32 great groups of soils. In addition, approximately 400 soil series (the lowest level of soil classification) have been identified to date.

Inceptisols, which can be defined as soils that do not have clear soil horizon development, cover 76.7% (7.21 million ha) of Korean territory. The predominance of Inceptisols indicates that the land surface has undergone radical changes. For instance, rapid soil erosion constantly removes topsoil from slope surfaces, and active deposition in areas such as alluvial fans, valleys, and riverside flats hinders soil horizonation. The characteristics of Korean summers also serve as crucial factors of fast erosion; concentrated precipitation, high temperatures, and high humidity interrupt the accumulation of organic matter and weaken soil formation processes. Additionally, freezing during the winter also prevents active differentiation of soil horizons.

Entisols, occupying 12.6% (1.18 million ha) of Korea, have a weakly developed A horizon. Even in flat areas, Entisols are commonly considered infertile as they have a low nutrient status and a decreased capacity for water storage. Seventy-three soil series are currently classified as Entisols, and four subgroups have been identified. Entisols are predominantly concentrated in major mountain areas, such as Taebaeksanmaek and Sobaeksanmaek, where active soil erosion occurs. Psamments (often found in sand deposits and shifting sand dunes) and Fluvents/Aquents/Orthents (mostly formed on riverbanks and tidal mudflats) are some identifiable suborders of Entisols.

Alfisols and Ultisols have well-developed B horizons that characteristically appear in clay-enriched argillic horizons. These soils occupy 5.4% and 3.7% of the land, respectively. Alfisols are located in riverside flatlands or on hillsides composed of neutral or basic rocks. Ultisols are acidic and can usually be found along hillsides or foothills consisting of acidic rocks.

Andisols are formed in volcanic rocks and are mainly distributed on volcanic islands that were formed during the Quaternary eruption (such as Jejudo and Ulleungdo). They also appear in inland regions, where they show the local distribution in the Tertiary volcanic rock zones along Taebaeksanmaek, Sobaeksanmaek, Gyeonggi-do, and the northern part of Gangwon-do. Andisols, however, only occupy 1.5% of the total area of South Korea.

Histosols are developed in organic-rich environments. They can be observed throughout the coastal area of the South Sea and Jejudo. On the other hand, Mollisols are common in the valleys of northern Sobaeksanmaek and southern Gangwon-do. Mollisols are soils illuviated with organic matter and nutrients.

Korea is well known for its success in combating land degradation. By the end of the Joseon dynasty, many of its mountains were devastated due to long years of slash-and-burn farming and firewood logging. The Japanese Colonial Period and the Korean War that followed only further deteriorated the situation through severe forest degradation and consequent soil loss. Since the 1970s, however, many barren mountains have successfully been transformed into lush green forest areas, and soil quality has steadily improved. Korea's case of overcoming land degradation serves as a valuable example of sustainable development, particularly for developing countries.

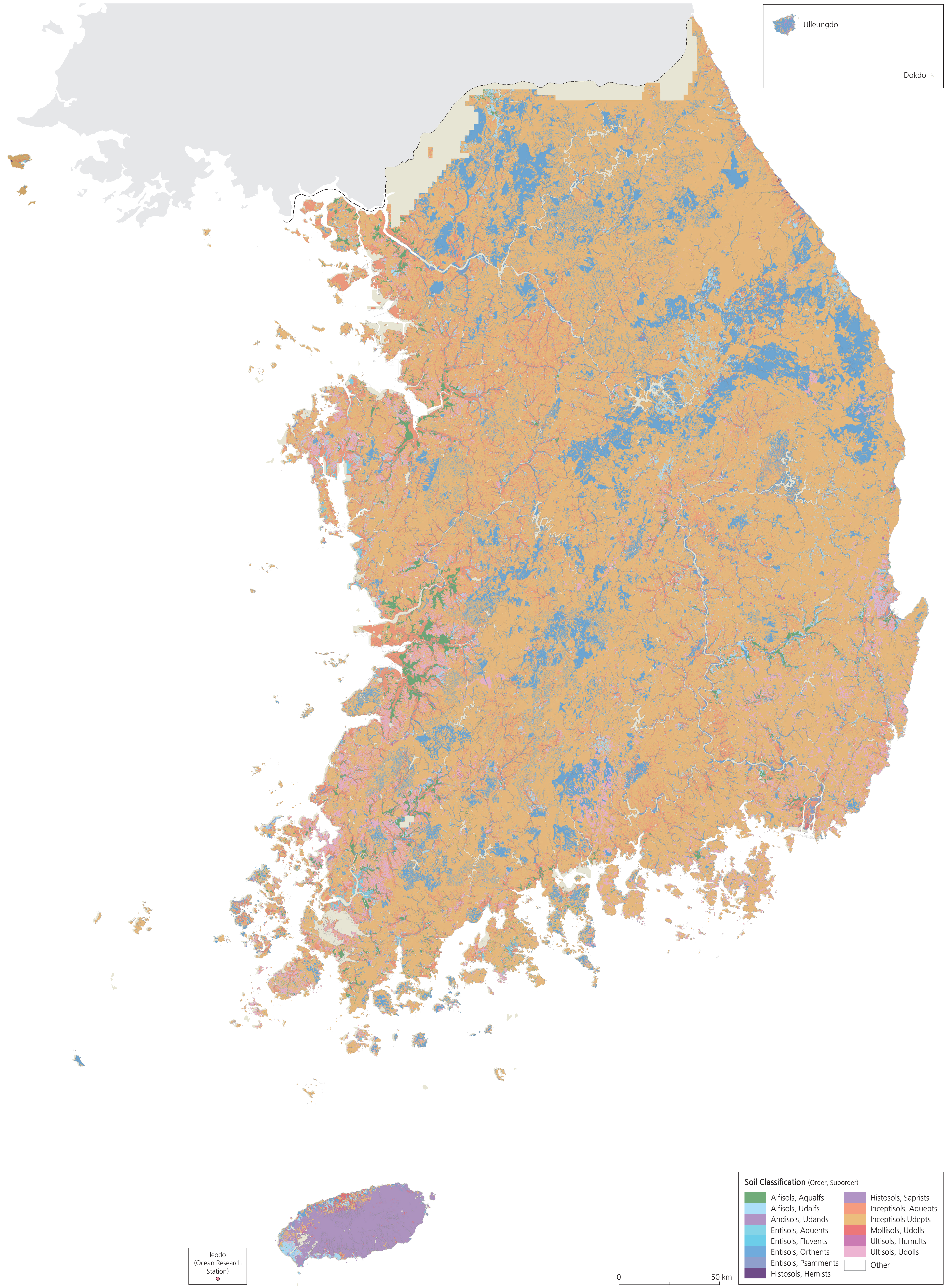
Soil Classification (Soil Taxonomy)

Order (7)	Suborder (14)	Soil Series (405)	Area (ha)
Inceptisols	Aquepts	72	882,075
	Udepts	129	6,331,241
Entisols	Aquents	12	27,951
	Fluvents	5	22,460
	Orthents	40	1,091,305
	Psamments	15	38,980
Ultisols	Humults	5	5,062
	Udults	23	340,509
Alfisols	Aqualfs	12	138,889
	Udalfs	42	366,640
Andisols	Udands	42	144,673
Mollisols	Udolls	6	16,149
Histosols	Hemists	1	358
	Saprists	1	50

Rural Development Administration (2020)

Soil Status

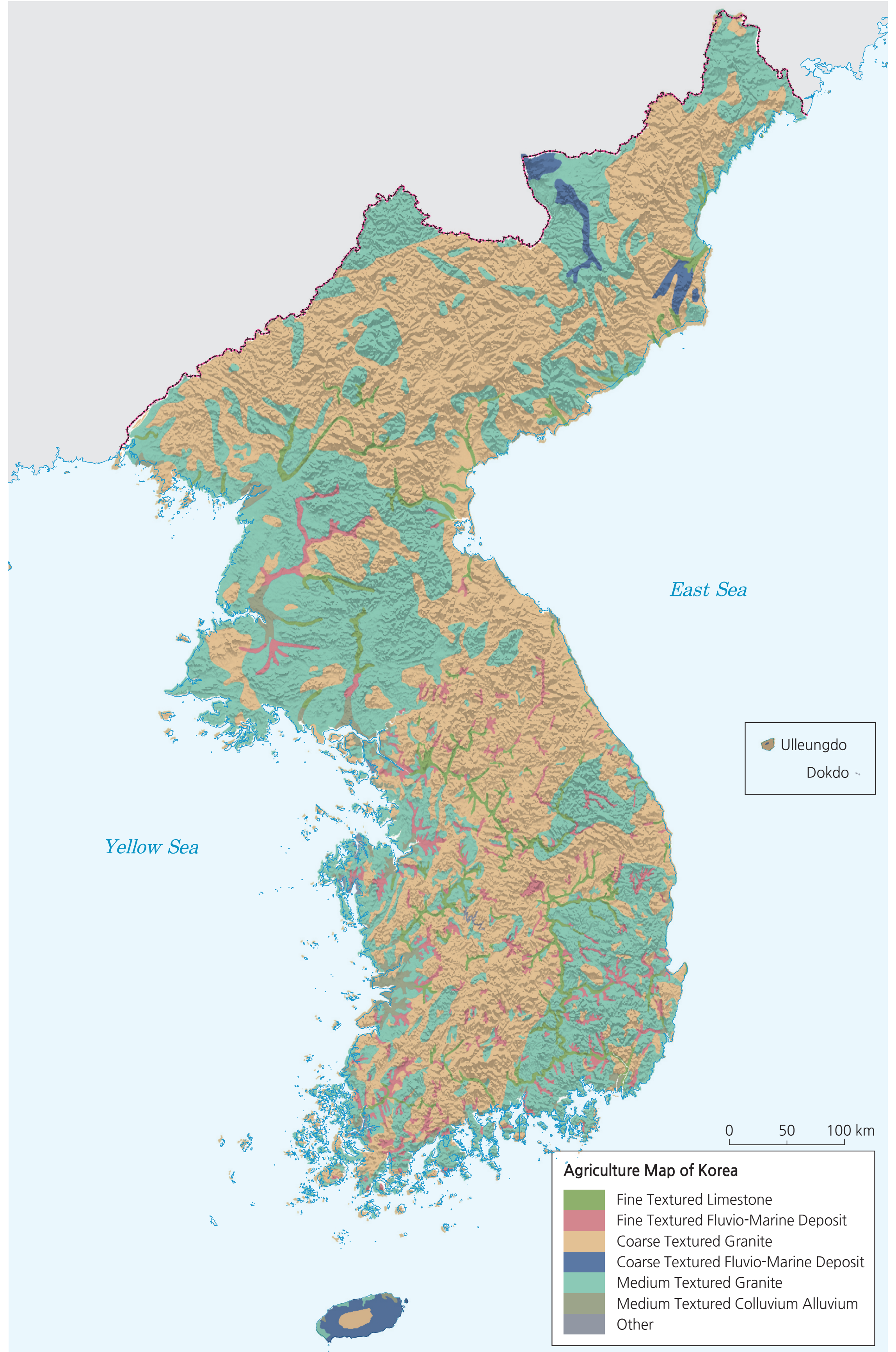
Soil Map of Korea



Rural Development Administration (2020)

Soil Survey

Agriculture Map of Korea



Rural Development Administration (1986)

Nongsa jikseol (農事直說, 1429)

Compiled during the King Sejong era (Reigned, 1418–1450), *Nongsa jikseol* is Korea's first agricultural text that organized traditional agricultural practices and techniques. Before its publication, Korean farmers sought information from Chinese agricultural books, most notably *Nongsang jibyo* (農桑輯要). However, as *Nongsang jibyo* specifically referred to farming experience in China's northern region, it had limitations when applied to Korean climate and soil. In 1428, King Sejong ordered the governors of Gyeongsang-do, Chungcheong-do, and Jeolla-do to survey and record the agricultural technology of each region. Using this data, Jeong Cho (鄭招, ?–1434) and Byeon Hyomun (卞孝文, 1396–?) constructed a viable agricultural system and published it as *Nongsa jikseol*. The book first contains general information on managing soil and seeds, and then elaborates on the cultivation methods of various crops.

Soil Survey Methods

Class	Reconnaissance Soil Survey	Detailed Soil Survey	Super-detailed Soil Survey
Base Map Scale	1:40,000	1:10,000–18,750	1:1,200–5,000
Soil Map Scale	1:50,000	1:25,000	1:5,000
Minimum Mapping Unit Area in Soil Map	6.25 ha	1.56 ha	1 ha
Survey Precision and Soil Classification	Interpretation based on Aerial Images	Field-based Survey	Survey of each Land Unit
	Higher Categories (Great Soil Groups, Soil Groups)	Lower Categories (Soil Series, Mapping Units, Soil Types, Soil Phases)	Lower Categories (Soil Series, Mapping Units, Soil Types, Soil Phases, On-site Land Use)
Distance between Survey Points	500–1,000 m	Within 100 m	50 m
Results	Study of Nationwide Soil Formation and Distribution of Great Soil Groups	Farming Supervision Plans for Gun or Myeon Units	Detailed Farming Plan for each Farm
	Comprehensive Development Plan for Central and Provincial Governments	Development Plans for each Region	Data for Soil Management in each Land Unit
	Distribution File of Potential Agricultural Development Areas	Construction of Chief Producing Areas for each Agricultural Belt	Selection of Crops according to Soil Characteristics
		Improvement of Fertilizer Usage in each Region	Study of Proper Sites for Farms or Groves
		Fundamental Data for Soil Management	Selection of Sites for Soil Introduction, Deep Cultivation, and Drainage

Korea's mountainous topography and high population density have led the country to have the highest social demand for soil resources. In response to this, Korea carried out an extremely detailed and sophisticated soil survey, the results of which have been made available to the public through a digitalized soil information system.

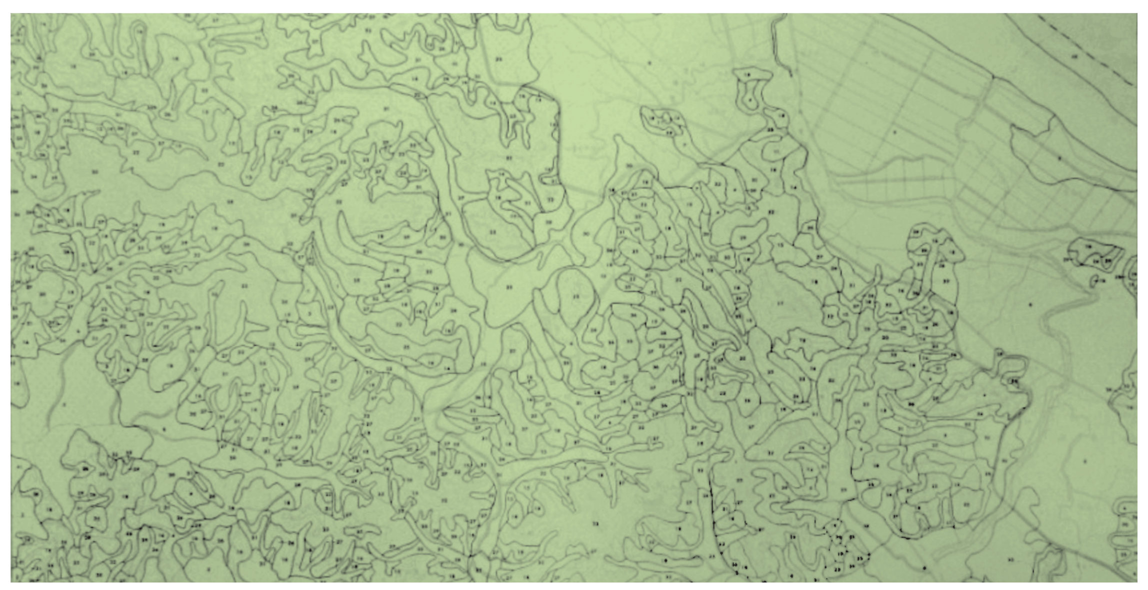
According to *Nongsa jikseol* (the agricultural text written by Jeong Cho and Byeon Hyomun in 1429), the taste of the soil served as the standard for soil classification at the time. Records state that the fertility of soil differs according to its taste; sour-tasting soil indicates barrenness, while sweet-tasting soil refers to richness.

Modern soil surveys were first conducted in 1905. In 1930, an irrigation association conducted a survey to set a standard for fertilizer usage. The first planned soil survey project was launched in 1936 with a decade-long plan to study cultivated land. However, it was halted due to the outbreak of World War II and the Korean War. Advanced scientific soil survey methods under the USDA soil classification system were introduced in 1959. Between 1964 and 1999, extensive national soil survey projects were carried out. There are three types of soil surveys: reconnaissance, detailed, and super-detailed. The categorization depends on the survey's objectives, base map scales, and precision. Reconnaissance soil surveys were carried out from 1965 to 1967 over relatively wide areas. The printed soil map resulting from these surveys was provided at a 1:50,000 scale. It is being used for various policies, such as comprehensive land development plans.

Detailed surveys began in November 1964 to examine potential areas for future cultivation. The projects surveyed a total of 9,586,407 ha or 96.6% of Korea's total area. As of now, only the areas surrounding the Military Demarcation Line and newly reclaimed lands have yet to be surveyed.

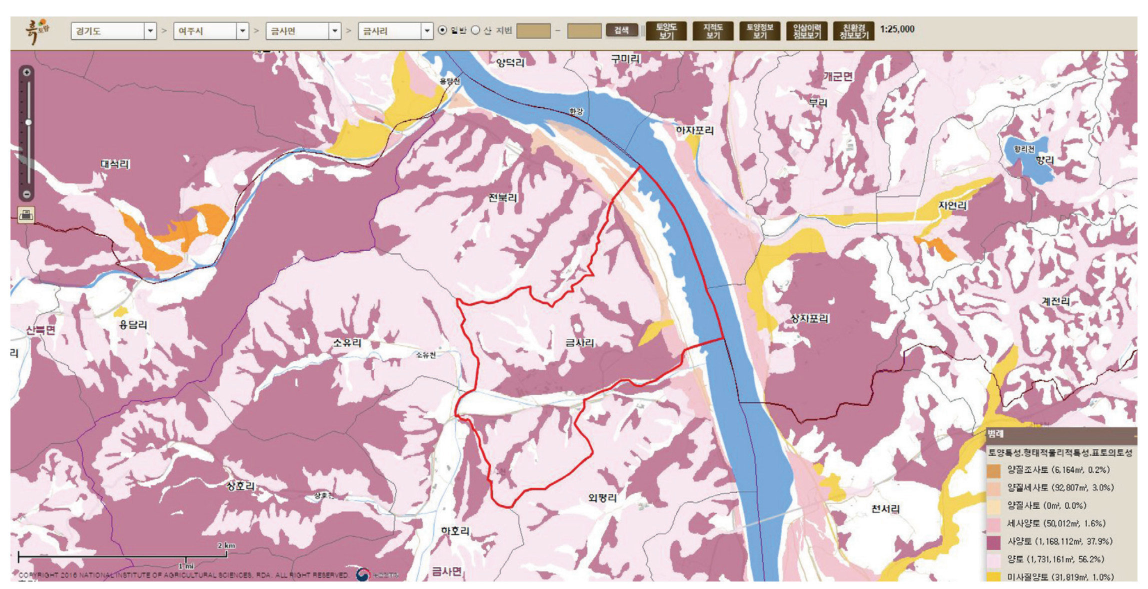
The Forest Service first launched a government-led survey of forest soil in 1968 to find suitable areas to plant trees in the river basins of Anseongcheon, Dongjingang, and Sangjucheon. Since 1995, annual soil surveys have been conducted to achieve systematic development and management of forest resources. A 1:25,000 scale national forest soil map was completed in 2003. Current projects aim to enhance this map to a scale of 1:5,000 to invigorate sustainable forest and ecosystem management, particularly for private forests.

Part of a 1:5,000 Soil Map (Bukbyeon-ri, Gimpo-si)



Rural Development Administration (1969)

Korean Soil Information System

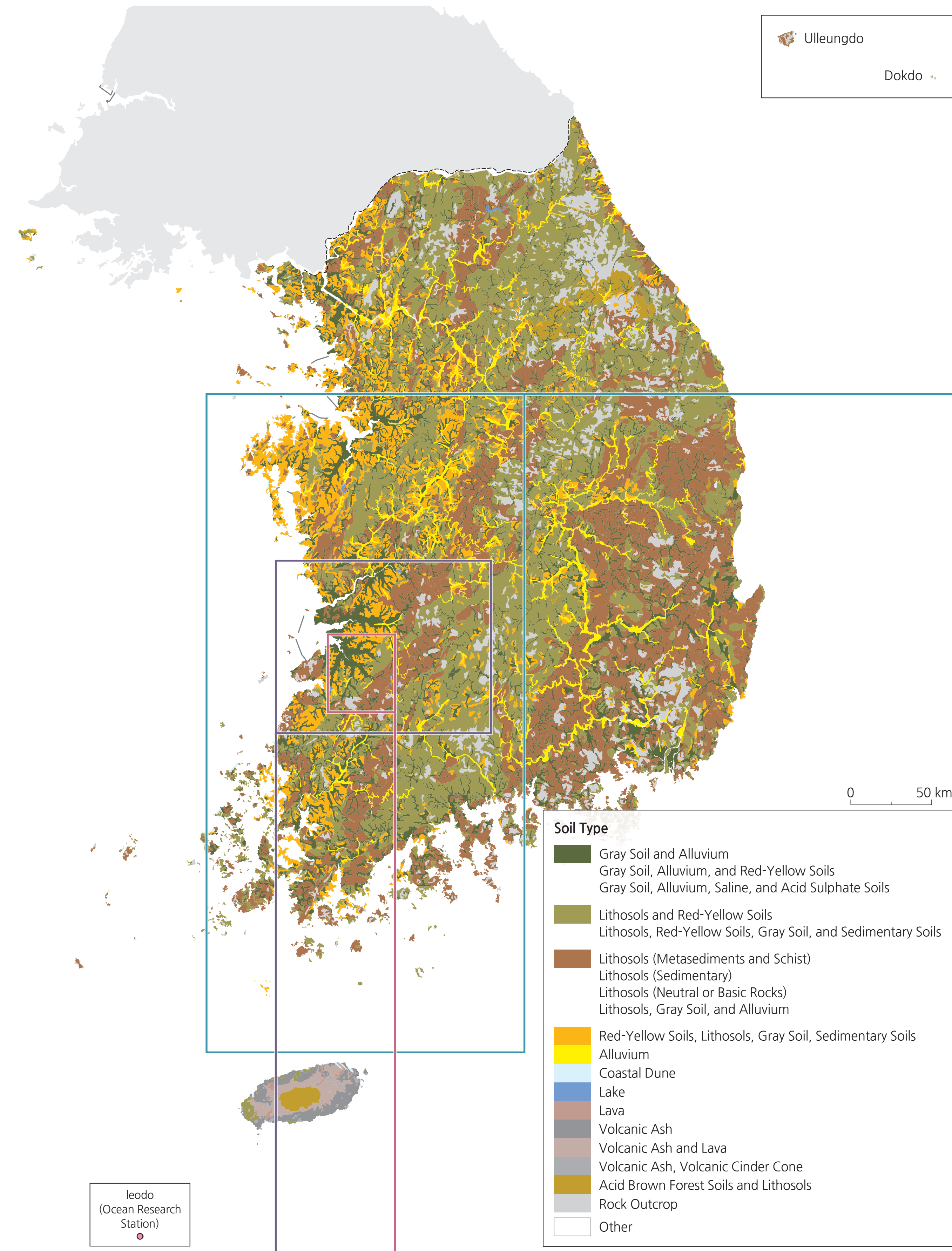


Rural Development Administration (2016)

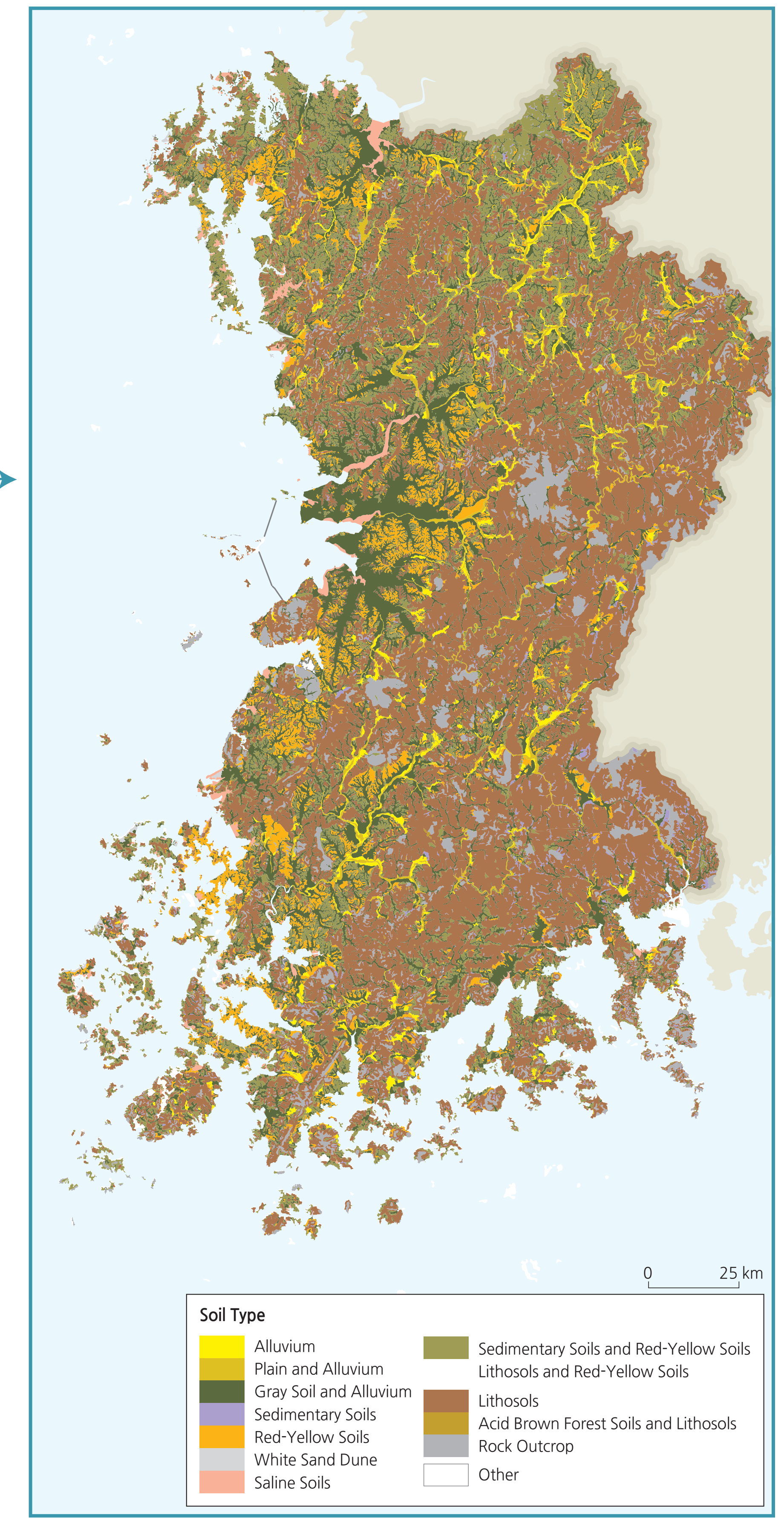
Forest Information Inquiry System Dadream

Korea Forestry Promotion Institute (2020)

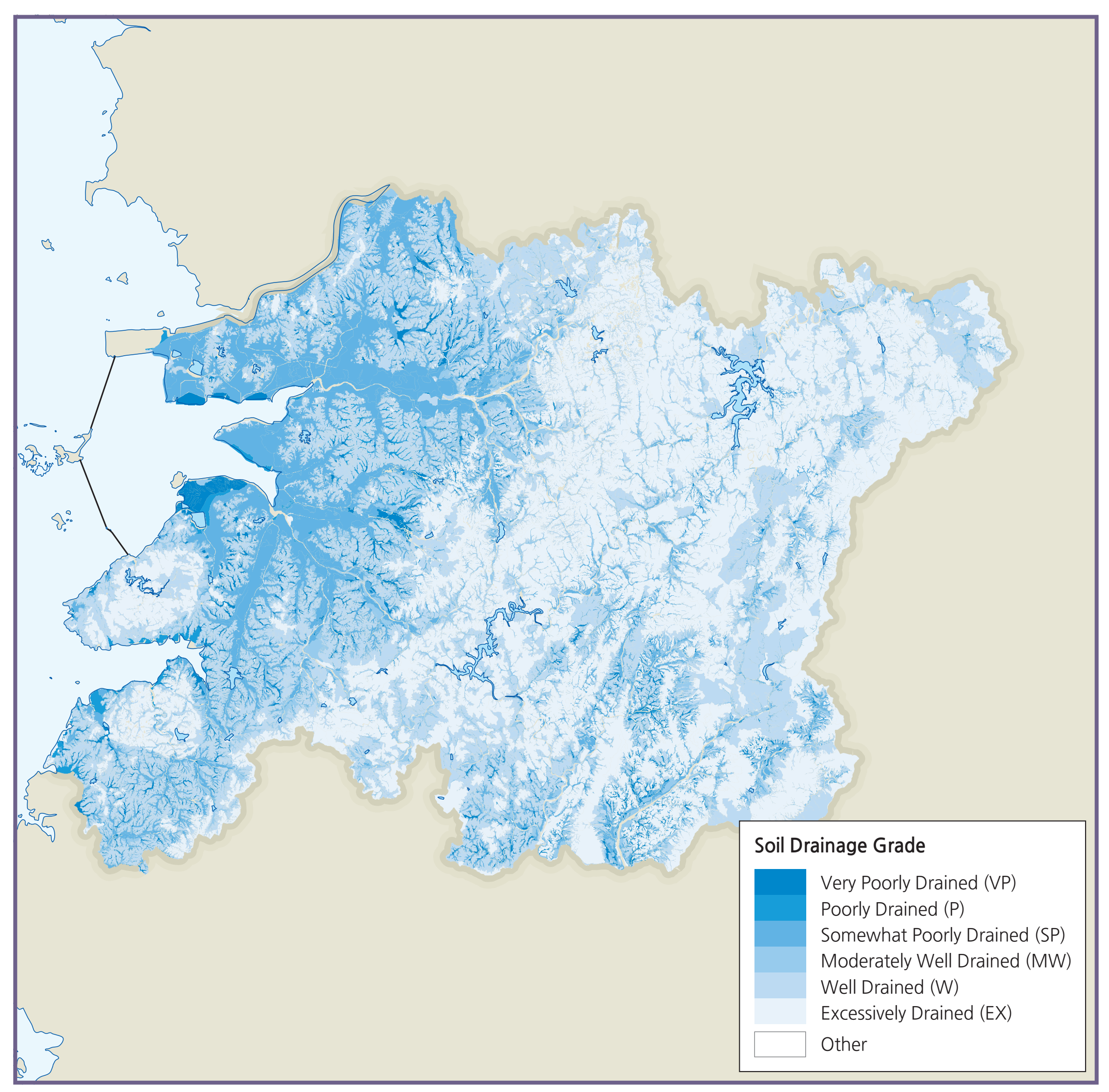
Reconnaissance Survey Soil Map at a Scale of 1:250,000



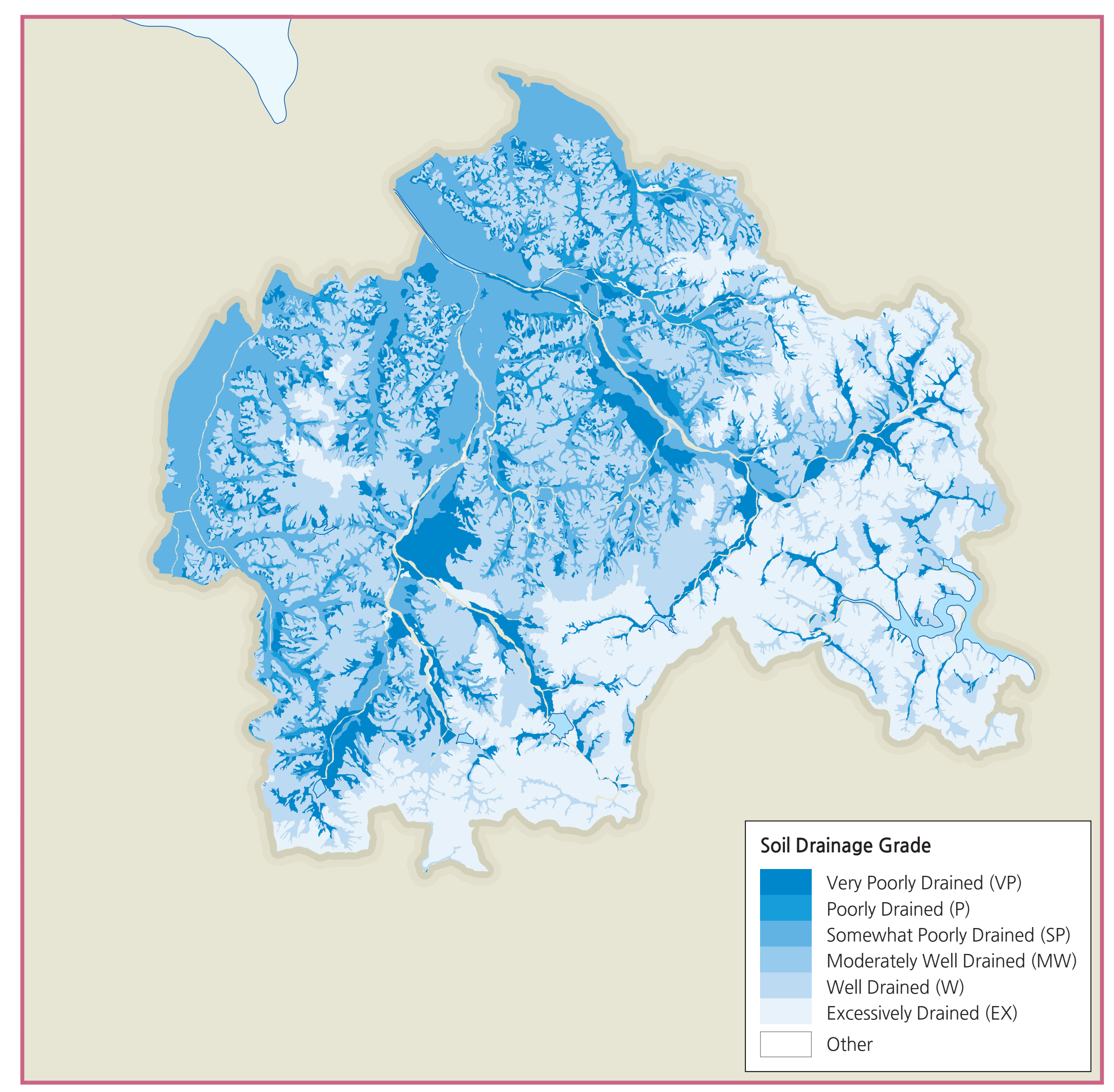
Example of Reconnaissance Soil Survey Map at a Scale of 1:50,000



Example of Detailed Soil Survey Map at a Scale of 1:25,000



Example of Super-Detailed Soil Survey Map at a Scale of 1:5,000

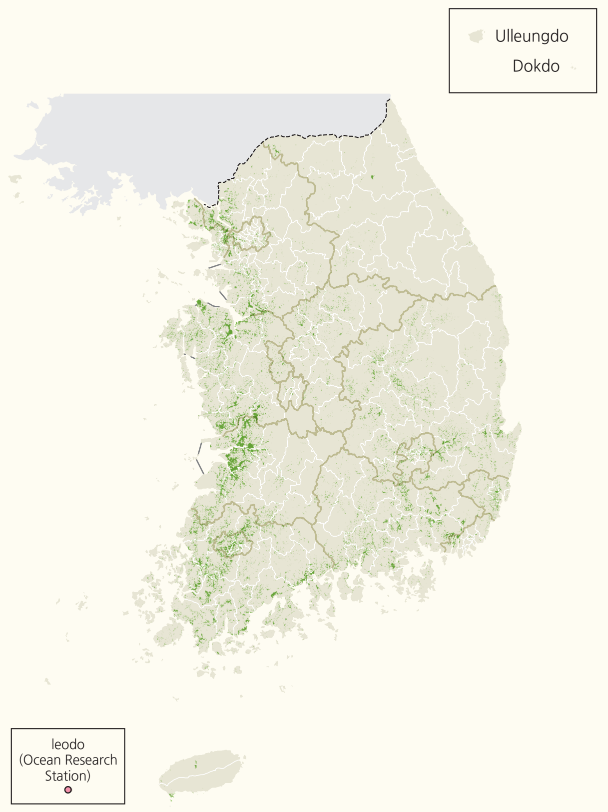


Rural Development Administration (2015)

Representative Soils of Korea

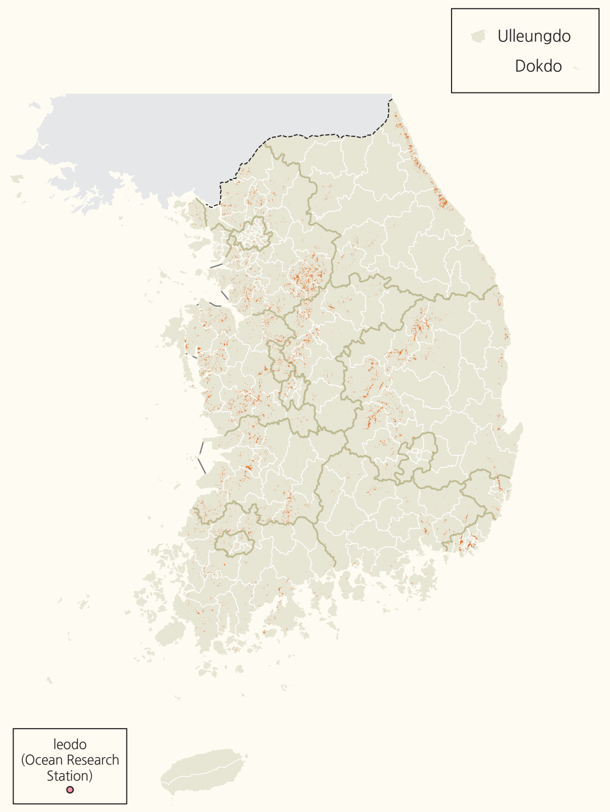
Representative Paddy Soils

Ordinary Paddy Soil



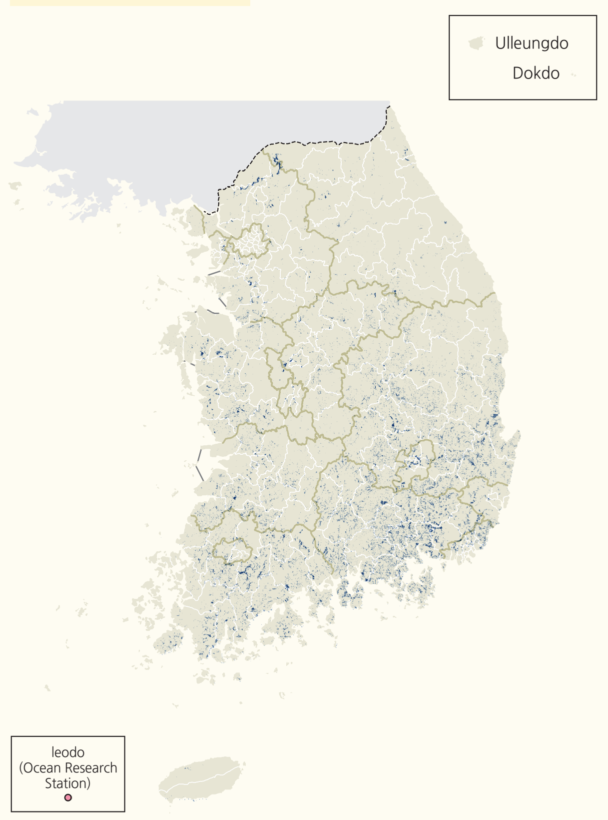
Ordinary paddy soils are distributed in highly productive paddies with no specific limiting factor in rice cropping. These soils comprise approximately 32.6% of the total area of paddy fields in Korea. Adequate soil management, followed by the balanced use of fertilizer, would sustain the high productivity of the soils.

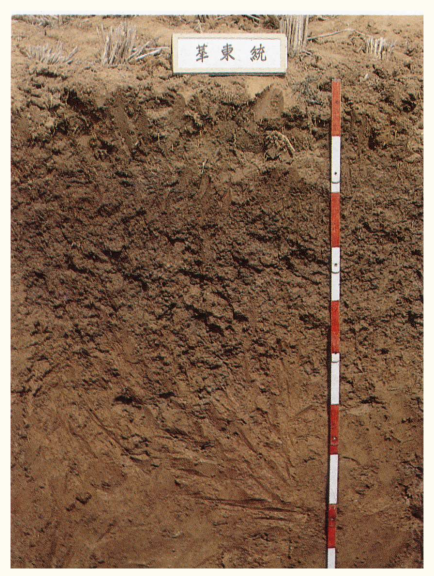
Poorly-Drained Paddy Soil



As poorly-drained paddy soils are located in paddies that are only about 50 cm above groundwater level, they are at high risk of damage from cold or dampness. Due to the intense reduction process in the soils, hydrogen sulfide and acidic organic matter can easily accumulate. These paddy soils require drainage installations to increase nutrient absorption by crops.

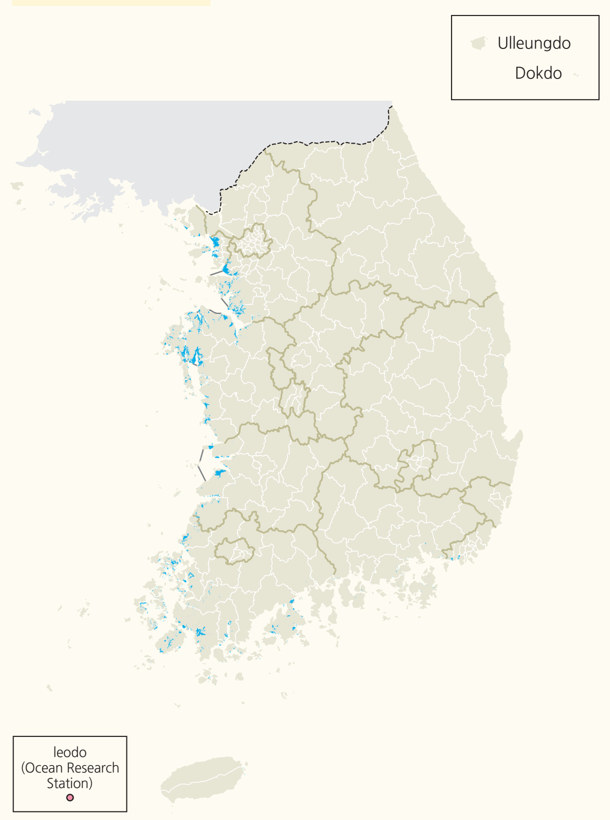
Immature Paddy Soil

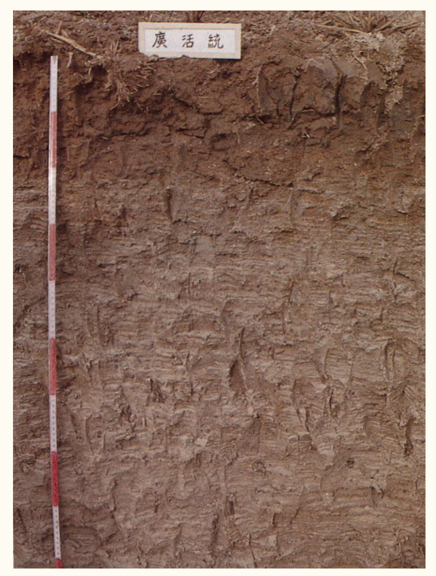




Immature paddy soils can be found in new paddies with low levels of organic matter. The soils require intense care due to their low capacity for storing water and nutrients, compact texture, and low water permeability. These soils comprise 23.4% of the total area of paddy fields in Korea.

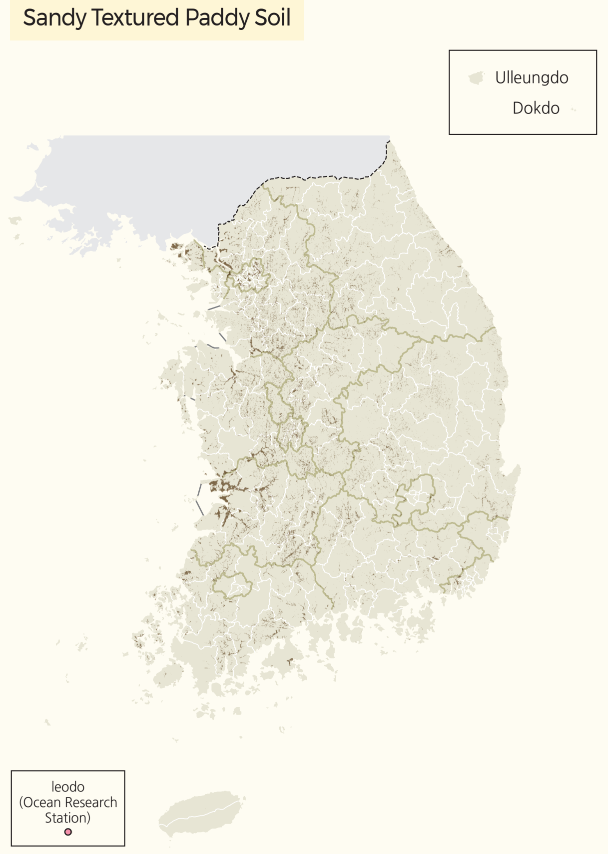
Saline Paddy Soil





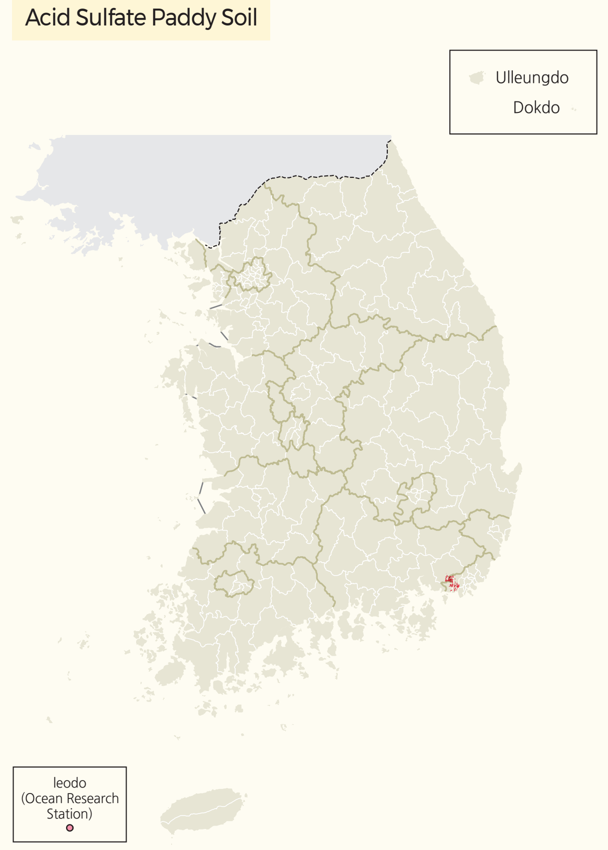
Saline paddy soils form in reclaimed lands and have high salinity. The majority of these soils are located in fluvio-marine plains that comprise 2.5% of paddy fields in Korea. When including areas that are undergoing reclamation processes, the actual total size of saline paddy soil areas is considerably larger.

Sandy Textured Paddy Soil



Sandy textured paddy soils are incompletely formed soils that lack sufficient horizon development because of a shorter history of cultivation. Due to their high sand content, they exhibit severe leaching, which leads to low nutrition capacity. These soils comprise 32.3% of the total area of paddy fields in Korea.

Acid Sulfate Paddy Soil

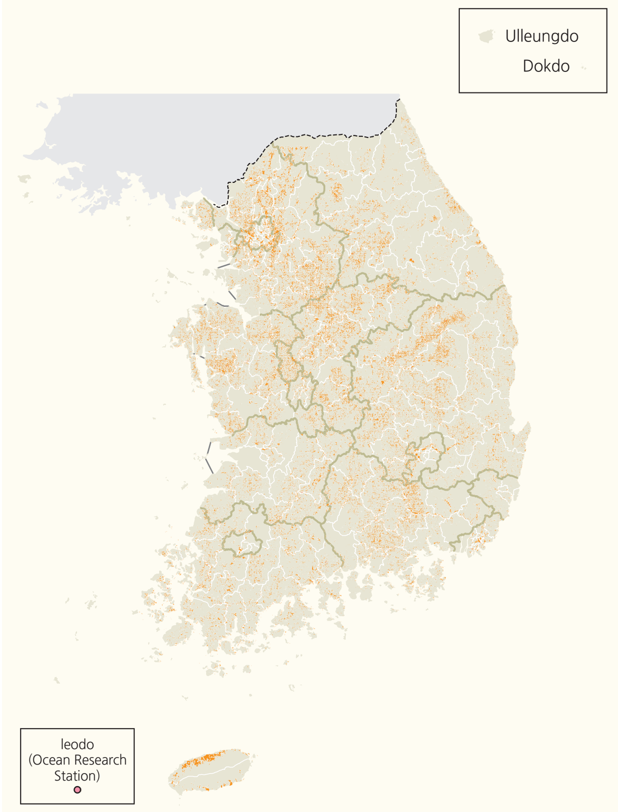


Acid sulfate paddy soils are formed in the sulfate illuvial horizon located 50 cm beneath the surface and can be found in the Gimhae Plain. Due to its low pH value and high acidity, soil yield is very low. Drainage facilities must be installed to remove sulfate from the soils and maintain a neutral pH value.

Rural Development Administration (2015)

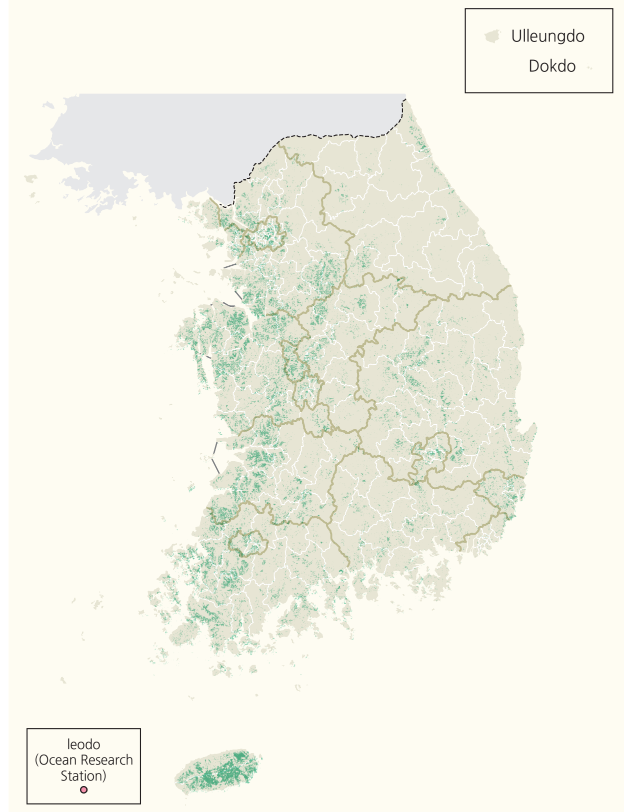
Representative Farm Field Soils

Ordinary Upland Soil



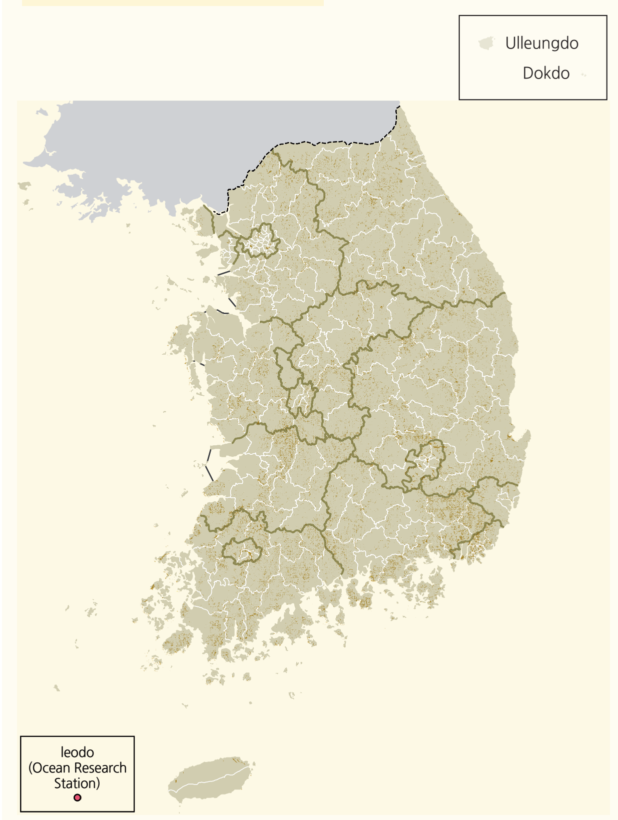
Ordinary upland soils comprise up to 41.8% of the total area of farm fields in Korea and are mainly distributed in alluvial fans or valleys. While there is no limiting factor for ordinary farm field soils in rice cropping, this type of soil's productivity is quite promising even without additional care for soils or crops. Adding lime powder may improve crop yield.

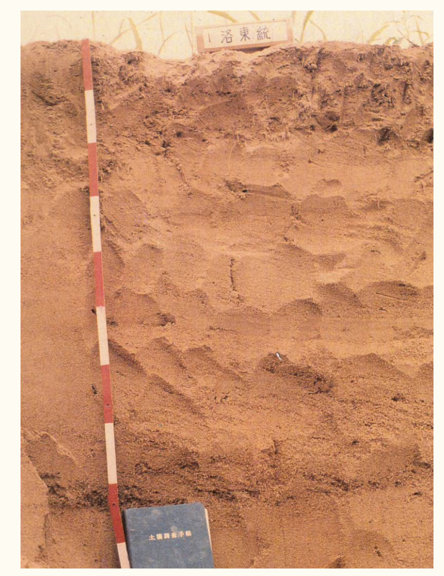
Immature Upland Soil



Immature upland soils are common in alluvial fans, mountain foothills, and hills. They form in farm fields that have a relatively short history of cultivation. These soils heavily depend on the amount of fertilizer, organic material, lime, and phosphate used for remediation and comprise 19.0% of the total area of farm fields in Korea.

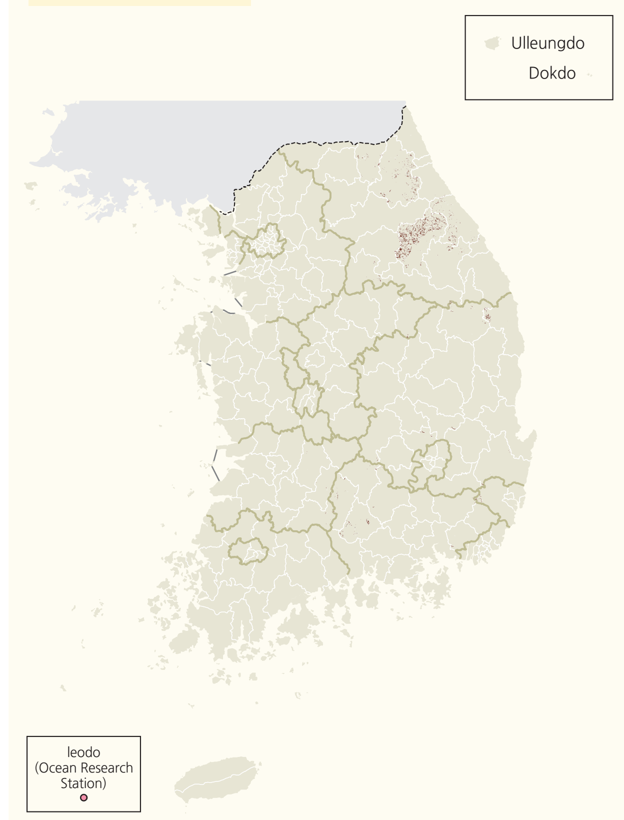
Sandy Textured Upland Soil





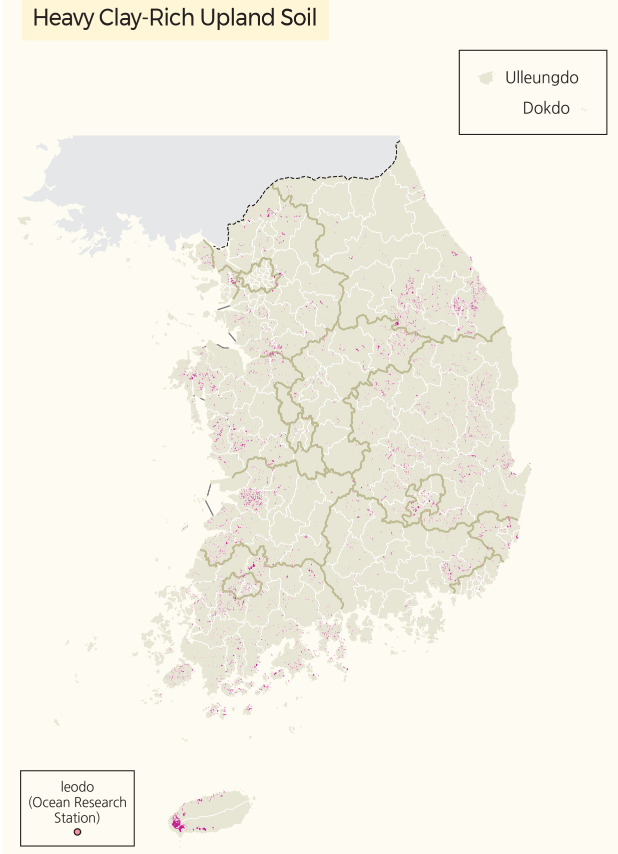
Sandy textured upland soils have a high sand content and are mostly found in plains, alluvial fans, and valleys. They comprise 22.7% of the total area of farm fields in Korea. Suitable irrigation methods and fertilization are required due to their insufficient water/nutrient storage capacity.

Plateau Upland Soil



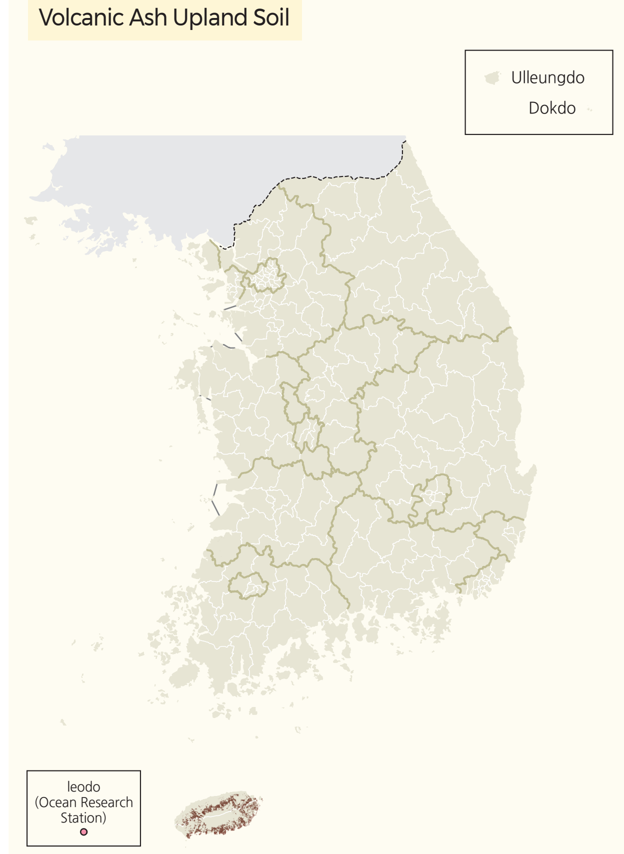
Ulleungdo Plateau upland soils are clayey soils or loams that contain high levels of clay. They comprise only 0.3% of the total area of farm fields in Korea and are found in the high reaches of Gangwon-do. As fertile soils, they are well-developed in areas where the mean temperature is low during the summer, thus ideal for growing seasonal greens. However, they need preservation plans against rapid erosion.

Heavy Clay-Rich Upland Soil



Heavy clay-rich upland soils, which can be found in low hills, valleys, and foothills, are distributed in slopes of less than 7%. While they have high water/nutrient storage capacity, permeability remains relatively low, thus potentially damaging crops through excessive moisture. Certain soil management practices, like subsoil breaking, are needed. This kind of soil comprises 14.3% of the total area of farm fields in Korea.

Volcanic Ash Upland Soil

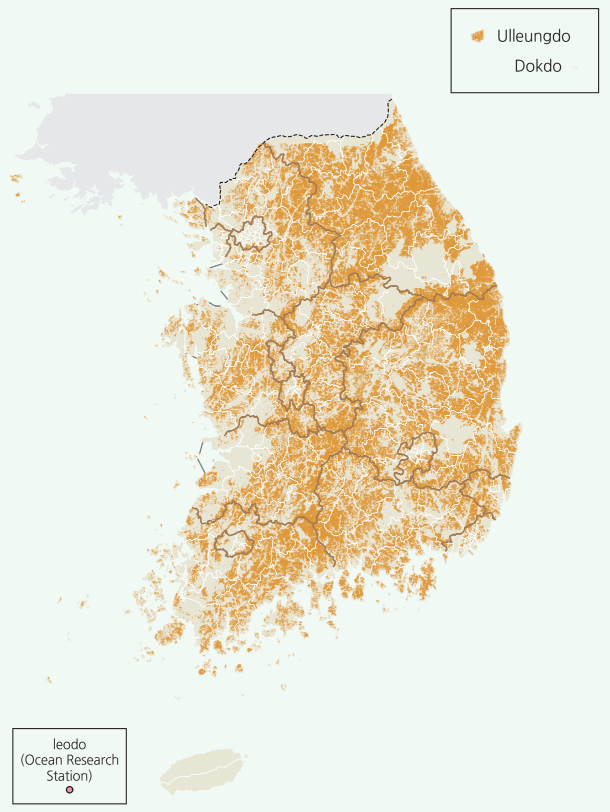


Volcanic ash upland soils are black, organic-rich soils that comprise 2.4% of the total area of farm fields in Korea and are most common in Jejudo. They contain clay minerals (mainly allophane), have high organic material content, and feature high cation exchange capacity, yet their high phosphorus fixation capacity leaves them with less available phosphate.

Rural Development Administration (2015)

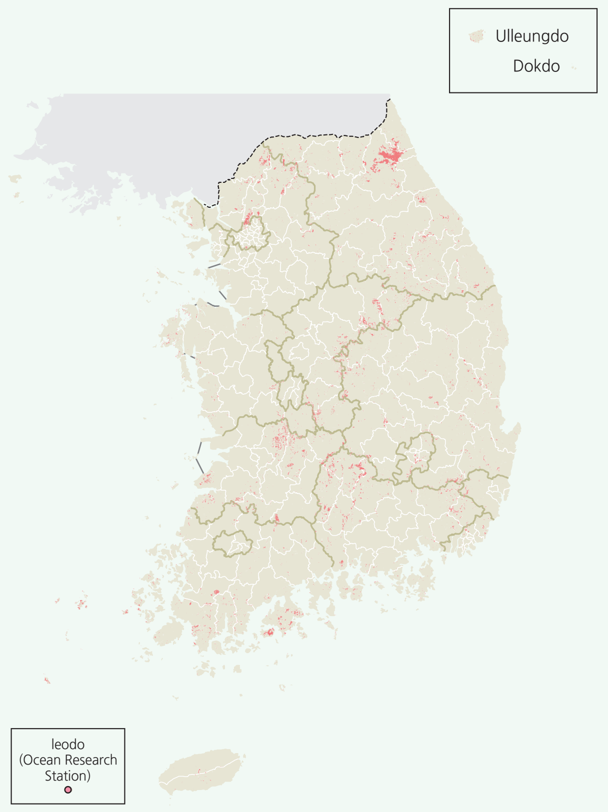
Representative Forest Soils

Brown Forest Soil



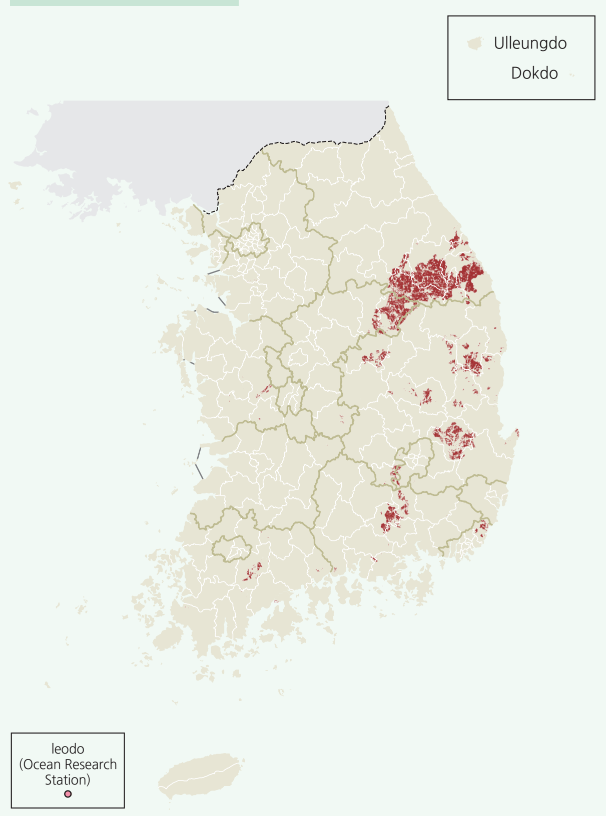
Brown forest soils are loamy soils originating from granite or granite gneiss. They are estimated to be the most abundant forest soils in Korea, covering 80% of its forested area. The soil profile explains some of the characteristics of brown forest soils, including the dark black color from humus decomposed and accumulated in topsoil and the gradual increase of hue and particle size through soil depth, which is 50–60 cm on average.

Red and Yellow Forest Soil



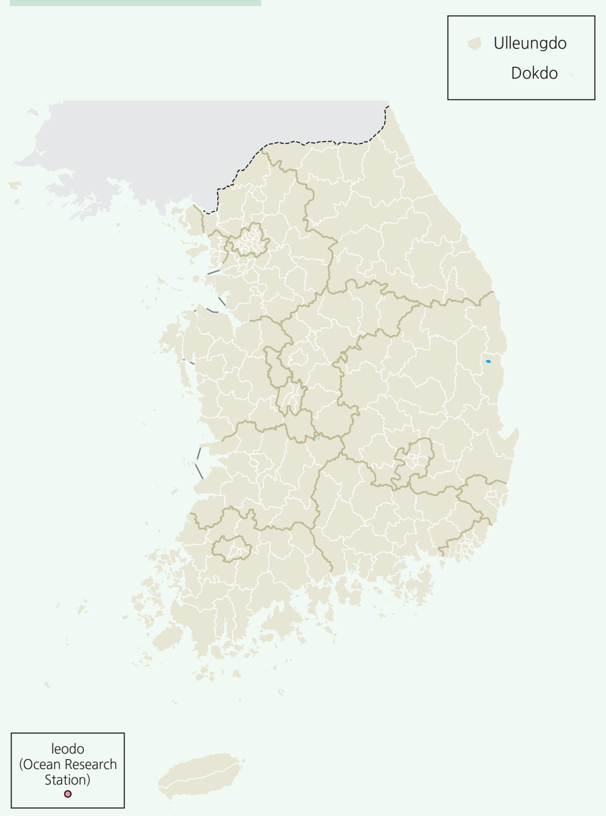
Red and yellow forest soils are mostly distributed in flat to gentle hillsides in the coastal regions of the Yellow Sea and South Sea. Their inclusion of hematite or limonite leads them to be classified into two different soil types, red forest soils and yellow forest soils, respectively. It is common for the subsoil layer of these soils to have less permeability due to their high silt and clay content. Thus, forest areas covered with red and yellow forest soils have a lower yield than other areas.

Dark Red Forest Soil



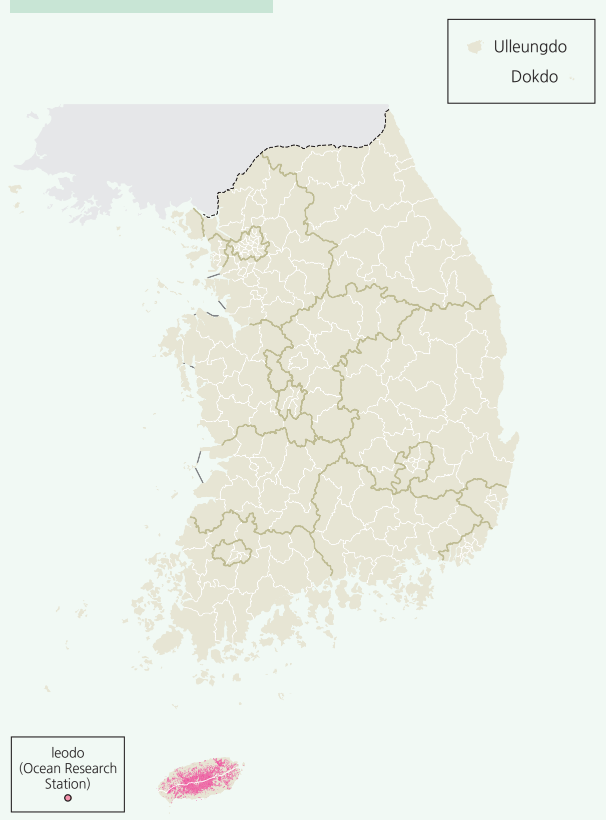
Dark red forest soils are differentiated according to their parent materials. The dark red forest subgroup develops from limestone. The dark red-brown forest subgroup develops from tuff or red sandstone. These soils usually have high clay and gravel content and contain high levels of calcium and magnesium. Consequently, they may not be suitable for plant growth because of their thick texture, shallow depth, and low air permeability.

Gray Brown Forest Soil



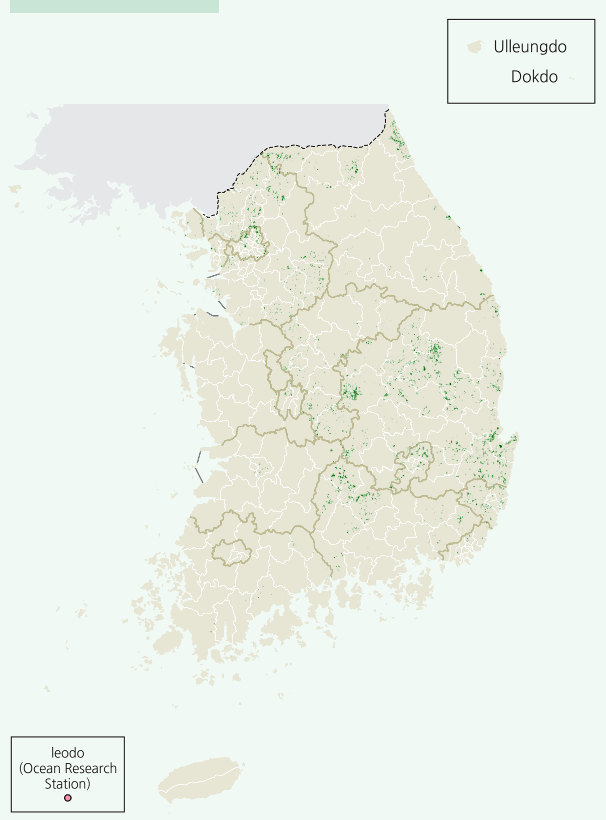
Gray-brown forest soils are formed from parent materials such as mudstone, shale, and ash gray sandstone. Compared to other soils, these soils have less permeability due to high silt content. As they dry out easily and have little vegetation, erosion occurs easily, particularly on slopes. The productivity of these soils is low due to poor drainage, little water, and limited nutrient content.

Volcanic Ash Forest Soil



Volcanic ash forest soils are distributed over small areas in Jejudo, Ulleungdo, and Yeoncheon-gun of Gyeonggi-do. The average depth of these soils (about 80 cm) is deeper than the average of all forest soils (50 cm). Because they are formed from basalt, a porous material, volcanic ash forest soils have a low bulk density. Thus, they have a high capacity for organic matter and essential nutrients and can also hold a great amount of water.

Eroded Forest Soil

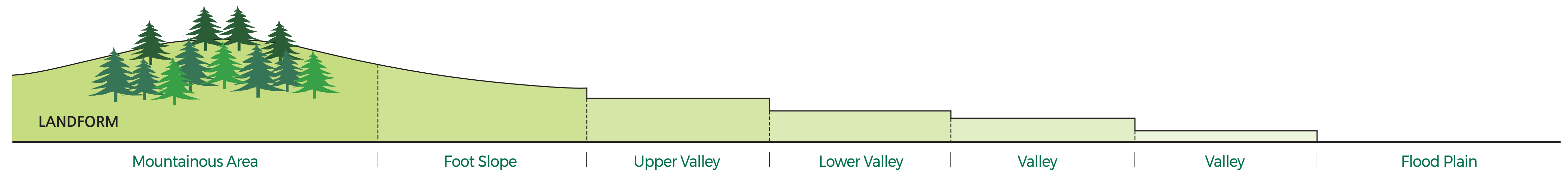


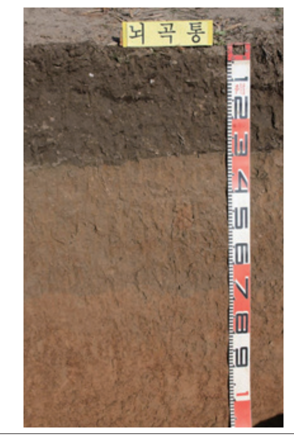
Eroded forest soils are soils with partly or entirely removed topsoil because of erosion by rain and wind. They also refer to soils that have stabilized top soils after restoration. These soils have the lowest productivity due to shallow soil depth (under 20 cm). Eroded forest soils are classified into three types according to the degree of erosion or soil restoration: slightly eroded soils, heavily eroded soils, and erosion controlled soils. These soils cover 0.11 million ha across Korea.

Korea Forestry Promotion Institute (2016)

Soil Association

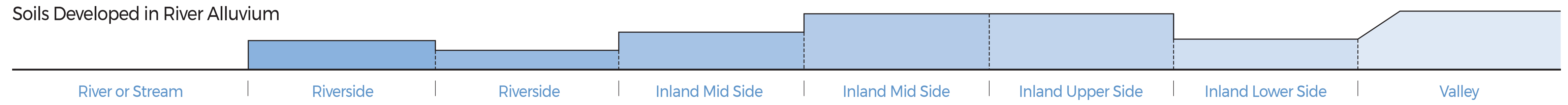
Soils Developed from Granite



Soil Series	Samgag Series, Typic Dystrudepts	Sangju Series, Dystric Fluventic Eutrudepts	Noegog Series, Fluvaquentic Dystrudepts	Eungog Series, Fluvaquentic Eutrudepts	Sachon Series, Aeric Endoaquepts	Yecheon Series, Fluvaquentic Endoaquepts
Soil Profile						
Drainage Class	Excessively Drained (EX)	Well Drained (W)	Moderately Well Drained (MW)	Moderately Well Drained (MW)	Somewhat Poorly Drained (SP)	Poorly Drained (P)
Land Use	Forest Land	Farm and Grove	Farm and Grove	Paddy Field	Paddy Field	Paddy Field

Rural Development Administration (2015)

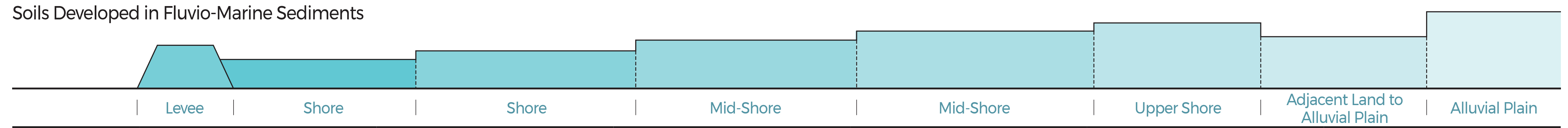
Soils Developed in River Alluvium



Soil Series	Hwangryong Series, Typic Udipsamment	Namgye Series, Aquic Udipsamments	Deogcheon Series, Typic Udifluvents	Jungdong Series, Typic Udifluvents	Seogcheon Series, Fluvaquentic Endoaquepts	Hamchang Series, Typic Endoaquepts
Soil Profile						
Drainage Class	Excessively Drained (EX)	Moderately Well Drained (MW)	Well Drained (W)	Well Drained (W)	Somewhat Poorly Drained (SP)	Poorly Drained (P)
Land Use	Farm	Paddy Field	Farm and Grove	Farm and Grove	Paddy Field	Paddy Field

Rural Development Administration (2015)

Soils Developed in Fluvio-Marine Sediments



Soil Series	Munpo Series, Typic Fluvaquents	Gwanghwal Series, Typic Endoaquepts	Mangyeong Series, Fluvaquentic Endoaquepts	Jeonbug Series, Fluvaquentic Endoaquepts	Buyong Series, Typic Endoaqualfs	Gimje Series, Fluvaquentic Endoaquepts
Soil Profile						
Groundwater Level	< 20 cm	< 20 cm	80 cm	90 cm	100 cm	100 cm
Land Use	Paddy Field	Paddy Field	Paddy Field	Paddy Field	Paddy Field	Paddy Field

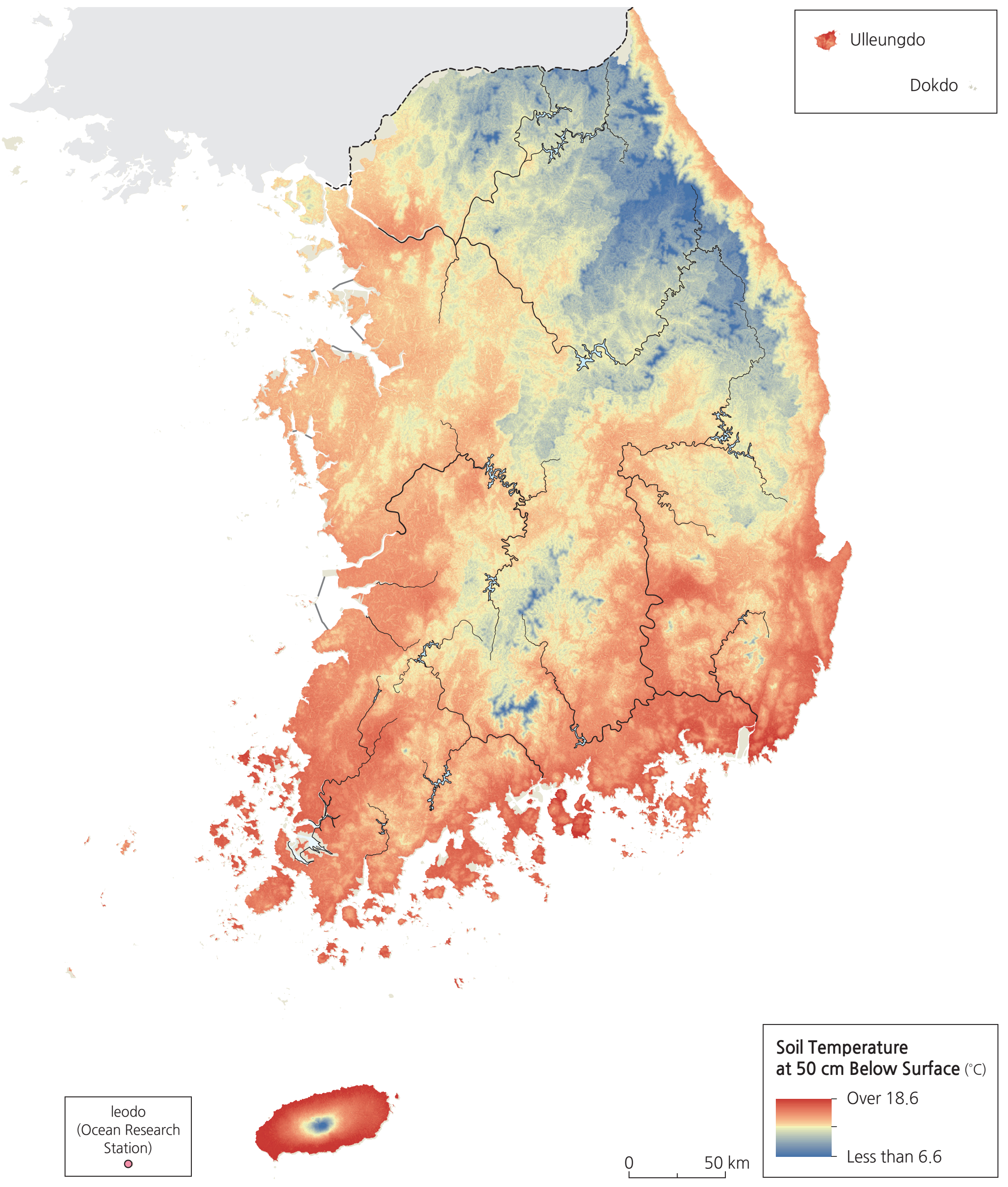
Rural Development Administration (2015)

Soil-forming factors that determine the morphological, physical, and chemical characteristics of soils consecutively appear on the land's surface in a predictable pattern. For example, a decrease in temperature or an increase in precipitation by elevation results in changes in vegetation, which are in turn reflected in the characteristics of the soil. A group of soils associated with one area occurs in a predictable pattern. The characteristic that the soils related to each other appear sequentially is called Soil Catena.

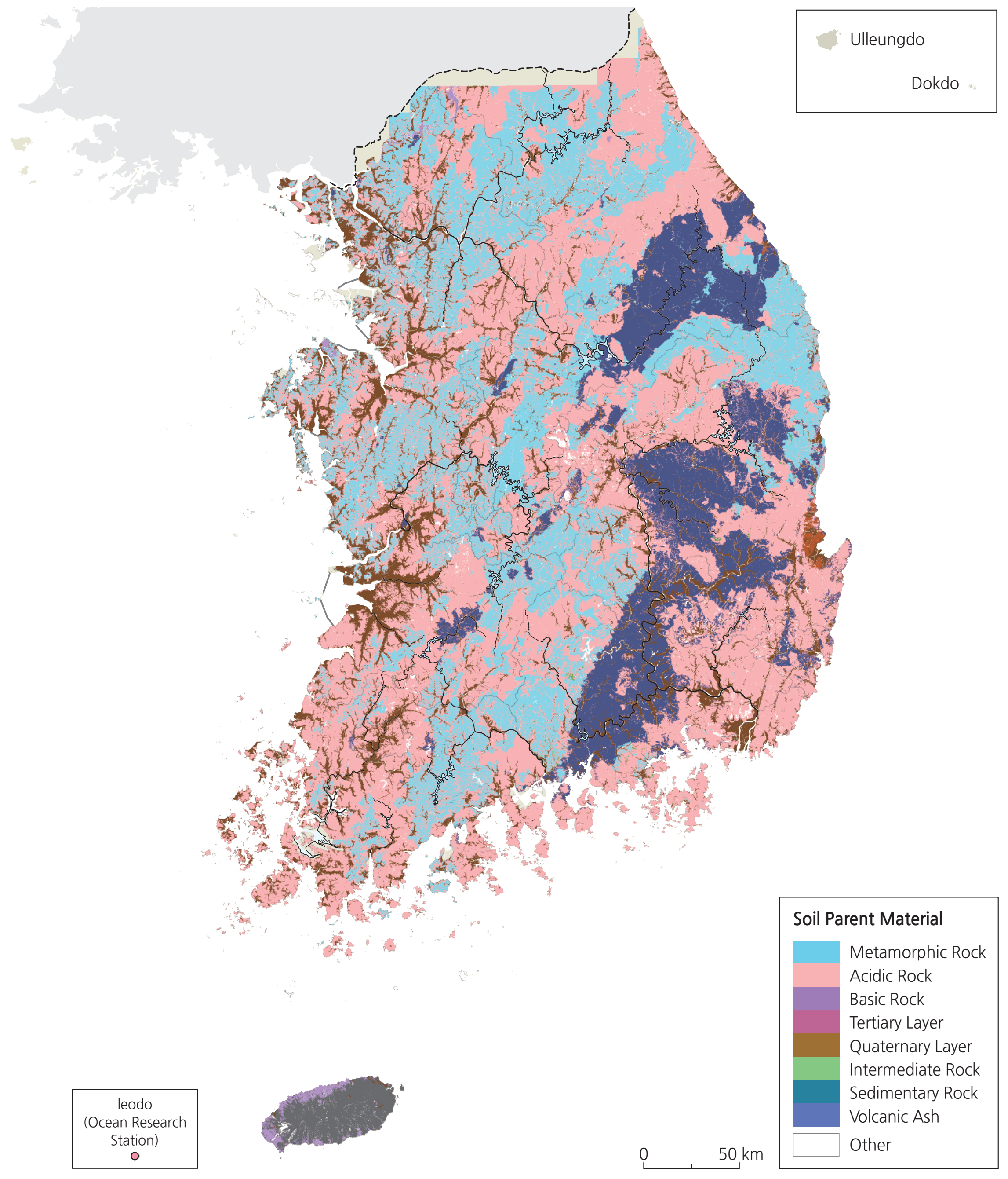
Typical Korean topography shows floodplains on both sides of a river adjacent to the piedmonts, or foothills, of nearby gentle sloping mountains. These foothills are in turn connected to the rear, steep-sloped mountains. The flow of water from mountain to river erodes soil particles, leaches soil nutrients, and then deposits them on the lower part of a mountain. Rainfall infiltrating and percolating into the soil increases its water content. Floodplains experience flooding during periods of high discharge and display high groundwater levels. These soil-forming factors appear in a continuous manner, which leads adjacent soil series to develop accordingly.

Soil Forming Factors

Soil Temperature



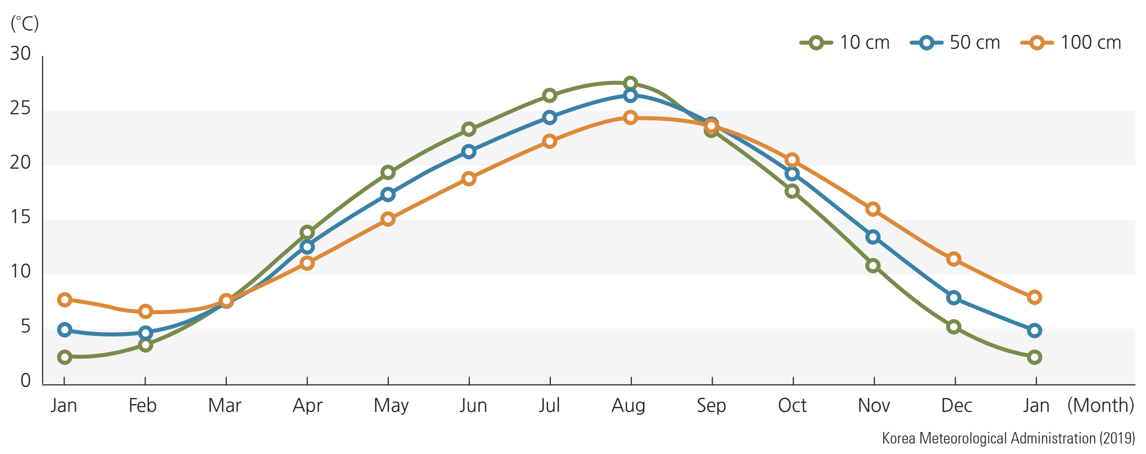
Soil Geological Map



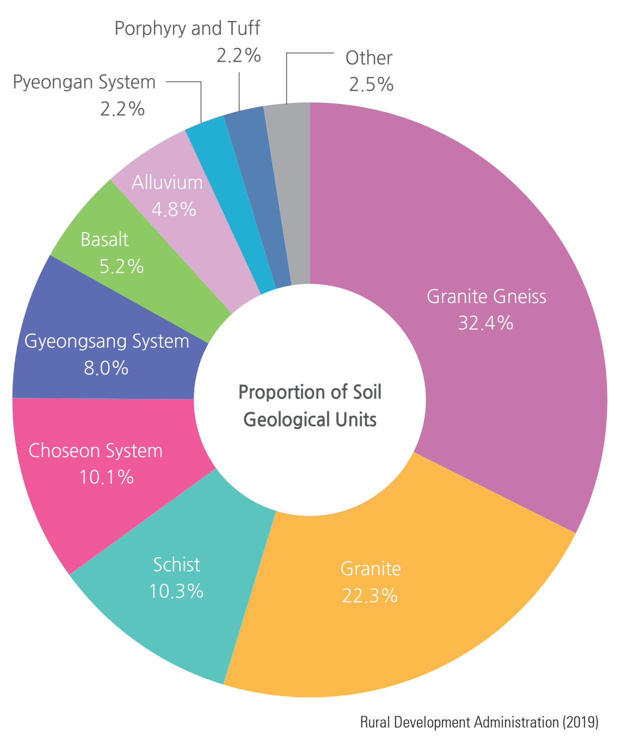
Climatic factors, especially precipitation and temperature, have the biggest influence on the formation of soil. The Korean Peninsula has a temperate monsoonal climate with four distinct seasons of spring, summer, autumn, and winter. Heavy rainfall occurs during July and August, which causes slopes to have shallow soil due to soil loss. Summer has an average temperature of approximately 20˚C–25˚C, with August being the hottest month, while winter has an average temperate of -5˚C–5˚C, with January being the coldest month.

The mean annual soil temperature in Korea is 14.5˚C, ranging from 7.1˚C in Daegwallyeong to 18.1˚C in Seogwipo. According to the soil temperature regimes, Korean soils mostly belong to the mesic (8˚C–15˚C) or thermic (15˚C–22˚C) regime. The Korean mean annual soil temperature at 10 cm of soil depth (which is highly relevant to underground plant growth) is reported to be 1.6˚C lower than the mean atmospheric temperature. This difference varies in the summer (1.9˚C in August) and winter (1.8˚C in January), and also ranges from 0.9˚C in March to 2.2˚C in September. The difference is more significant during summer and autumn than it is during spring.

Change of Mean Soil Temperature by Depth



Proportion of Soil Geological Units



Korea has many diverse soil types. A total of 405 series of soils are developed from different parent materials. Soils originating from granite, granite gneiss, and granitic gneiss are coarse and shallow due to intensive soil erosion on steep, high mountain faces. Soils originating from schist and gneiss are acidic. Limestone is widespread throughout some areas in Gangwon-do, northern Gyeongsangbuk-do, and northern Chungcheongbuk-do. Soils from limestone have shallow soil depth and are usually fine-textured and slightly acid or neutral.

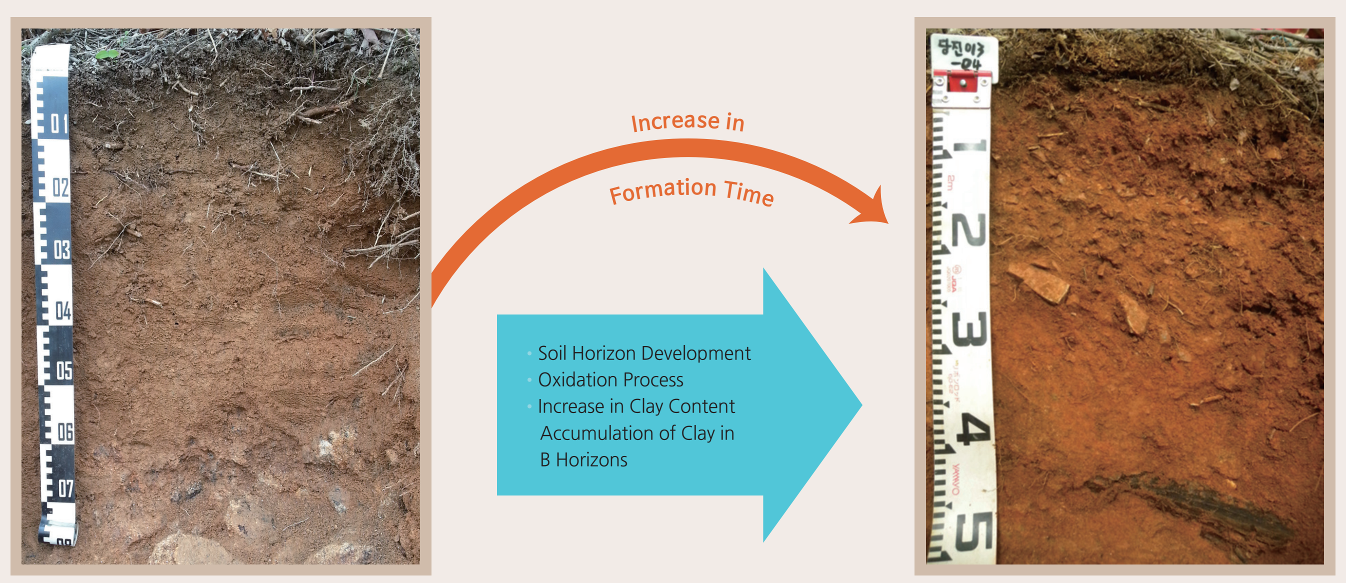
The Gyeongsang Supergroup is a representative sedimentary rock layer that is distributed in Gyeongsang-do. Within this supergroup, there are two subordinates: the Nakdong group and the Silla group. The rocks in the Nakdong group are mostly shale, sandstone, or conglomerate. Soils from shale often have a deep, well-developed profile. Soils from sandstone or conglomerate are coarse and bright in color. The rocks in the Silla group are andesite, basalt, rhyolite, and tuff. Soils from these rocks are fine-textured and have a deep, well-developed soil profile. Rocks from the Tertiary consist of unconsolidated sandstone, shale, and conglomerate and are common in Gyeongsangnam-do and Gyeongsangbuk-do. Soils from sandstone are coarse and bright, while those from shale are medium-textured and have a shallow soil profile. Basalt is most commonly located in western coastal areas or granite located in Jejudo, and soils developed from basalt are dark brown, fine-textured with average depth. Soils from volcanic ash are very dark brown or black due to their high organic material content.

Soil Changes Through Time

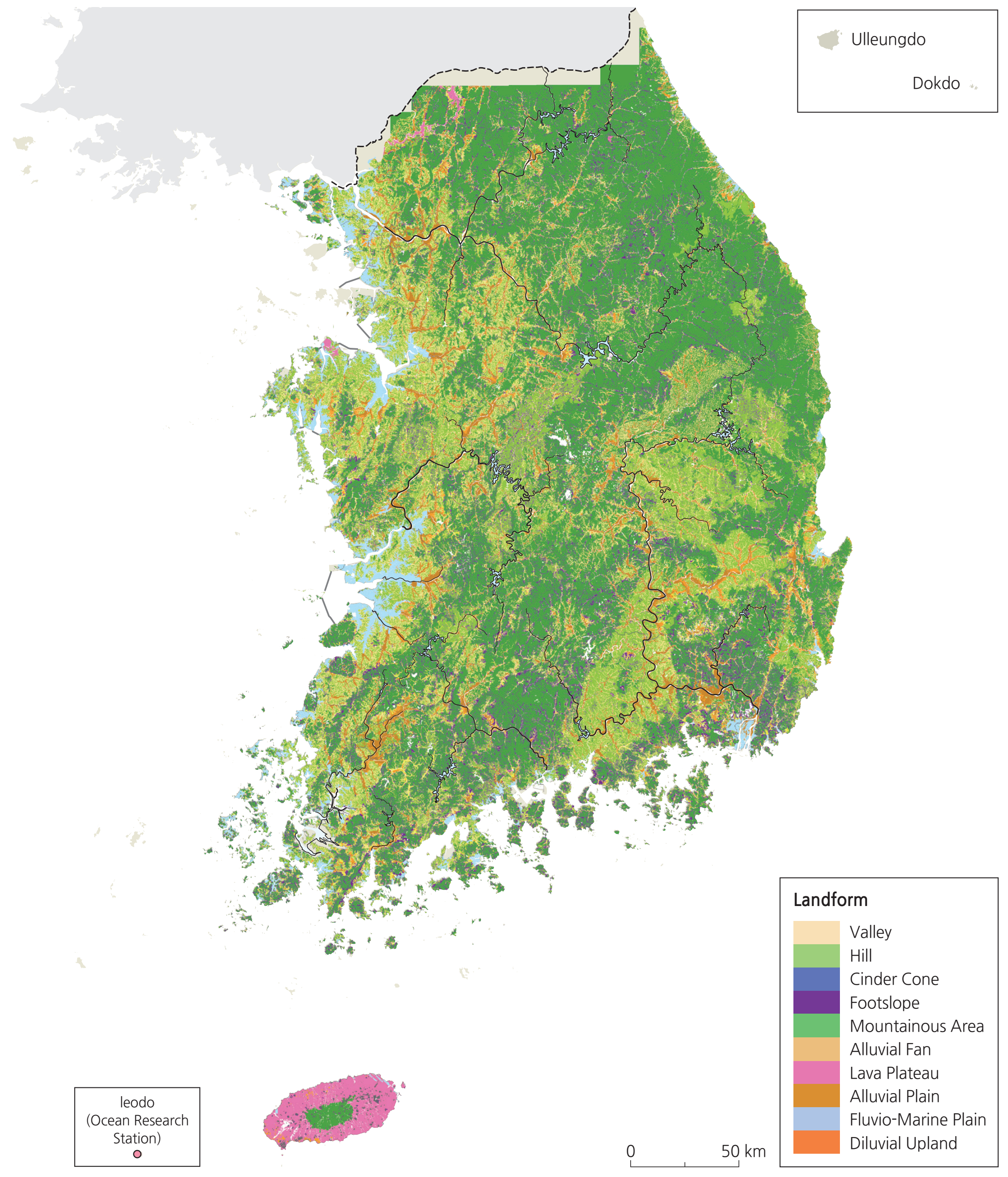
When time is considered as a soil-forming factor, the key concern is the relative time of soil formation rather than the absolute duration of time passed. The duration of time required for the soil profile to exhibit fine differentiation between horizons depends on the intensity of other formation factors such as climate, vegetation, parent materials, and topographical conditions. Soils with a shorter soil formation time would retain more of the characteristics of the parent material. In contrast, soils with a longer soil formation time would feature traits more influenced by other environmental factors.

The Korean Peninsula has developed over a long period of geological time; however, its complex terrain results in soils with a relatively shorter formation time. Hence, soils do not have a clear development of soil horizons. On the other hand, in regions of low gradient (gentle hills, terraces, lava plateaus), reddish-brown soils develop, showing clear horizon differentiation and reddening processes.

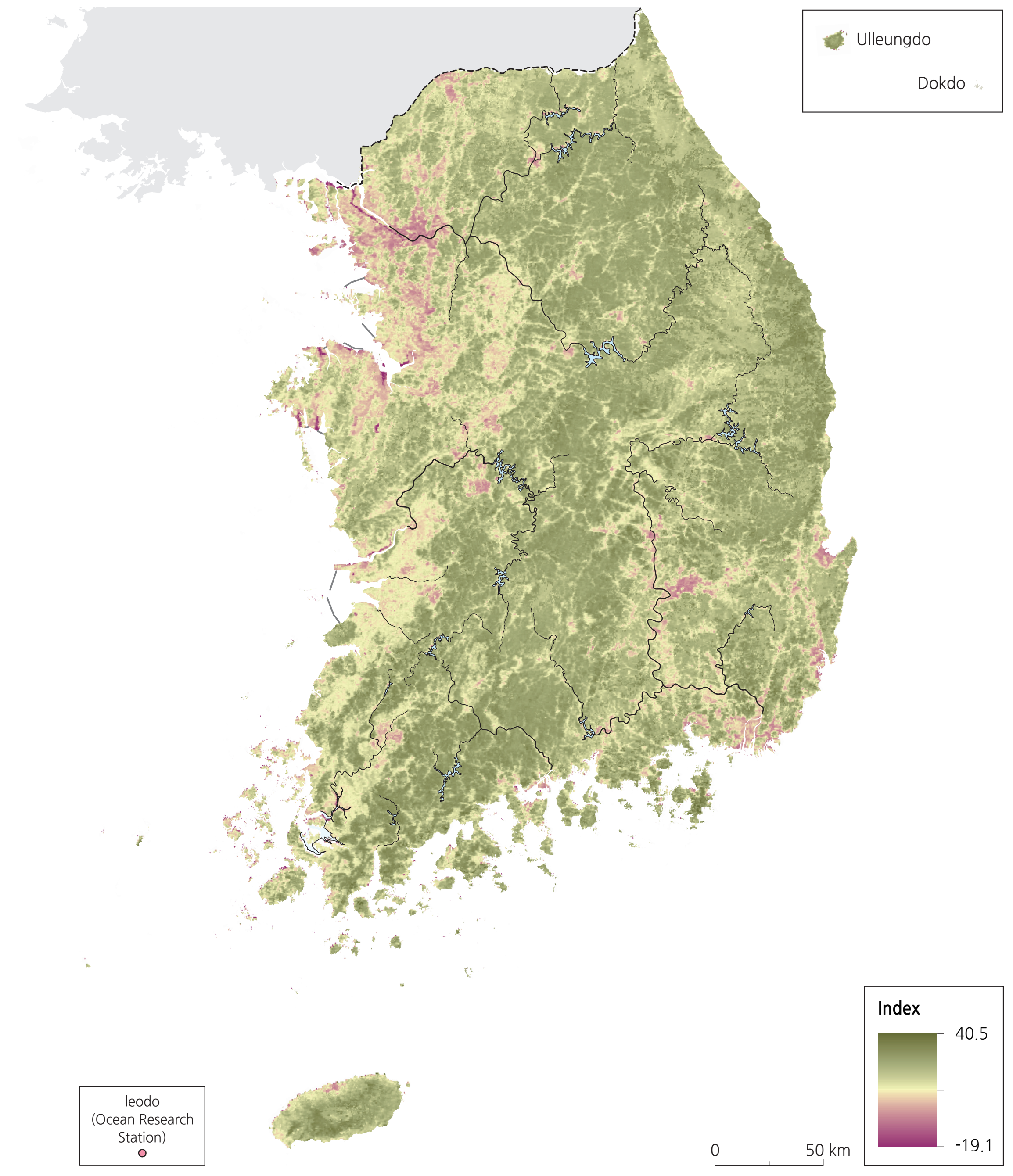
Soil can change depending on how it is managed, and farming methods can maintain or increase carbon stocks in the soil. The carbon stocks of all paddy soils in Korea increased by about 0.3 teragrams (Tg) each year, from 30.6 Tg in 1999 to 33.5 Tg in 2007. This can be attributed to the increase in rice production and root biomass due to increased fertilizer use, including compost use.



Soil Geomorphological Map



Normalized Difference Vegetation Index Map (2017)



As the climatic pattern of Korea shows little difference between regions, topographic factors play critical roles in soil-forming processes. Consequently, the soil survey system classifies different landforms into ten soil geomorphological units, according to slope gradient and cause of formation.

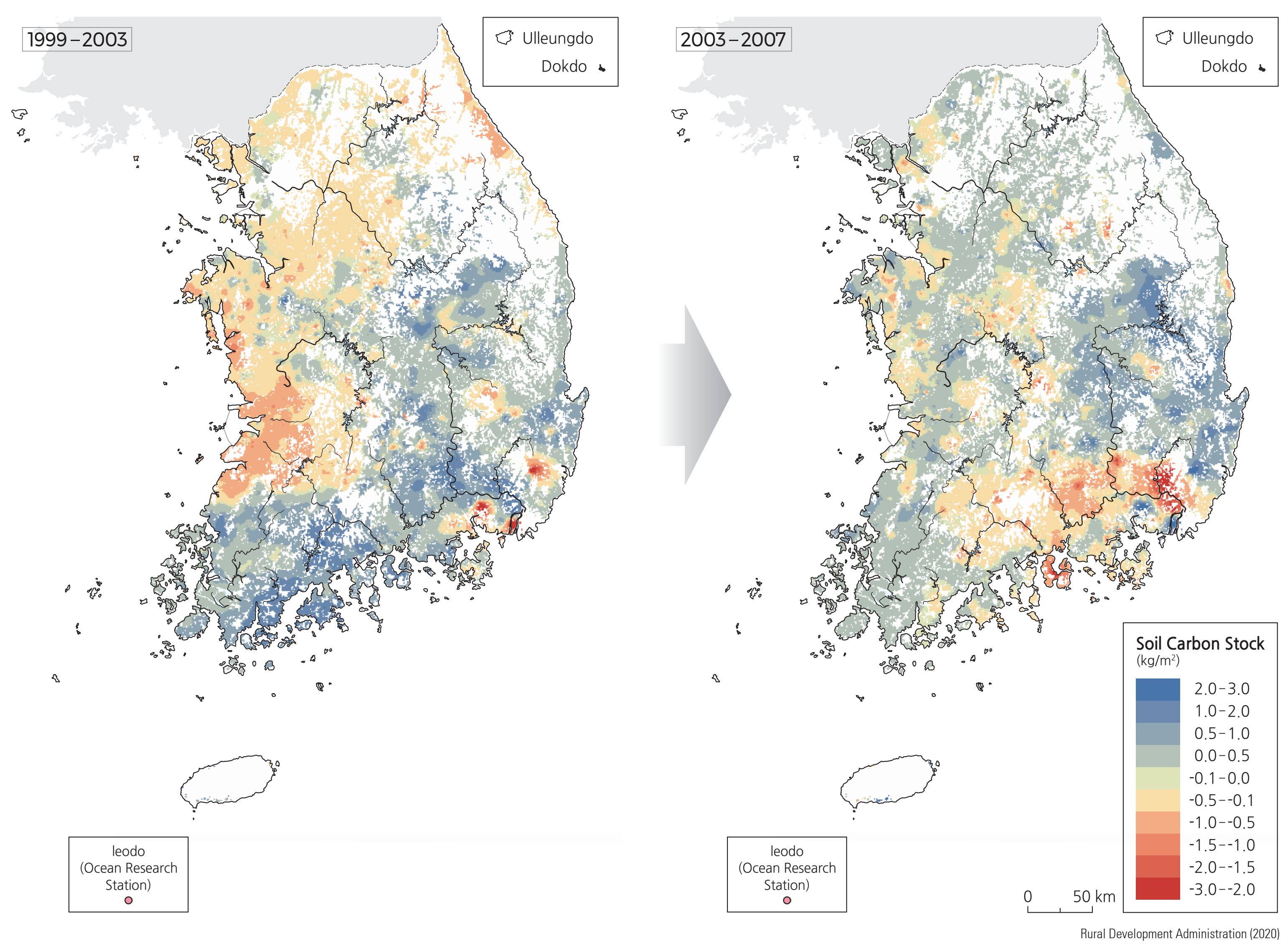
Among the ten units, mountainous areas constitute the highest proportion, with 43.2% of the total land area. These areas are generally used as forest land as they have shallow soil layers resulting from erosion. Hills take up approximately 19.9% of land area and are mostly located in western coastal areas or granite erosion basins. Although hills have better-developed soil than mountainous areas, they are also used for forests due to the high slope gradient. Valleys (10.9%) are commonly filled with mountain sediments and thus possessing a deeper soil layer. As they usually have convenient access to water sources, valleys are often utilized for small-scale paddies. Foothills (8.0%) are more suitable for farmland than for paddies as they lack a water source. Alluvial plains (4.9%) and fluvio-marine plains (3.5%) are formed by river deposits and joint action of the sea and river, respectively. They are adequate for agriculture usage as they have deep soil layers with high productivity. Other landforms—alluvial fans, lava plateaus, diluvial uplands—each constitute less than 3% of the total land area.

Proportion of Soil Geomorphological Units

Soil Geomorphological Unit	Area (ha)	Percentage (%)
Mountainous Area	4,180,428	43.2
Hill	1,922,008	19.9
Valley	1,052,741	10.9
Footslope	776,633	8.0
Alluvial Plain	470,124	4.9
Fluvio-Marine Plain	341,000	3.5
Alluvial Fan	279,542	2.9
Lava Plateau	155,481	1.6
Diluvial Upland	94,077	1.0
Other	402,711	4.1
Total	9,674,745	100.0

Rural Development Administration (2015)

Changes of Paddy Soil Carbon Stock (1999–2007)

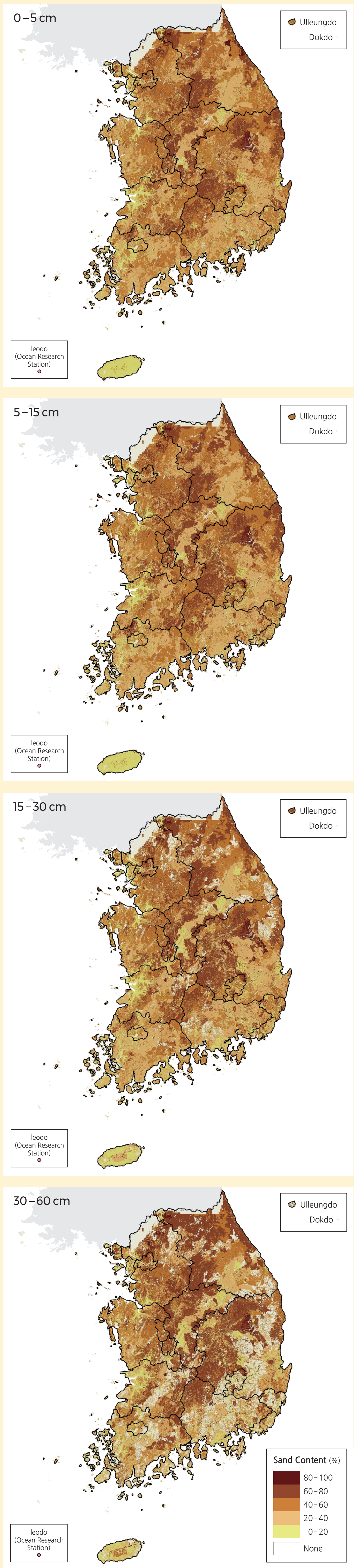


Organisms (animals, plants, and microorganisms) influence the soil-forming processes. Vegetation determines the amount of organic matter supplied to the soil. In grasslands, a lot of organic matter is generated from the decomposition of roots, so the soil becomes black, its moisture content increases, and its cation exchange capacity is improved. One of the most distinctive features of a forest ecosystem, the forest floor, develops from vegetation shed from the canopy and surrounding plant life. The type and content of inorganic components in natural vegetation also affect soil formation. Because conifers are low in alkaline minerals like calcium, magnesium, and potassium, the soil formed under coniferous forests is more acidic than under broad-leaved forests.

Animals change the soil by breaking down organic matter and mixing or moving the soil. In particular, earthworms develop and stabilize the soil's structure and improve the ventilation and drainage of the soil. Earthworm castings, high in nitrogen, phosphorous, and potassium, fertilize the soil. Microorganisms decompose organic matter, change the chemical form of various nutrients necessary for plants, and affect the growth of plants, which in turn affect the soil.

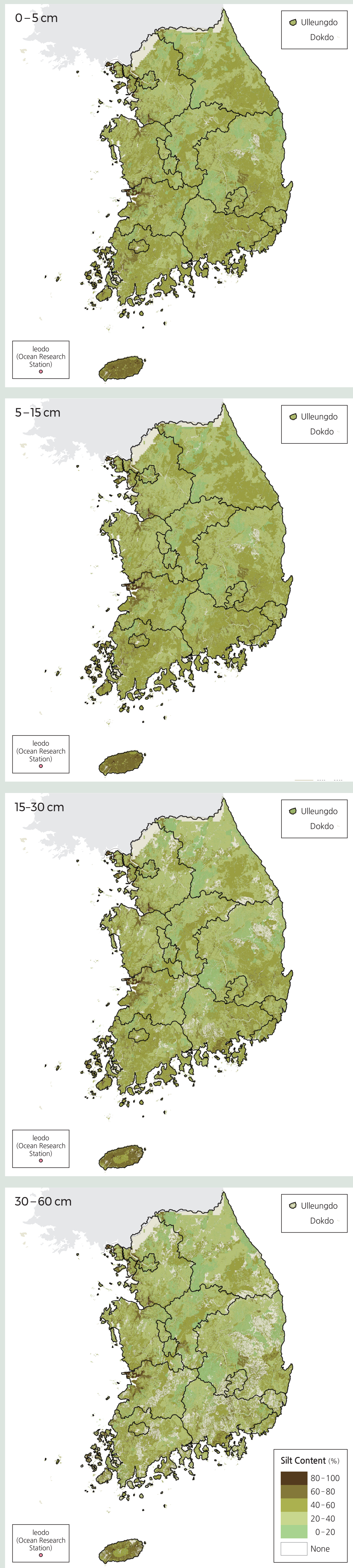
Soil Properties

Sand Content



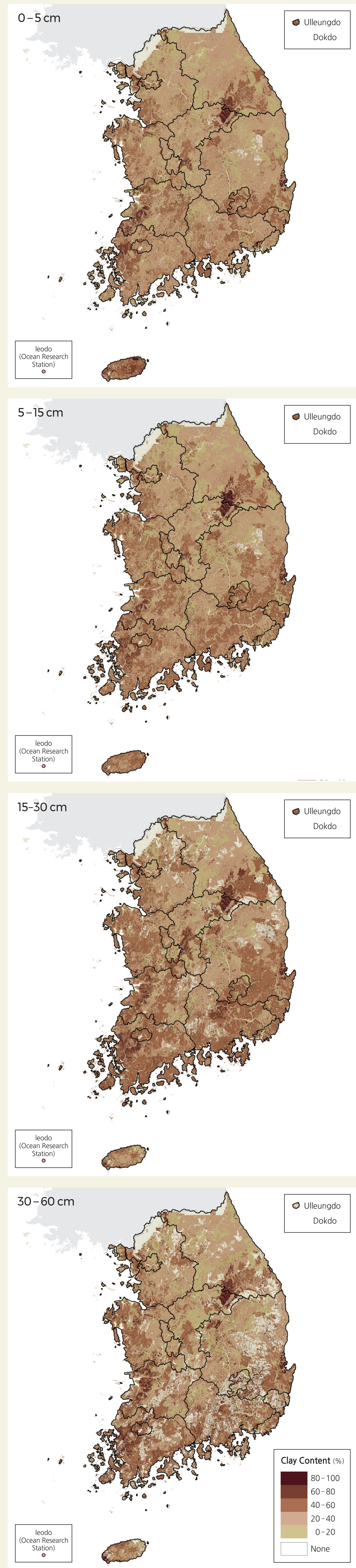
Rural Development Administration (2020)

Silt Content



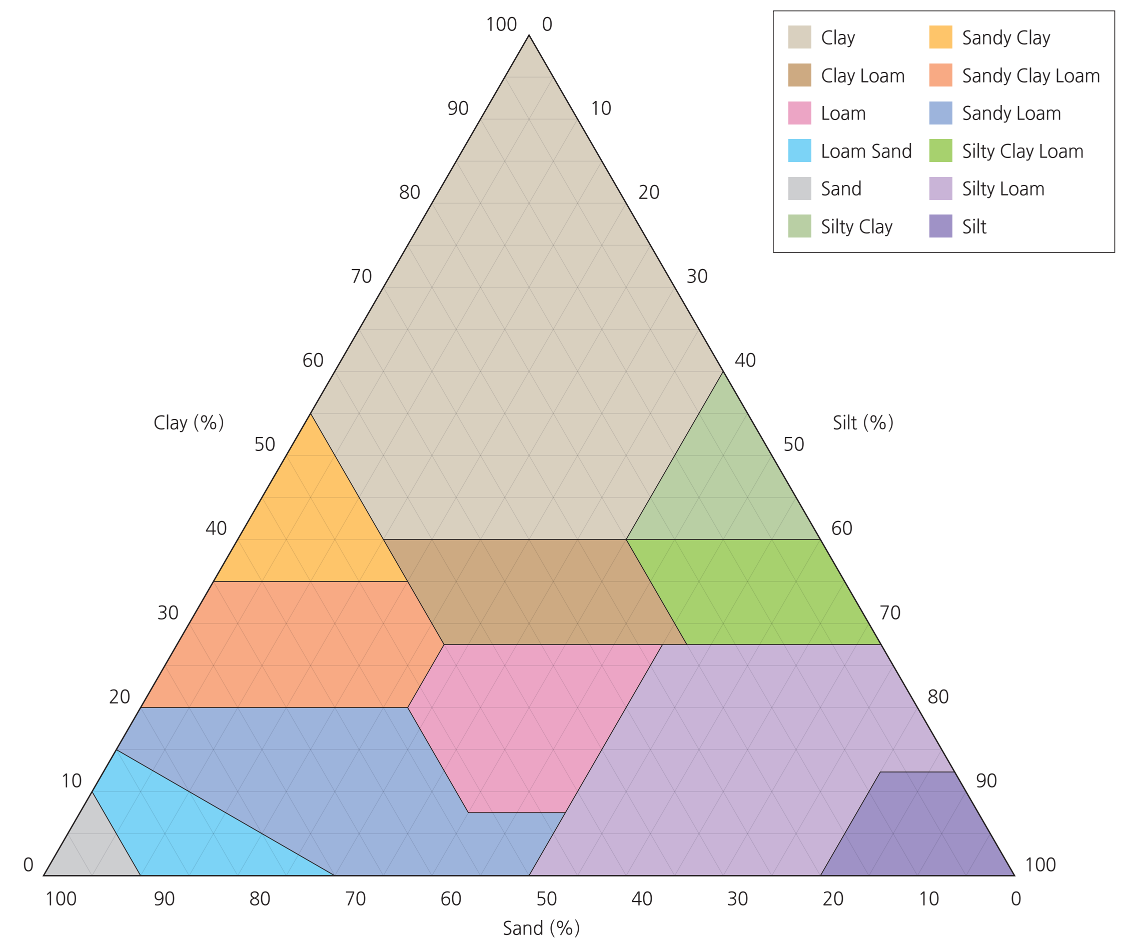
Rural Development Administration (2020)

Clay Content



Rural Development Administration (2020)

Soil Texture Groups



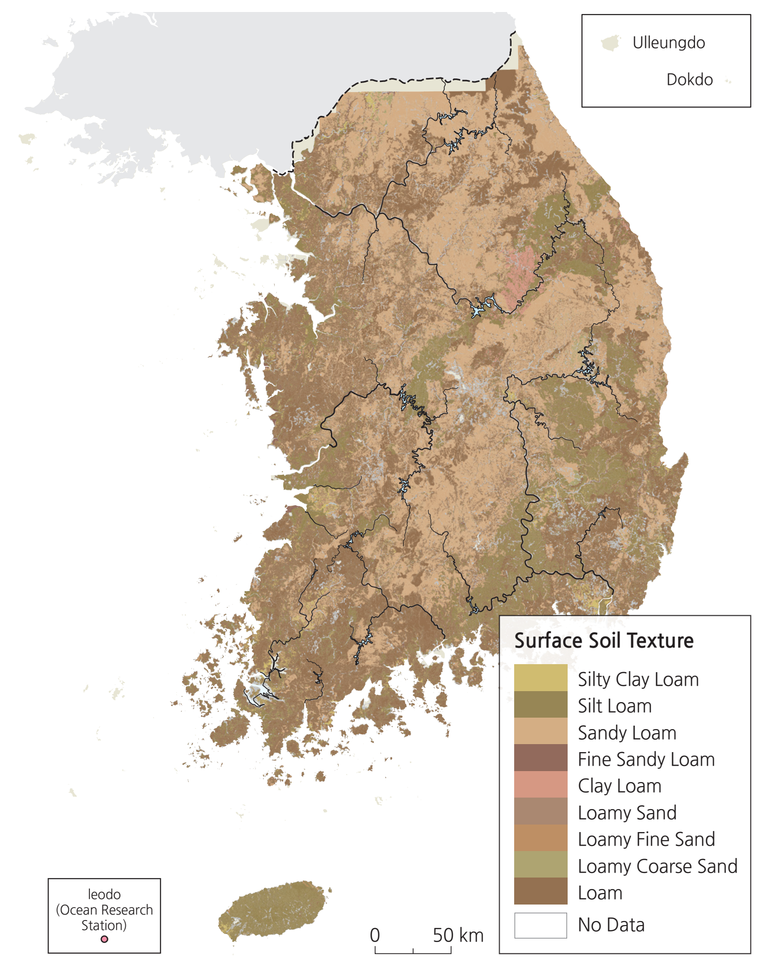
Rural Development Administration (2015)

Soil texture is determined by the relative proportion of three kinds of soil mineral particles: sand (0.05–2 mm), silt (0.002–0.05 mm), and clay (particles smaller than 0.002 mm). Soil texture is often considered to be one of the most important attributes that control the physical and chemical characteristics of the soil.

On average, the soil in the paddy/farm areas of Korea is composed of 41.7% sand, 41.5% silt, and 16.8% clay. Major soil textures are moderate coarse sandy loam (44.5%) and fine-textured clay-rich loam (34.1%), and these soils cover up to 78.6% of the total land area. Gravelly soils are also observed in 5.9% of the total area. Because Korean soils have high porosity and show good water drainage, the possible leaching of nutrients and organic matter may result in less productivity.

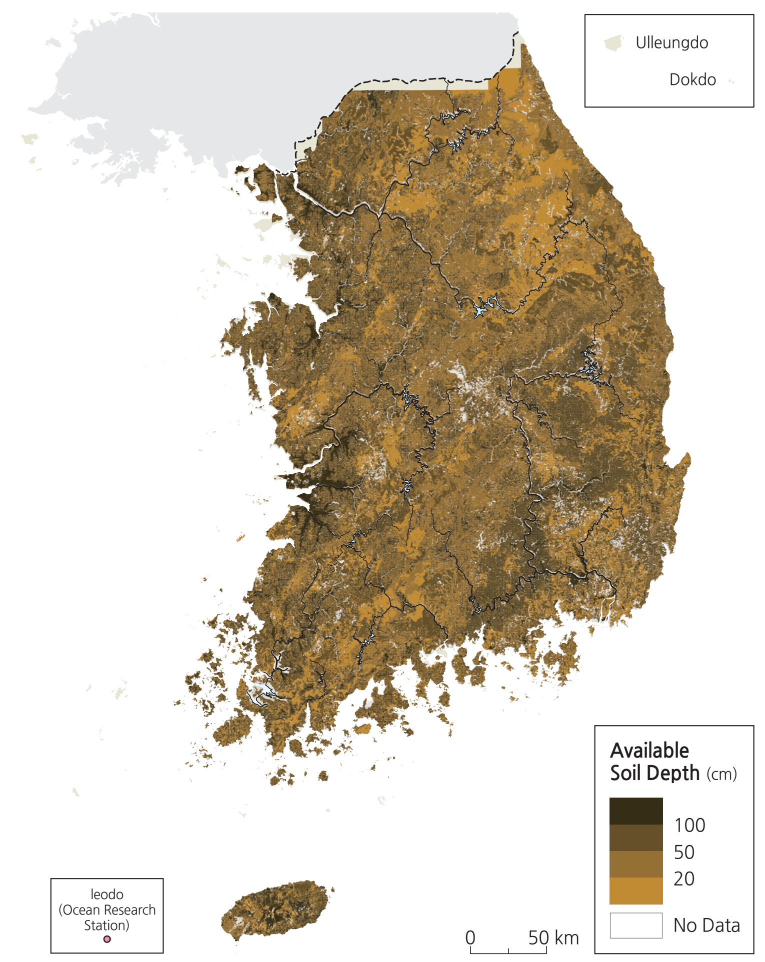
Paddies have the lowest percentage of sand in the soil, followed by farms and forests. Silt and clay content decrease in the same order. While paddy soils have higher silt content, farm and forest soils are sandier. Soils with higher sand content are distributed throughout the mountainous regions from southern Gyeonggi-do to Chungcheongnam-do and Chungcheongbuk-do. On the other hand, the amount of silt in the soil is high in coastal regions, the limestone areas of the Okcheon System from southern Gangwon-do to Jeollanam-do and Jeollabuk-do, and the sedimentary rock areas of the Gyeongsang System in Gyeongsangnam-do and Gyeongsangbuk-do.

Surface Soil Texture



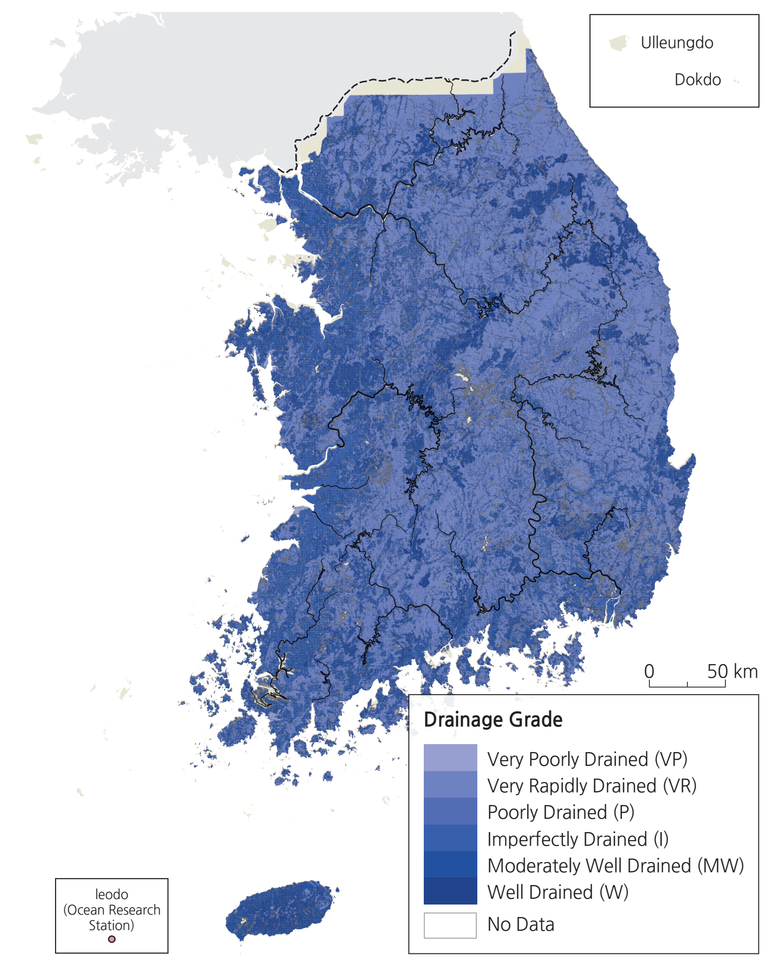
Rural Development Administration (2015)

Available Soil Depth



Rural Development Administration (2015)

Soil Drainage



Rural Development Administration (2015)

Proportion of Soil Texture Group

Texture	Area (ha)	Proportion (%)
Coarse Loamy	4,287,812	44.5
Fine Loamy	3,284,051	34.1
Gravelly	568,358	5.9
Fine Silty	462,448	4.8
Clay	398,397	4.1
Gravelly Sandy	373,075	3.9
Coarse Silty	213,243	2.2
Sand	51,814	0.5
Total	9,639,198	100.0

Rural Development Administration (2015)

Proportion of Available Soil Depth

Effective Soil Depth	Area (ha)	Ratio (%)
Very Shallow (20 cm or Below)	1,833,112	19.0
Shallow (20–50 cm)	2,067,736	21.5
Moderately Deep (50–100 cm)	4,003,722	41.5
Deep (> 100 cm)	1,734,624	18.0
Total	9,639,194	100.0

Rural Development Administration (2015)

Proportion of Soil Drainage Grade

Drainage Grade	Area (ha)	Ratio (%)
Excessively Drained (EX)	4,409,384	44.7
Well Drained (W)	3,137,992	31.9
Moderately Well Drained (MW)	744,276	7.6
Somewhat Poorly Drained (SP)	802,046	8.2
Poorly Drained (P)	86,326	0.9
Very Poorly Drained (VP)	174,134	1.8
Other	485,886	4.9
Total	9,840,044	100.0

Rural Development Administration (2015)

Available soil depth represents the depth of soil horizons. Available soil depth is the depth of soil that meets the conditions necessary for plants to grow. Areas with deep soil are often found in areas with well-weathered bedrock or areas where sediments are deposited. In contrast, areas with shallow soil represent poor soil formation or soil removal by erosion. It is recommended that available soil depth be at least 50 cm to be used as rice paddies or farmlands.

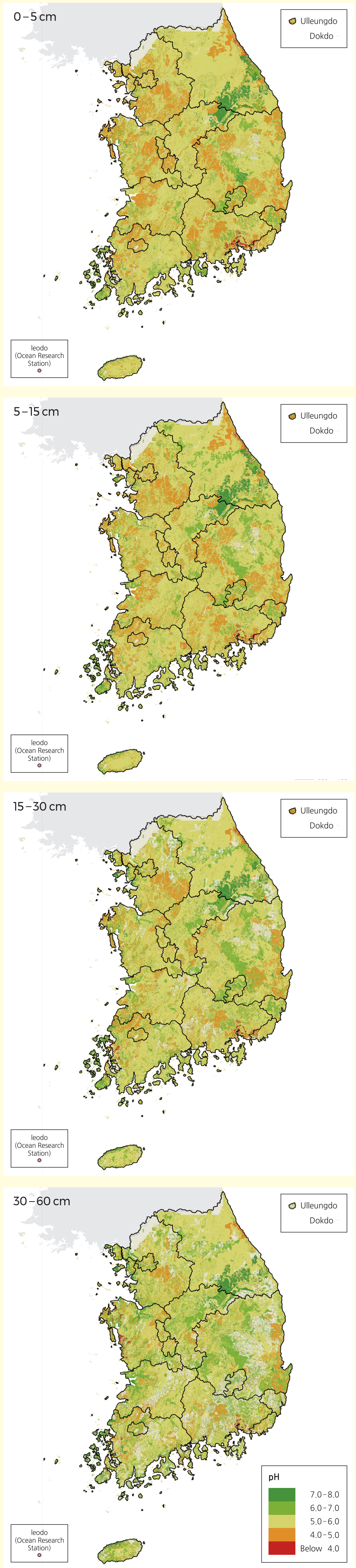
Available soil depth is divided into four levels: very shallow (< 20 cm), shallow (20–50 cm), moderately deep (50–100 cm), and deep (> 100 cm). In South Korea, soils with moderately deep soil depth constitute the largest area at 41.5%, followed by shallow (21.5%), very shallow (19.0%), and deep (18.0%).

Soil drainage grades indicate the type of drainage found within a soil profile and are determined by factors such as the amount of runoff, permeability, and groundwater level. Drainage classes are defined as follows: excessively drained (EX), well-drained (W), moderately well-drained (MW), somewhat poorly drained (SP), poorly drained (P), and very poorly drained (VP). Most farm field soils are classified as W, while soils in two-crop farming paddies, semi ill-drained paddy fields, and poorly drained paddies are classified as MW, SP, and P and VP, respectively. Lithosols of steep slopes and sandy-gravelly soils of riverbanks are excessively drained.

Excessively drained soils comprise 44.7% (4,409,384 ha) of the total area, and well-drained soils make up 31.9% (3,137,992 ha) of the total area. The combined area of these two classes constitutes 76.7% of the total area. Most of the soil in Korea is well-drained soil.

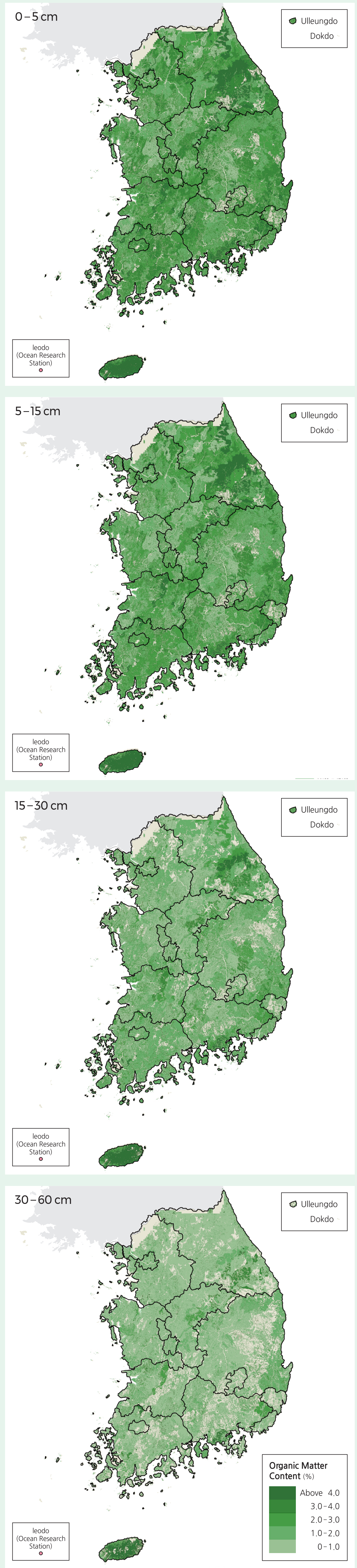
The percentages of the total area that other drainage classes hold are as follows: MW, which could be used for both paddy and farm field soils (7.6%); SP, mostly paddy soils (8.2%); P (0.9%); and VP (1.8%). These last three classes cover 10.9% of total soils.

pH Value of Soil



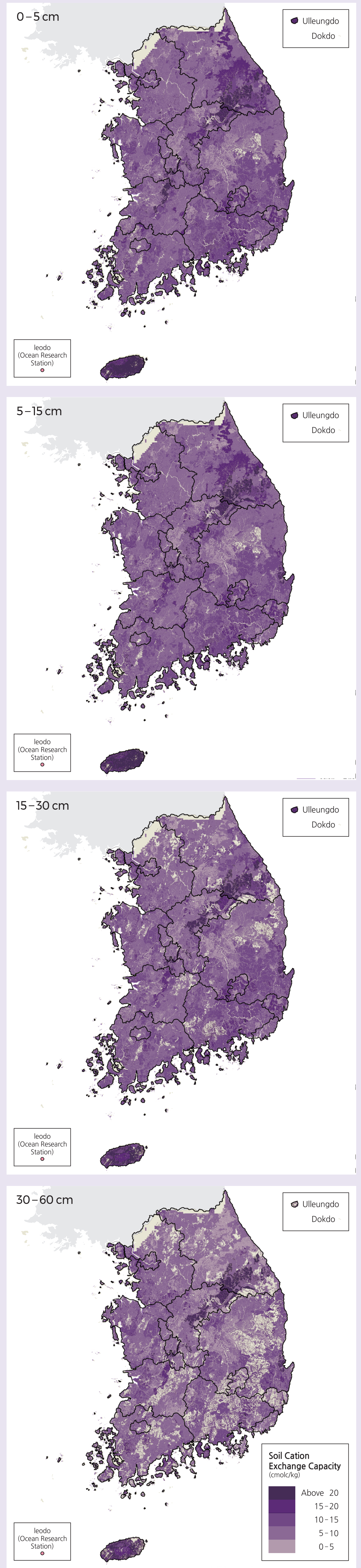
Rural Development Administration (2020)

Organic Matter Content in Soil



Rural Development Administration (2020)

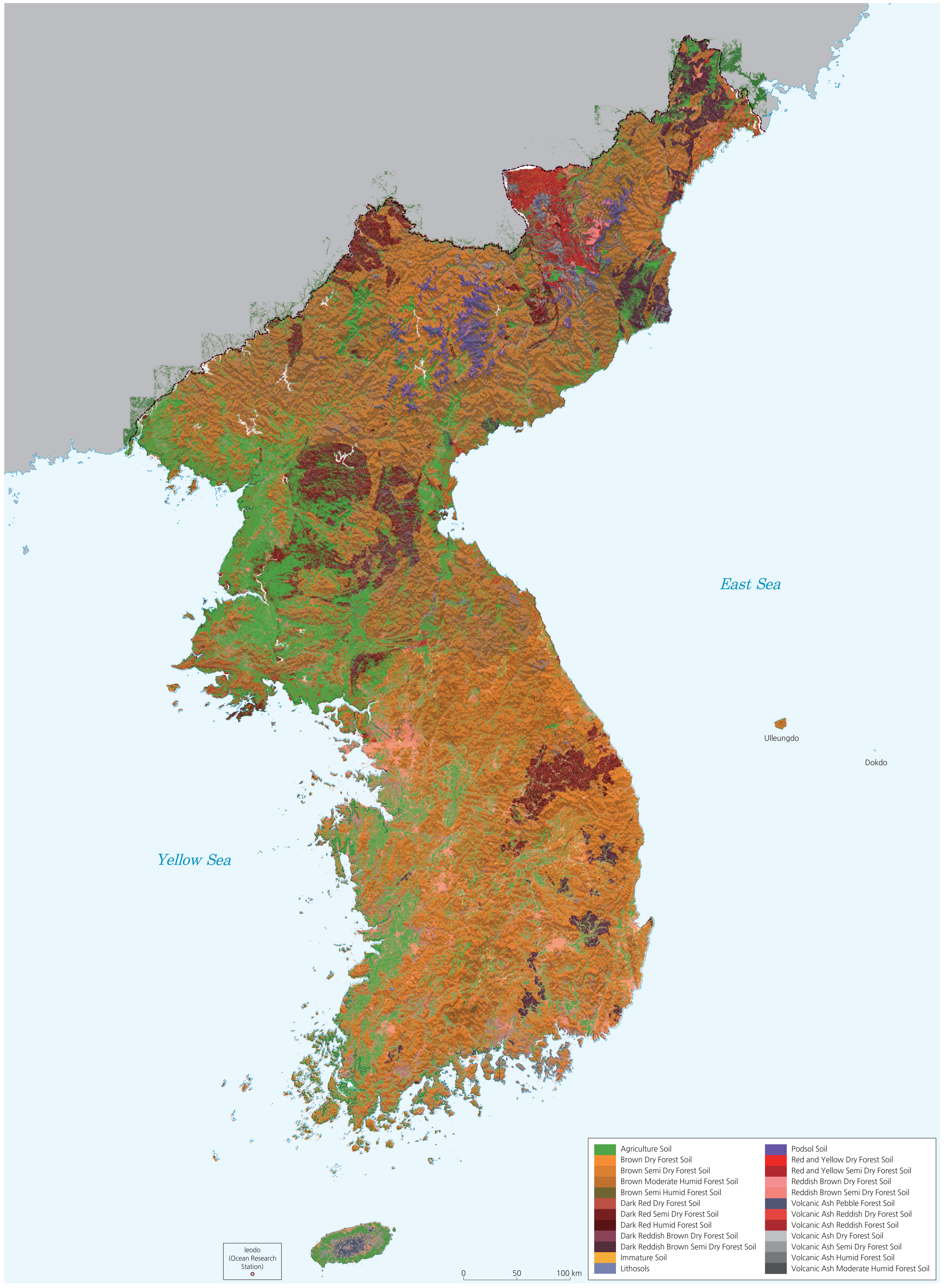
Soil Cation Exchange Capacity



Rural Development Administration (2020)

Forest Soil

Forest Soil Map



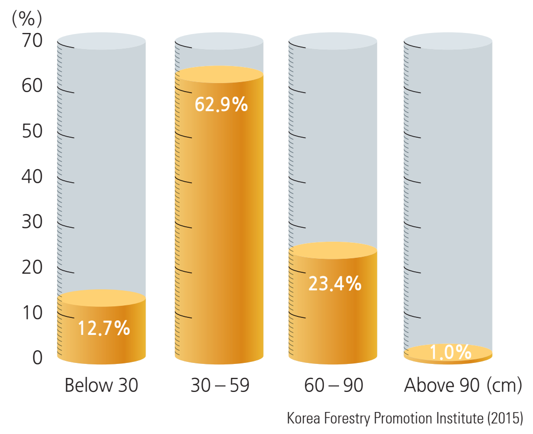
Korea Forestry Promotion Institute (2015), The Korean Geographical Society (2018)

Characteristics of Forest Soil

Forest Soil Depth

Korea Forestry Promotion Institute (2015)

Proportion of Forest Soil Depth

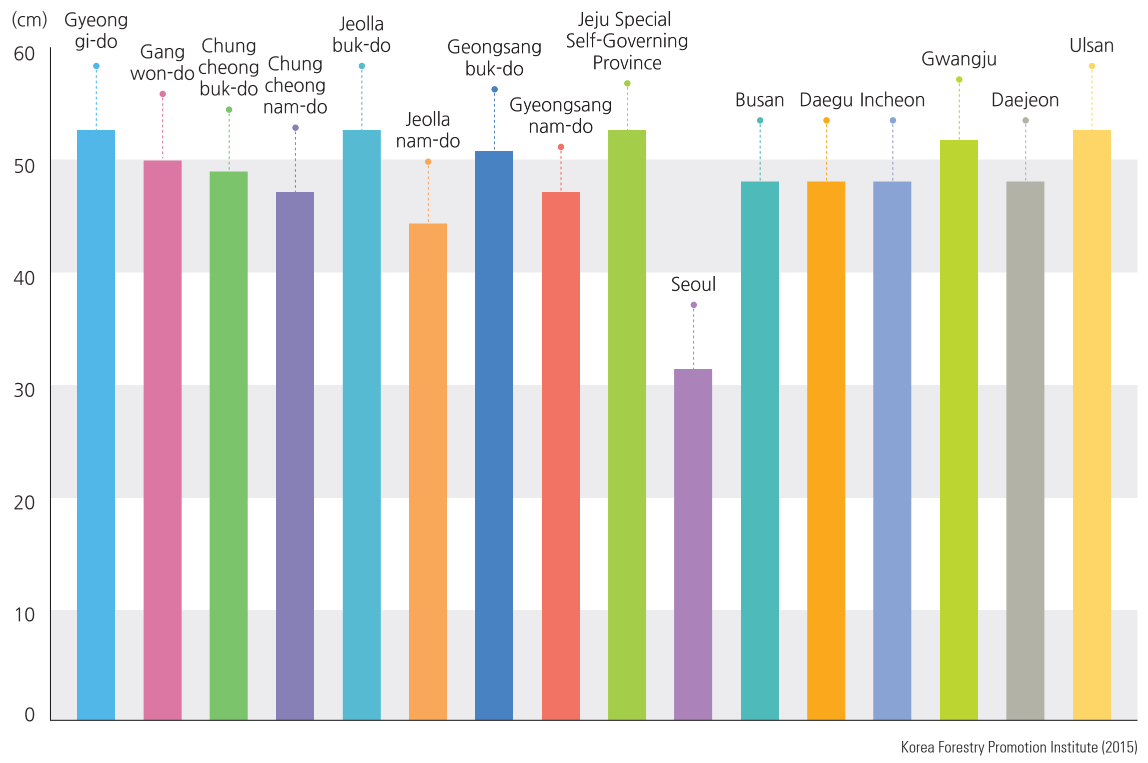


Korea Forestry Promotion Institute (2015)

The depth of forest soil is affected by various soil-forming factors, including climate, topography, organisms, parent material, and anthropogenic disturbance. In the case of forest soil in Korea, topographic and anthropogenic factors account for most forest soil depth characteristics. Along with the fact that 51% of Korea has mountain areas steeper than 20°, the exploitation of forest resources during the Japanese Colonial Period and the Korean War caused severe topsoil loss. Throughout the 1970s and 1980s, a series of nationwide afforestation projects stabilized most of the devastated forest areas. However, soil development processes have yet to achieve full maturity.

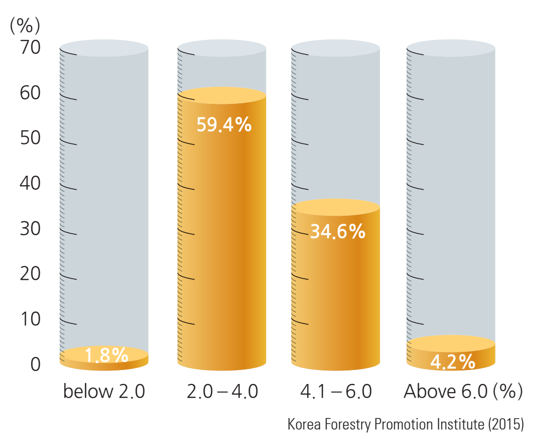
The average soil depth of Korean forests is 51 cm, which is considered to be quite shallow. Furthermore, 76% of forest soils have a depth of less than 60 cm, indicating that productivity is low. Recently, forest soil management has become more important as social demands for sustainable forest resources (timber, raw material, other) continue to grow.

Forest Soil Depth by Province



Korea Forestry Promotion Institute (2015)

Proportion of Organic Matter Content in Forest Soil

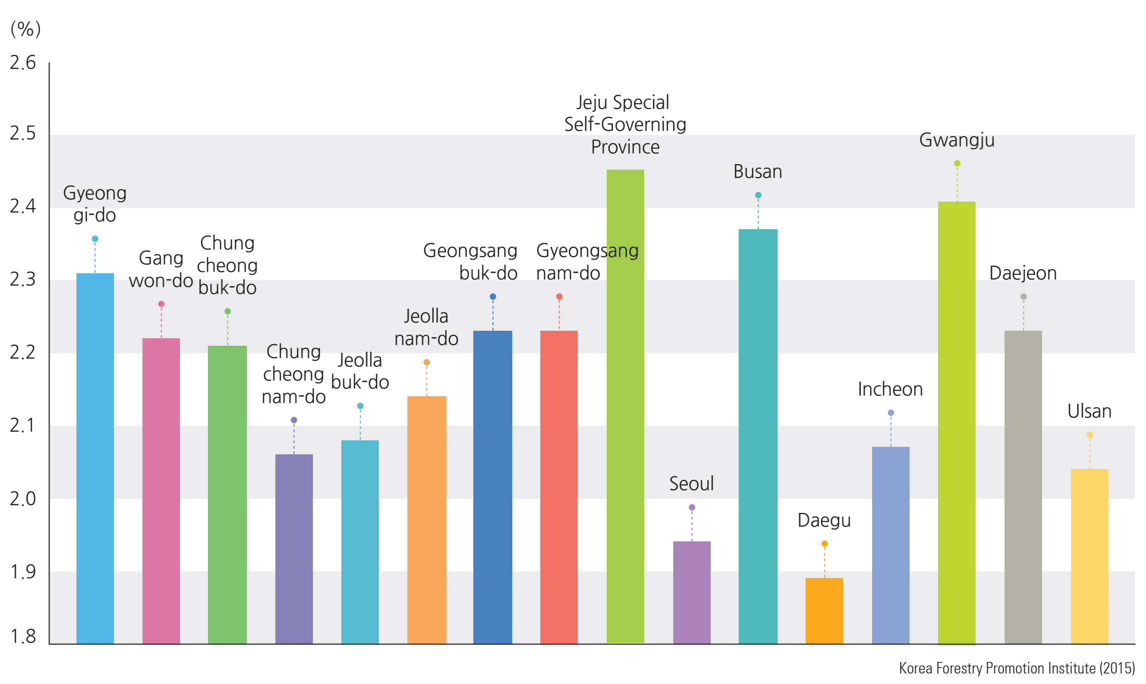


Korea Forestry Promotion Institute (2015)

In general, organic matter in forest soil is approximately twice that is found in ordinary farm field soils. The leaves and branches that fall from trees decompose on the ground surface and enrich the soil as humus. The resulting mixture of organic material within the soil increases the capacity for water and nutrient storage and also alters the degree of potential yield.

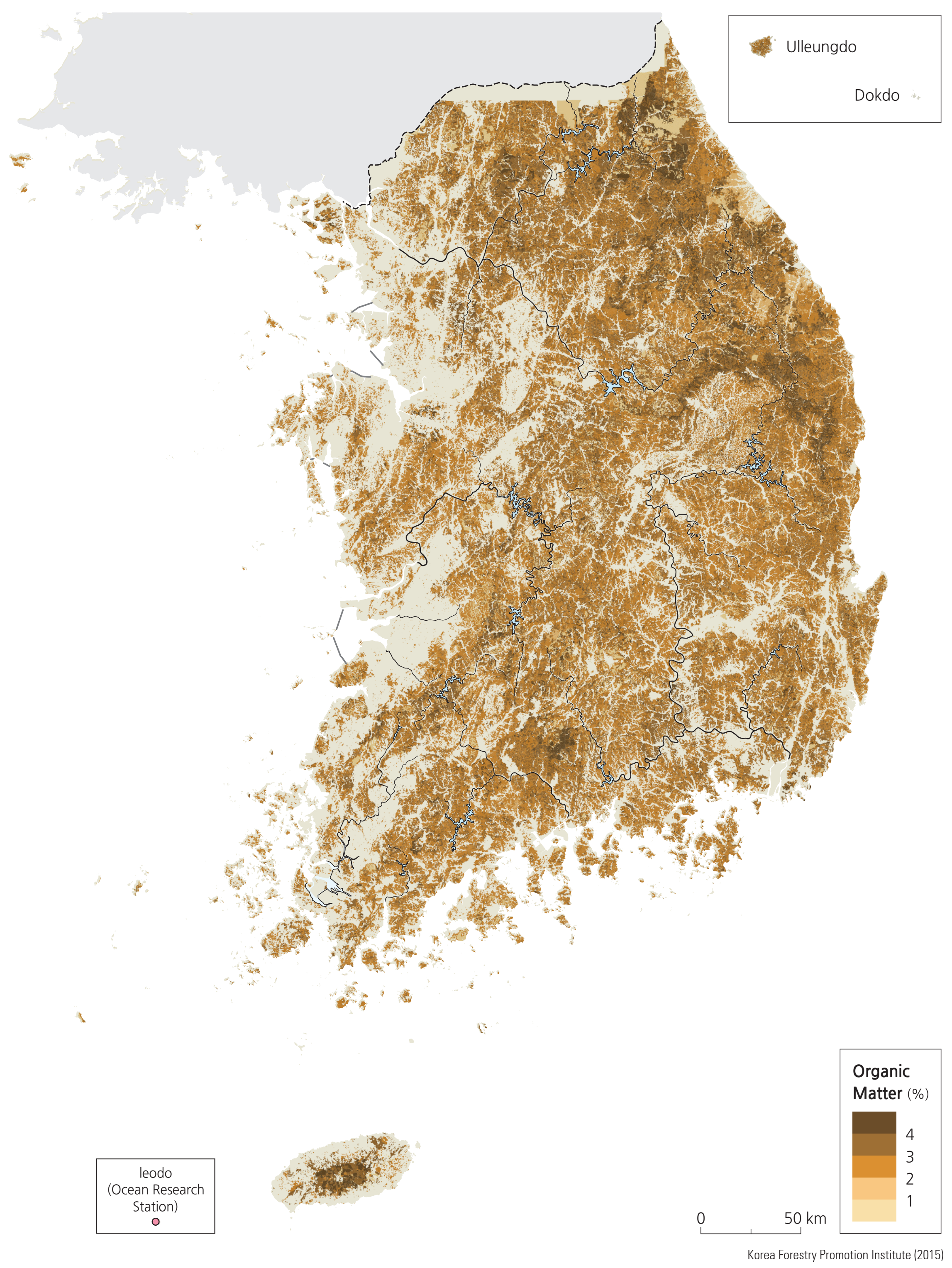
Forests with an organic matter content of 2.0–4.0% account for 59% of the forest area, while soils with 4.1–6.0% organic matter account for 35% of the total forest. The average soil depth of the forests is 51 cm. The productivity of these forests is poor since 76% of the total forest has a depth of less than 60 cm. Nevertheless, forest soil management has become important with increasing social demands for timber and short-term income forest products. If classified by tree species, organic matter content is 3.6% in coniferous forests dominated by pines and 6.1% in broadleaf forests with mainly oak trees. This difference is due to the litter-fall decomposition rates between tree species, which determine the amount of organic matter in forest soil.

Organic Matter Content in Forest Soil by Province



Korea Forestry Promotion Institute (2015)

Organic Matter Content in Forest Soil



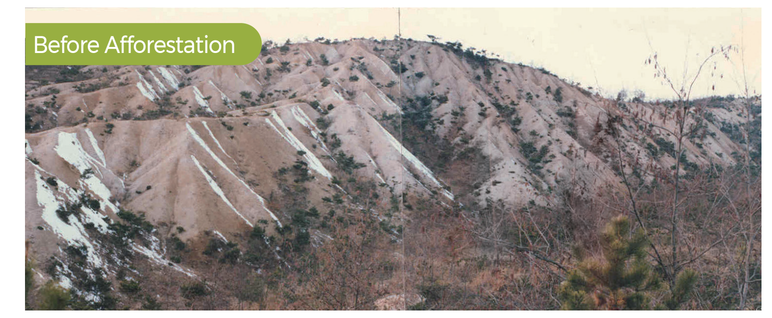
Korea Forestry Promotion Institute (2015)

Overcoming Forest Soil Degradation

Major Afforestation Areas

Korea Forest Service (2006)

Example of Afforestation on Devastated Forest Land



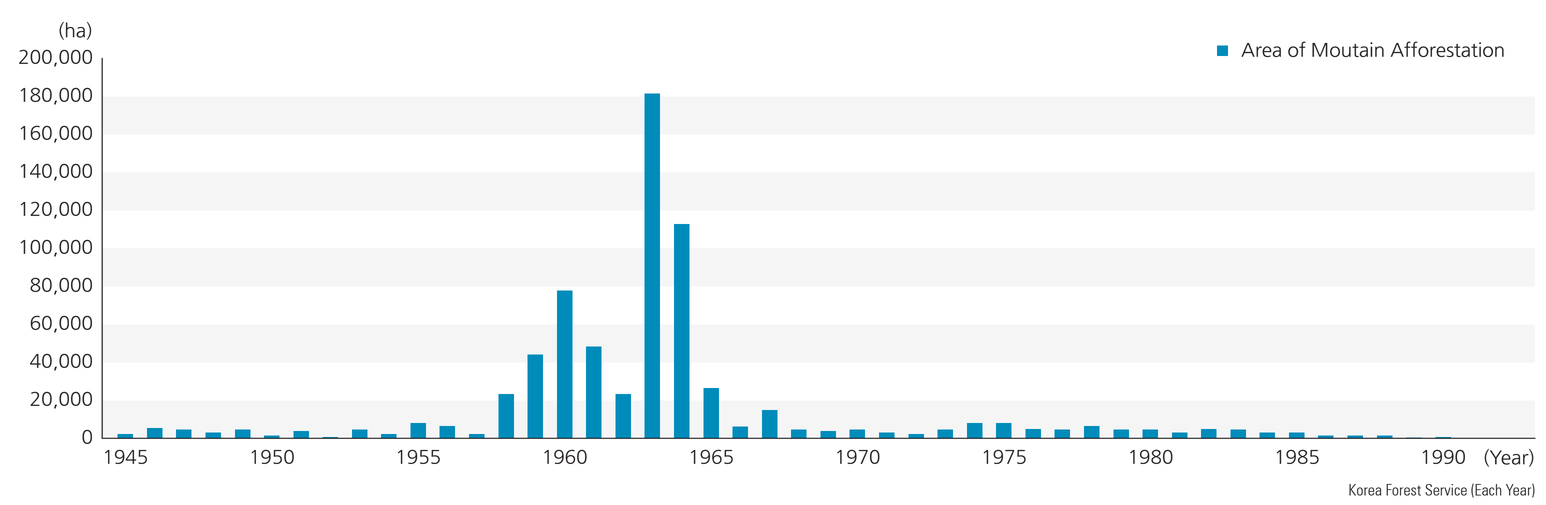
Normalized Difference Vegetation Index (NDVI)

MODIS (2009 - 2010)

Forest Devastation in North Korea

In contrast to South Korea's great success in the afforestation and restoration of its forest areas, most of North Korea's mountain areas still remain devastated. Satellite images clearly show the immense difference of vegetation that cover the two Koreas.

Mountain Afforestation Results by Year



Korea Forest Service (Each Year)

Korea is known for its success in combating land devastation. Long years of slash-and-burn farming and firewood logging left many parts of its territory devastated at the end of the Joseon dynasty. A forestation project to restore the forest was planned and completed for deteriorated forests around Changuimun Gate in 1907, which is now considered the first modern erosion control project in Korea. Some major land erosion control projects conducted during the Japanese Colonial Period include reforestation for watershed conservation, poverty relief, and aid for flood victims. These projects were generally carried out in response to frequent natural disasters and relief for the poor. However, during the last few years of the Japanese Colonial Period and the Korean War, forest exploitation and deforestation for war material accelerated throughout the country. Devastation reached its peak in 1956, with around 0.68 million ha, or 10% of South Korean forests, destroyed and in need of restoration.

Forest restoration and erosion control projects from the late 1950s to early 1980s prioritized the recovery of a devastated land. However, before the establishment of the Korea Forest Service in 1967, many restoration areas failed to meet their objectives as they were not able to build a fundamental vegetation base. Soon after the declaration of the Erosion Control Law (1962), a large area (0.18 million ha) was restored within a single year in 1963. Numerous projects for erosion control followed suit, including Youngil District Special Restoration (1973–1977), First National Decade Plan for Forestation (1973–1978), and the Second National Decade Plan for Forestation (1979–1987). Restorations for such large-scale devastations were completed around 1983.

There are four reasons for Korea's success with afforestation. First, it was the late President Park Chung-Hee's leadership and persistence regarding green projects. Second, the strong social response from people who participated in tree planting and poverty relief activities supported the success of the afforestation projects. Third, the Korea Forest Service, established in 1967, played a critical role in organizing systems and regulations for forestry and planning restoration projects. Lastly, as most of the projects were systemized under the direct control of the government, officials took responsibility and worked hands-on to yield the best results. Officials took direct responsibility for running operations in restoration fields.

Forest Denudation of North Korea

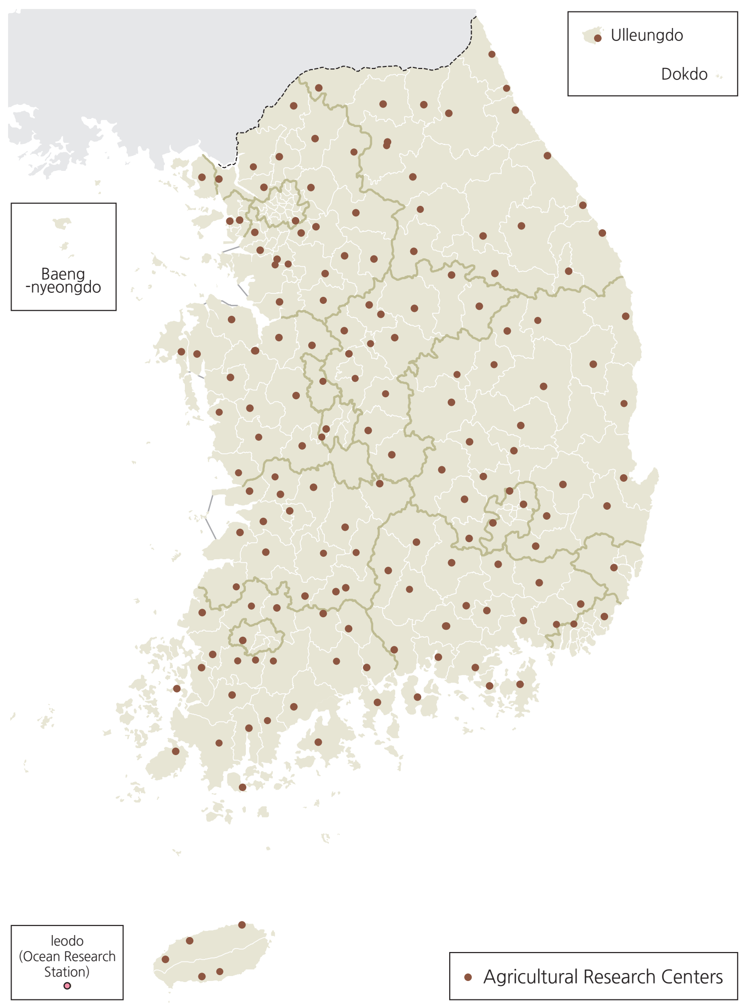
Soil Erosion

Sandy soils make up the majority of soils in Korea due to the large distribution of granite and granite gneiss. Most Korean soils are coarse, clastic soils that result from topographic and climate factors such as the large proportion of mountainous areas, seasonal temperature changes, concentrated precipitation in summer, and freezing in winter. These factors cause soils to have low pH values, low organic content, rapid nutrient leaching, and low possible yield.

One of Korea's main soil management issues is erosion. Currently, the annual net loss of soil is estimated to be more than 50 million tons, with the most damage occurring on cultivated lands. Total loss of soil from farm fields is estimated to be 37.7 tons/ha on average, while it is 3.5 tons/ha in forests and under 0.3 ton/ha in paddy fields. Ultimately, as much as 27 million tons of soil are lost over a mere 10% of cultivated land. The loss is severe, particularly in the mountainous areas of Gangwon-do, Yeongnam, and Honam, and regions of high precipitation such as Namhae-gun, Geoje-si, and Goseong-gun. The recent expansion of highland farming is another reason for rapid soil loss. Eroded soil from these farms eventually flows into nearby rivers, causing a destructive effect on the river and riparian ecosystem.

To prevent further worsening of the situation, Korea has been establishing agricultural technology centers in every province to assist with active soil management. Some major functions performed by these centers are as follows: developing and disseminating new crop breeds, educating people on proper crop selection and cultivation, and evaluating and treating for certain soils to enhance productivity.

Distribution of Agricultural Research and Extension Service Centers



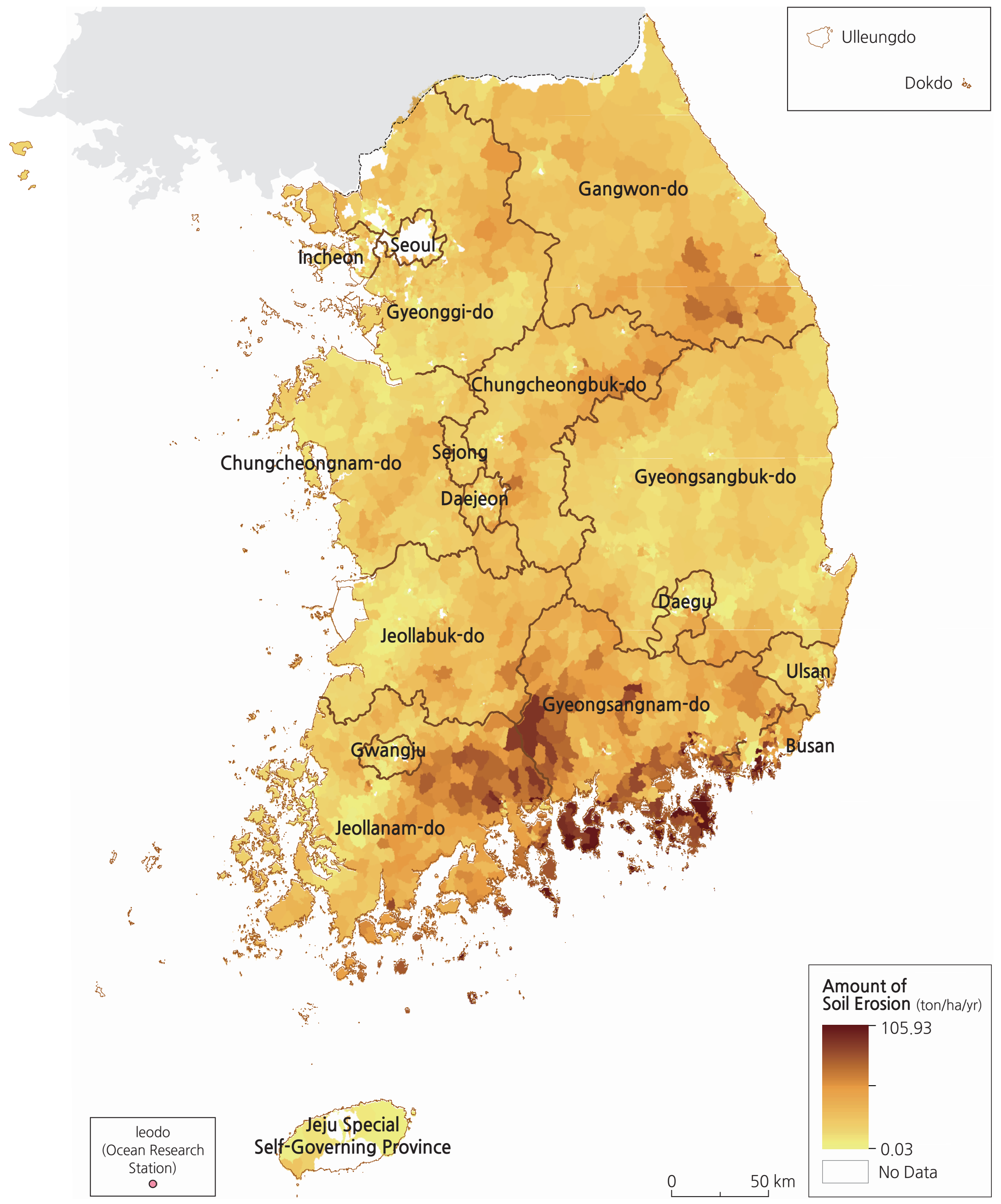
Rural Development Administration (2015)

Highland Farming and Risk of Soil Erosion

Cultivation on Steep Slope (Gangneung, Gangwon-do)

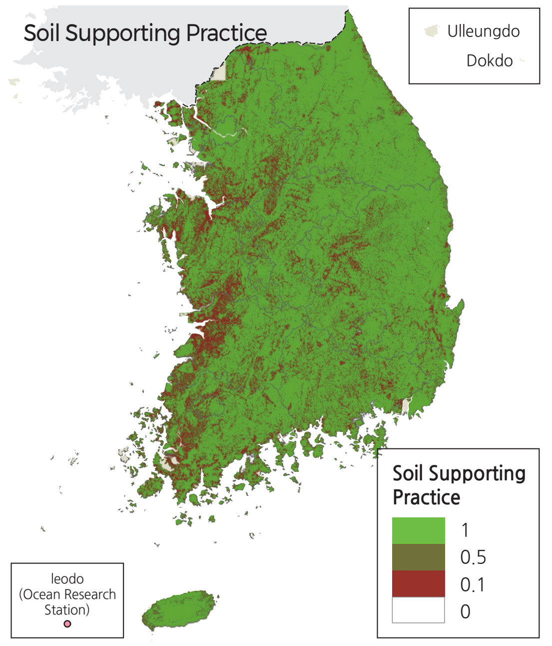
Landform Change for Highland Farming (Pyeongchang, Gangwon-do)

Risk of Soil Erosion (Farm Soils)

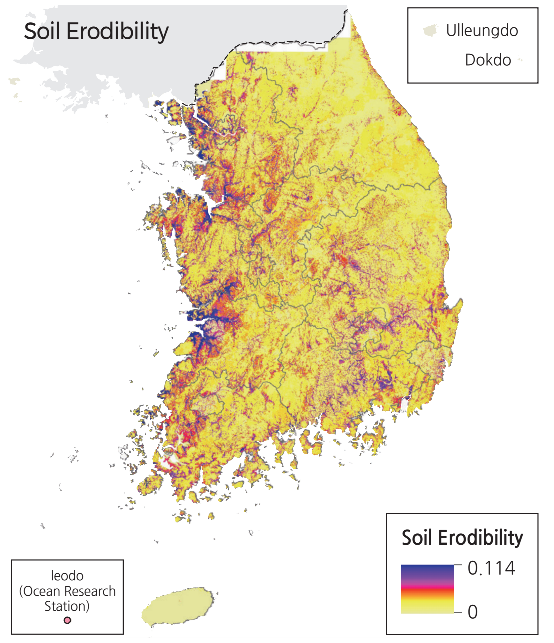


Rural Development Administration (2020)

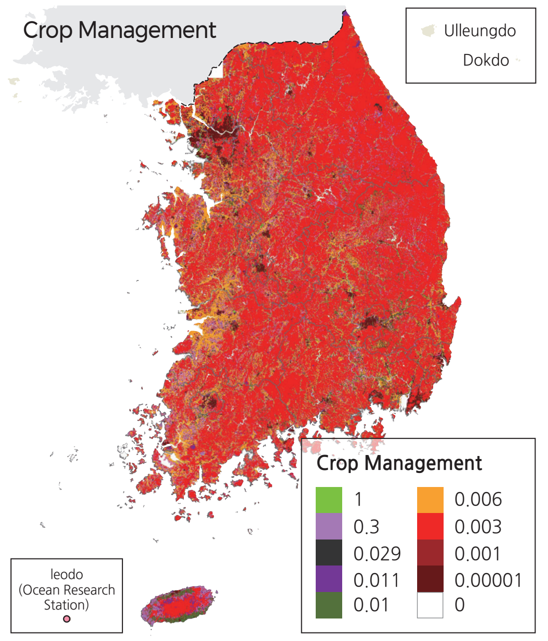
Factors for Soil Erosion



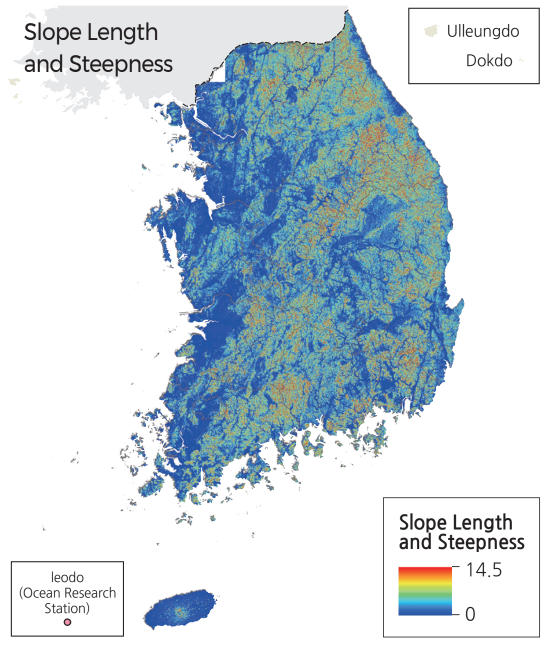
Rural Development Administration (2020)



Rural Development Administration (2020)

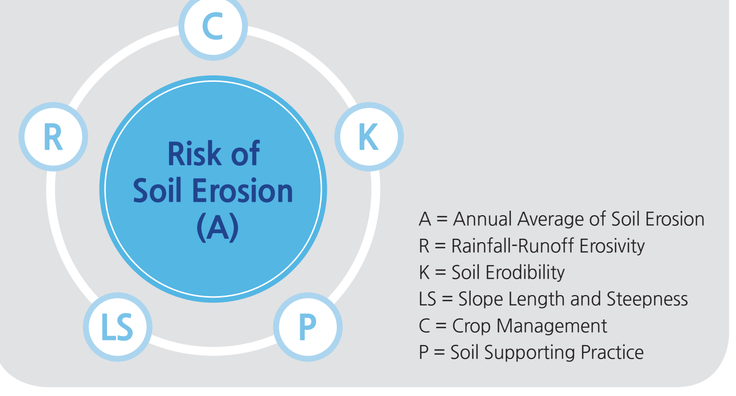


Rural Development Administration (2020)



Rural Development Administration (2020)

Risk Factors for Soil Erosion

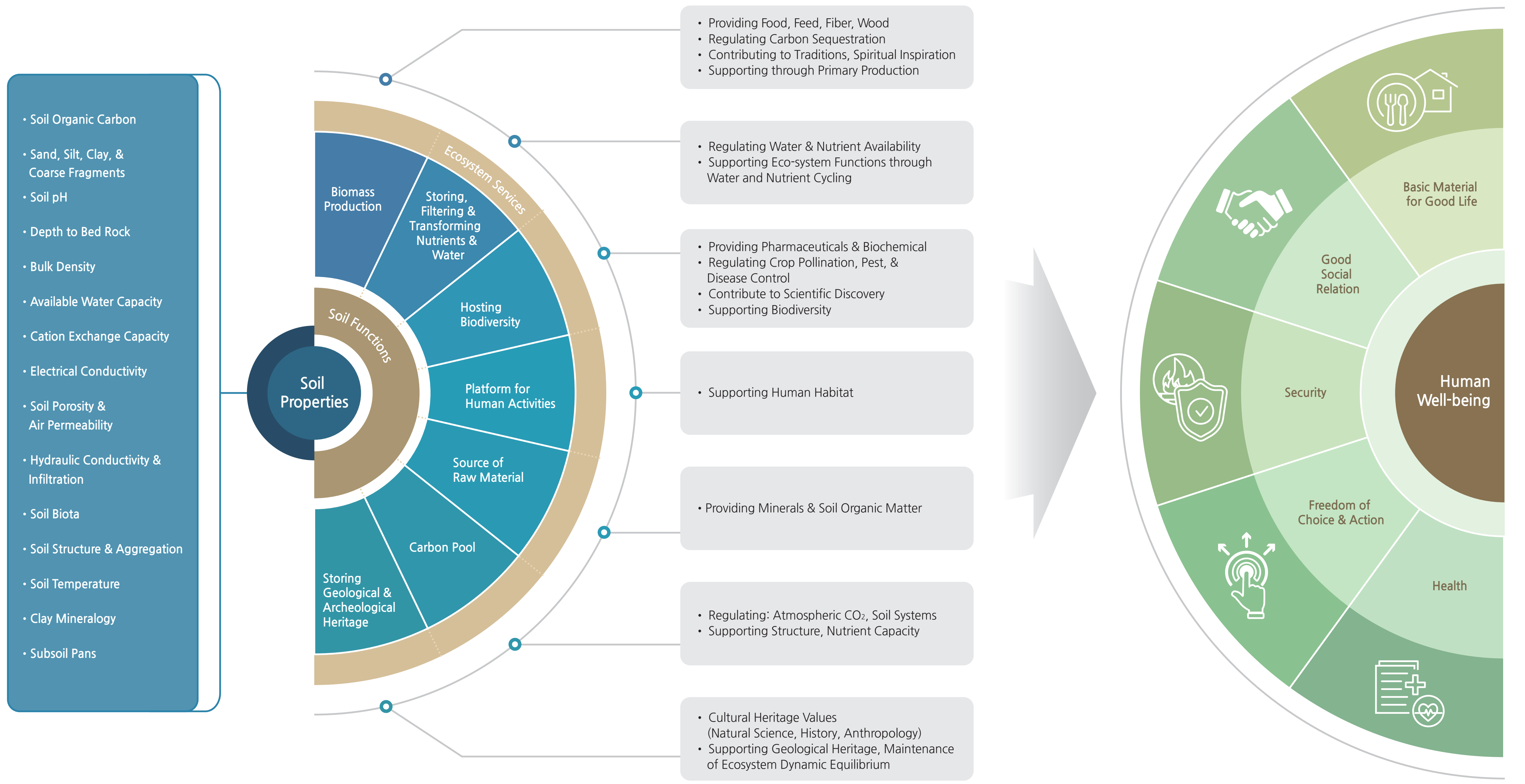


The majority of soil erosion in Korea can be identified as surface runoff erosion, while wind erosion occurs locally in coastal areas, islands, and high mountains. Soil erosion is produced by surface runoff generated by rainfall, and its rate depends on the following five variables: rainfall-runoff erosivity (R), soil erodibility (K), slope length and steepness (LS), crop-management (C), and soil supporting practice (P).

Land use in Korea can be divided into four main categories: forest, paddy field, farmland, and developed land. Soil loss associated with paddy fields is expected to be less than loss associated with other types of land use since the area is covered with water during the heavy rainy season in the summer, and its ridges act as barriers preventing runoff. Even on slopes, a staircase-formed paddy terrace has little chance of erosion. Forests and grasslands also have low erosion rates due to the vegetation on the surface. On the other hand, there is a risk of intensive soil erosion in farmlands, as these areas are mainly located on slopes and are exposed or bare during the fallow season. The risk of erosion due to rainfall and runoff is high in the part of south/west coastal areas like Goseong-gun. The risk of erosion due to slope length and steepness is high in the mountainous areas of Gangwon-do like Pyongchang. Soil erodibility is higher in the southwest plains than in the mountain areas in the eastern part of the country because light soil particles are carried by rainwater flow.

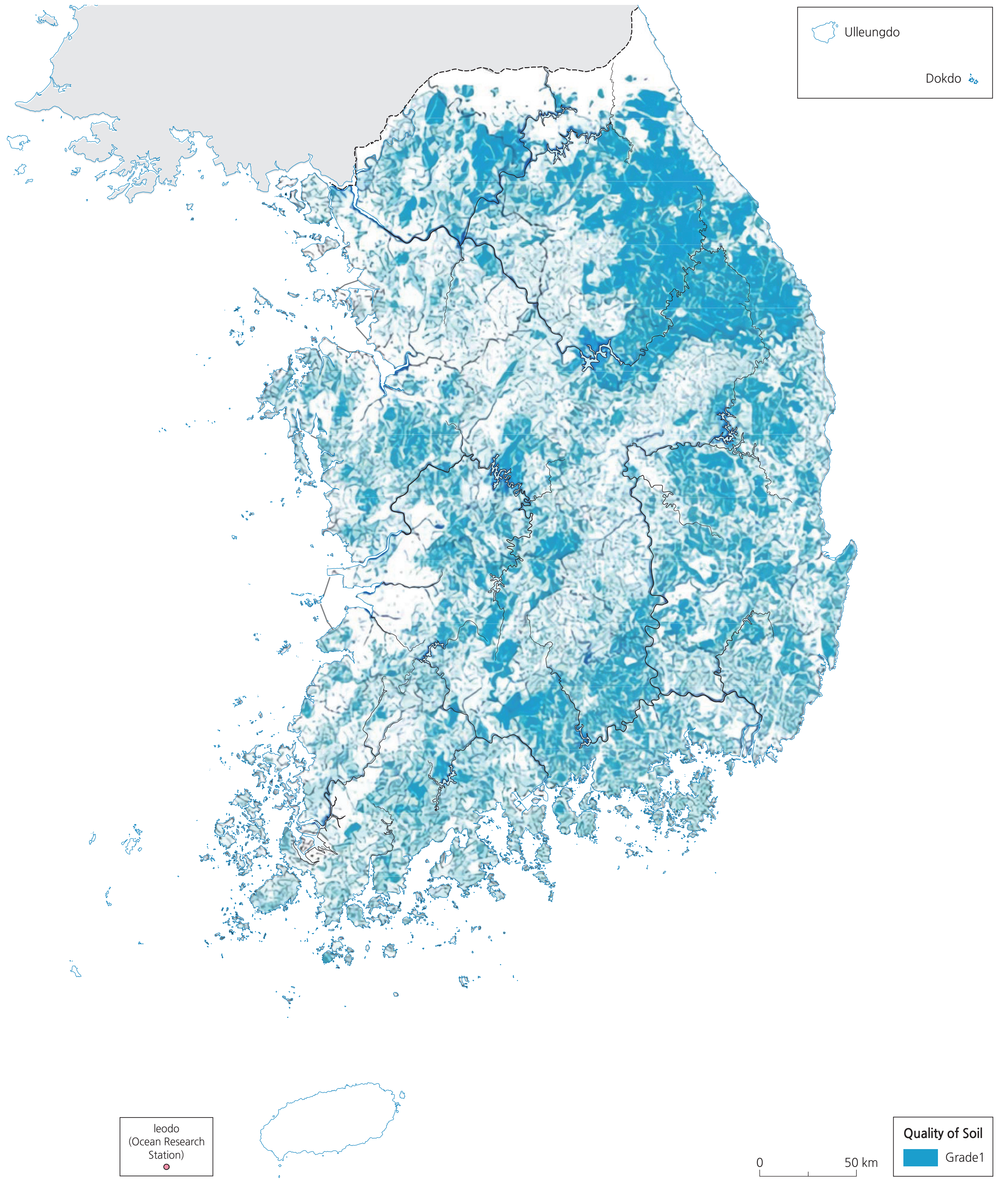
Soil Ecosystem Services

Soil Ecosystem Service



Geoderma (2016)

Soil Quality



Rural Development Administration (2020)

Valuation of Soil Ecosystem Services

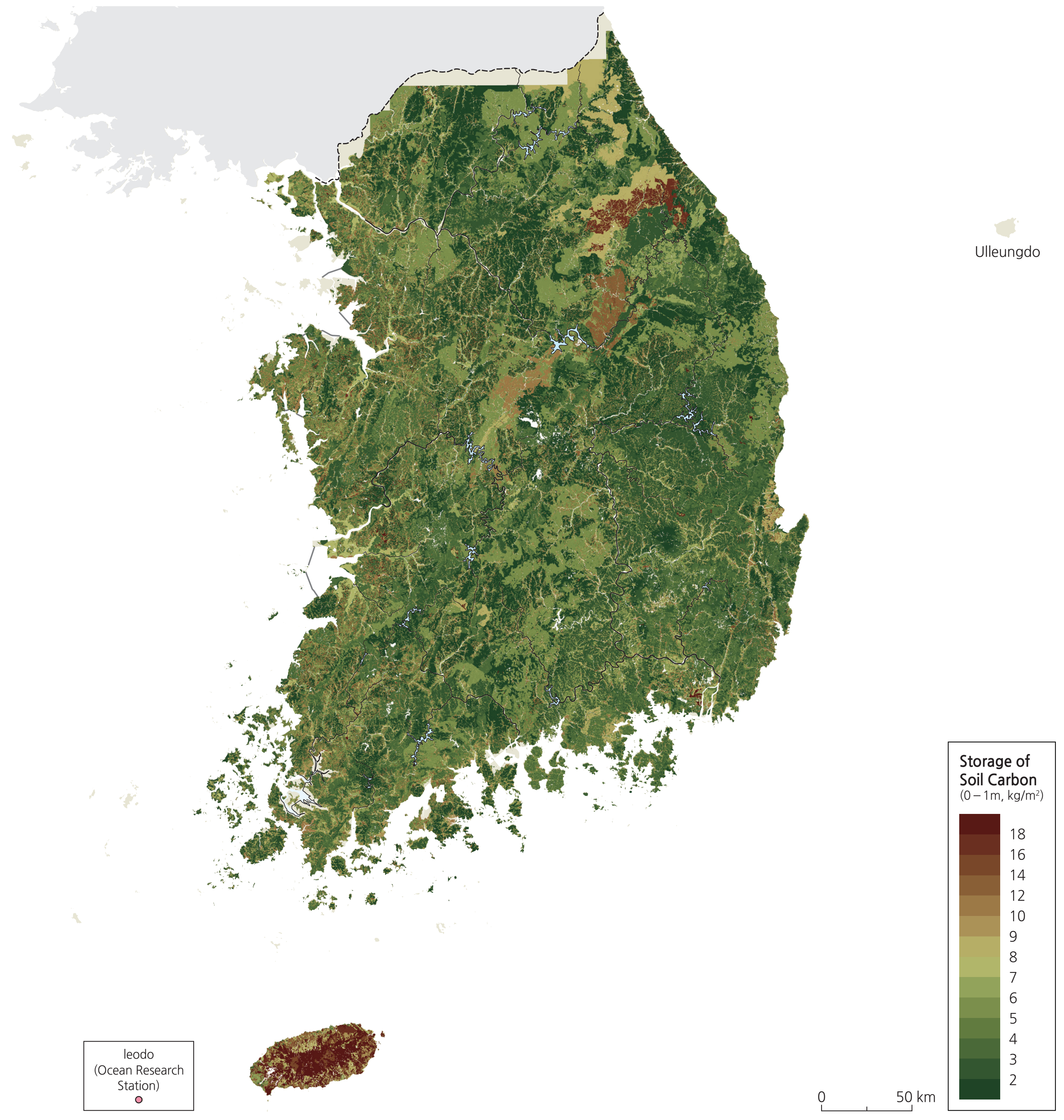
Topsoil Function	Economic Evaluation Method	Valuation Amount (100 Million Won)
Biomass Production	Market Method	157,335
Nutrient Content	Market Method	11,224,000
Water Content	Replacement Cost Method	229,616
Carbon Storage	Replacement Cost Method	184,608
Pollutant Purification	Replacement Cost Method	81,525
Providing Biodiversity	Willing to Pay	24,249
Total		11,901,333

Rural Development Administration (2020)

Soil is an important natural medium for supporting plant growth and crop production. Recent changes in global climate are placing greater emphasis on soil's role as a surface medium connected to water, atmosphere, and terrestrial vegetation. Hence, to respond to increasing societal demands for detailed knowledge regarding soils, there is a need to better understand the spatial distribution of and temporal changes in soils and their nutrient status.

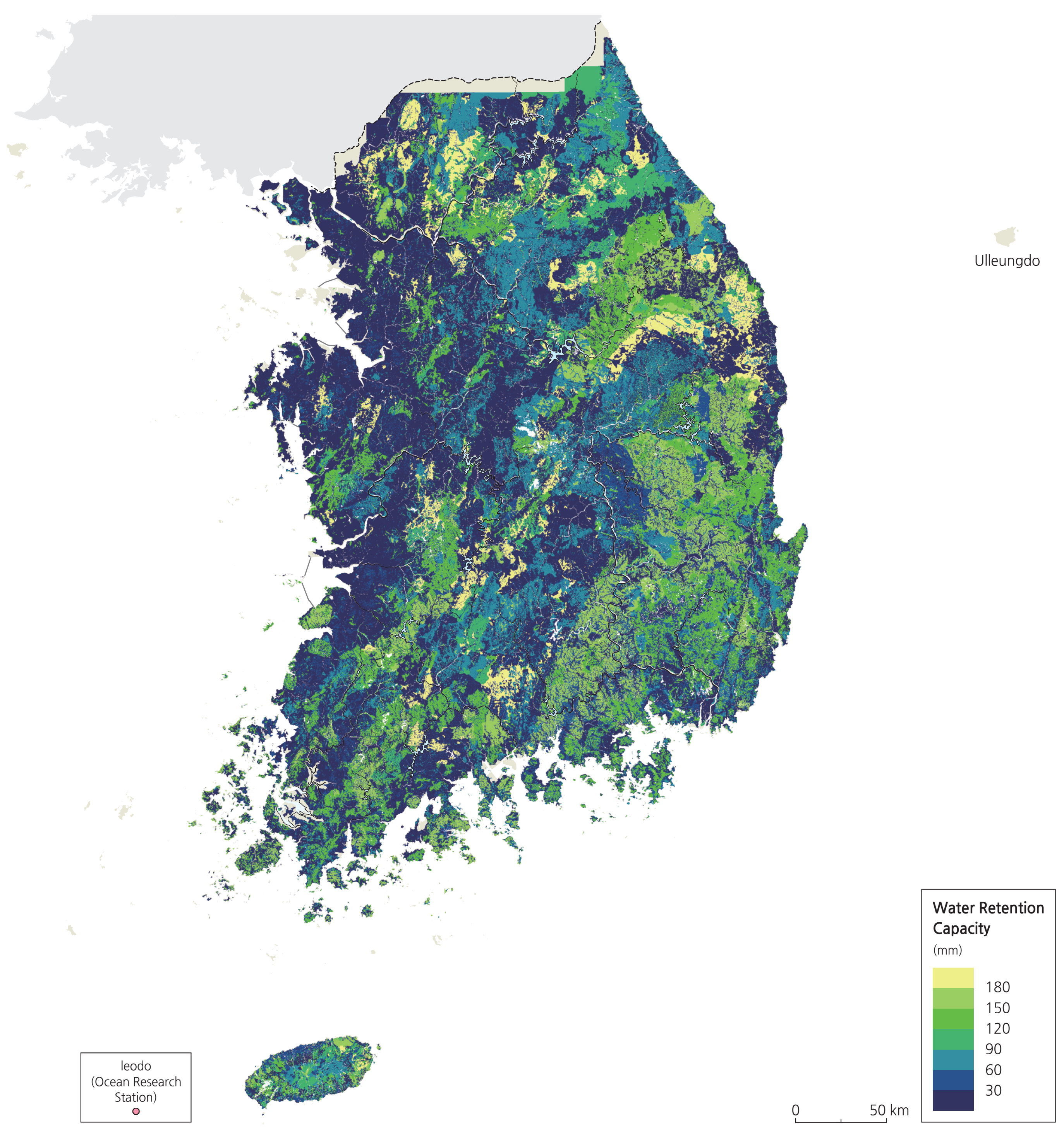
Soil fulfills various ecological functions and provides many benefits by aiding in providing dwelling space, cultivating water resources, recycling nutrients, maintaining biodiversity, purifying pollutants, and mitigating and adapting to climate change. The various benefits provide by soil are called soil ecosystem services. Soil ecosystem services in Korea are estimated to be worth about 1,190 trillion won. It is necessary to evaluate and manage soil quality or soil health to sustain soil ecosystem services. It is also necessary to understand the various physical and chemical properties of soils related to soil function to properly evaluate soil quality. For example, soil organic matter is a key soil property that determines soil quality.

Soil Carbon Stocks



Rural Development Administration (2020)

Water Retention Capacity



Rural Development Administration (2020)

Carbon Stocks in Soil

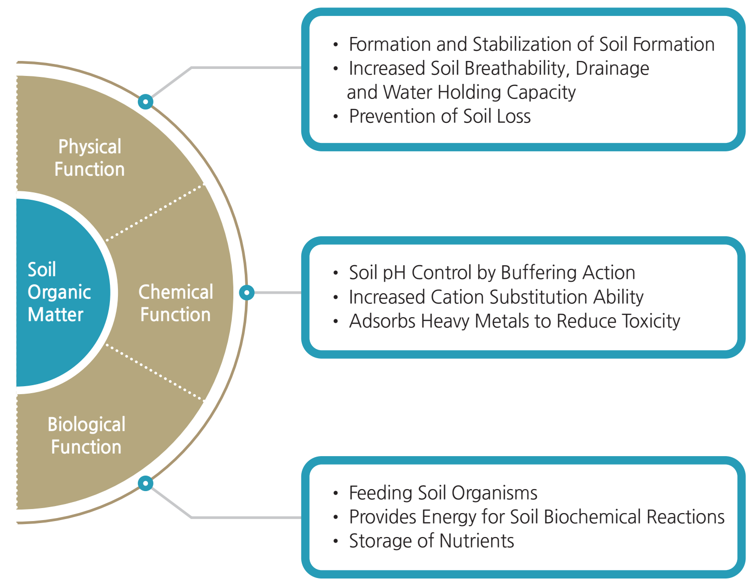
Division	Forest	Farmland	Grassland	Wetland	Bare Land
Land Use Area (km^2)	61,394	25,648	1,858	1,780	1,439
Amount of Carbon per Unit (kg/km^2)	4.05	6.77	8.82	1.1	4.24
Total Carbon Storage (Gg)	249	174	16	2	6

Rural Development Administration (2020)

The organic matter supplied by animals and plants on the surface and in the soil serves to supply nutrients to the soil. Soil carbon stock, which reflects the amount of organic matter in the soil, is an important indicator for evaluating the carbon balance of agricultural land and the global carbon balance.

The soil's organic carbon stock can be calculated by extracting the organic content per soil horizon and the volumetric density data from detailed soil maps. By this method, the national soil carbon density for up to 1 m in depth is estimated to be around 5 kg/m^2, and the total carbon stock comes out to 449 gigagrams (Gg). According to the type of land use, forests have the highest total carbon stock at 249 Gg, followed by agricultural land at 174 Gg, and grassland at 16 Gg.

Function of Soil Organic Matter



Differences in Soil Water Retention Capacity

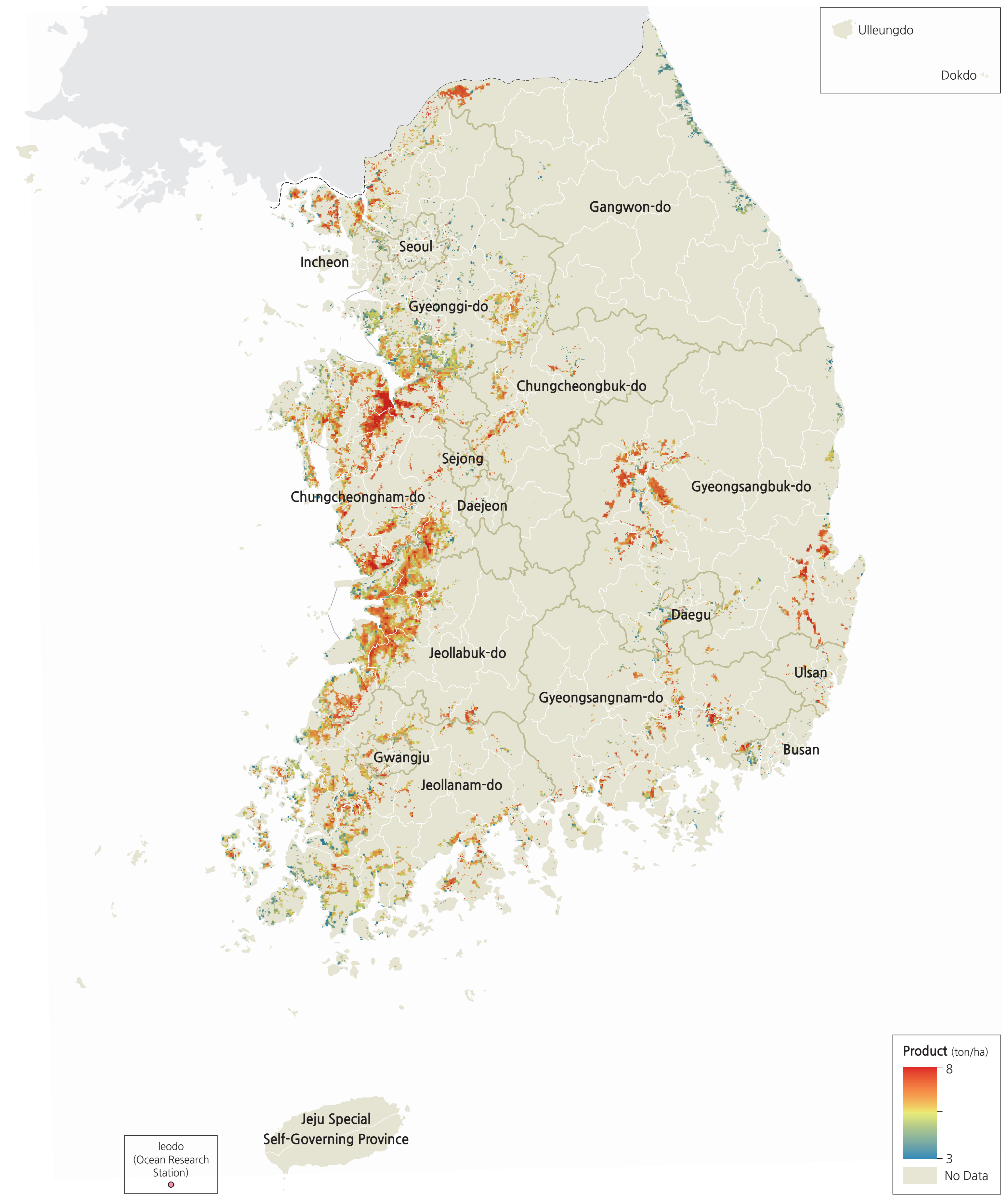
Area (km^2)		Water Holding Capacity (mm)	
		Average	Standard Deviation
Alfisols	3,474	205	27
Andisols	1,394	138	54
Entisols	14,291	149	73
Inceptisols	70,868	192	55
Ultisols	4,736	206	55

Rural Development Administration (2020)

Modern industrial agriculture uses water intensively, exacerbating water shortages and water pollution. Moreover, it is predicted that drought and water shortages will become more severe due to climate change. Therefore, reducing the intensive use of water in agriculture is a key adaptation policy for addressing climate change. Ecological organic agriculture reduces the need for intensive irrigation, increases soil water retention capacity, and improves water quality.

The water retention capacity of the soil is one of the most important soil factors affecting plant growth, carbon storage, nutrient circulation, and the rate of photosynthesis. The water retention capacity of the soil is determined by the soil volume density, taking into account the soil particle size and organic matter content. It determines the current physical state and characteristics of the soil and affects the hydrological cycle by controlling infiltration, runoff, and evapotranspiration rates, which greatly affect the climate. Korea aims to improve land use efficiency and adaptability to climate change by analyzing the spatial distribution of water retention capacity.

Rice Production (2018)



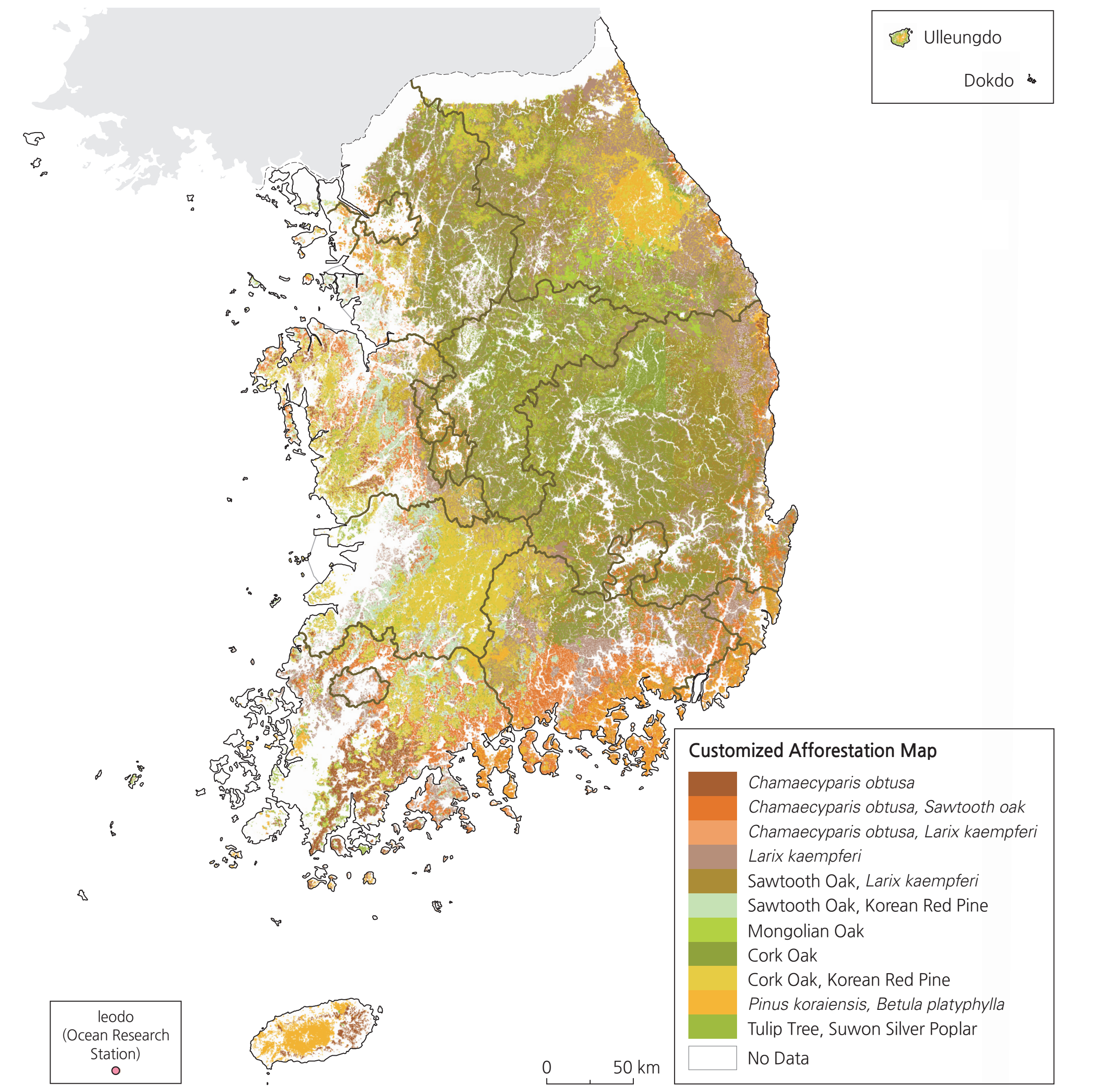
Remote Sensing (2018)

In 2020, 3,500 thousand tons of rice, the staple food, were produced. An area suitable for the cultivation of rice in Korea is a flat alluvial plain in a river basin with suitable soil and water conditions. Rice production is high in Jeollanam-do, Jeollabuk-do, and Chungcheongnam-do.

Korean Plains

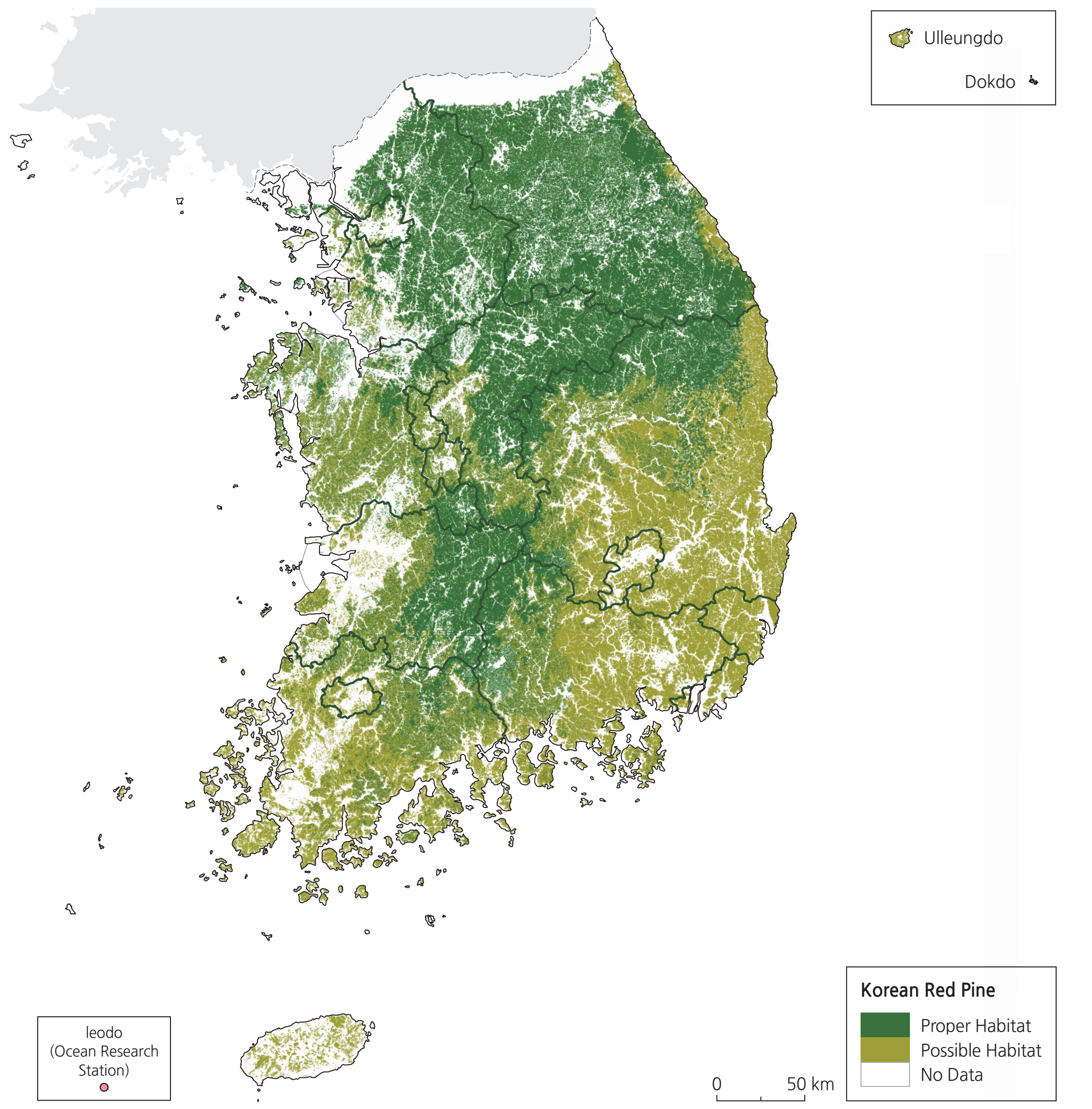
Each tree species has unique spatial and environmental characteristics suitable for growth. Afforestation projects allow for trees to be planted where they do not naturally occur. The Map of proper trees for afforestation indicates which forests are suitable for planting each tree type based on the result of a comprehensive survey of the soil (soil depth, soil class, humidity, soil type), climate, and topography of forests nationwide.

Map of Proper Trees for Afforestation



Rural Development Administration (2020)

Map of Proper Trees for Afforestation: Pine Trees



Rural Development Administration (2020)

International Cooperation

Five Pillars and Activities

- **Pillar 1 — Soil Management**
  - Black Soils, Salt-Affected Soils, Nutrition-Sensitive Agriculture
- **Pillar 2 — Awareness Raising**
  - Global Soil Doctors Program, World Soil Day
- **Pillar 3 — Research**
- **Pillar 4 — Information and Data**
  - GLOSIS
  - P4WG
  - INSII
  - Soil Atlas of ASIA
- **Pillar 5 — Harmonization**
  - GLOSOLAN
  - SEALNET

Food and Agriculture Organization Global Soil Partnership

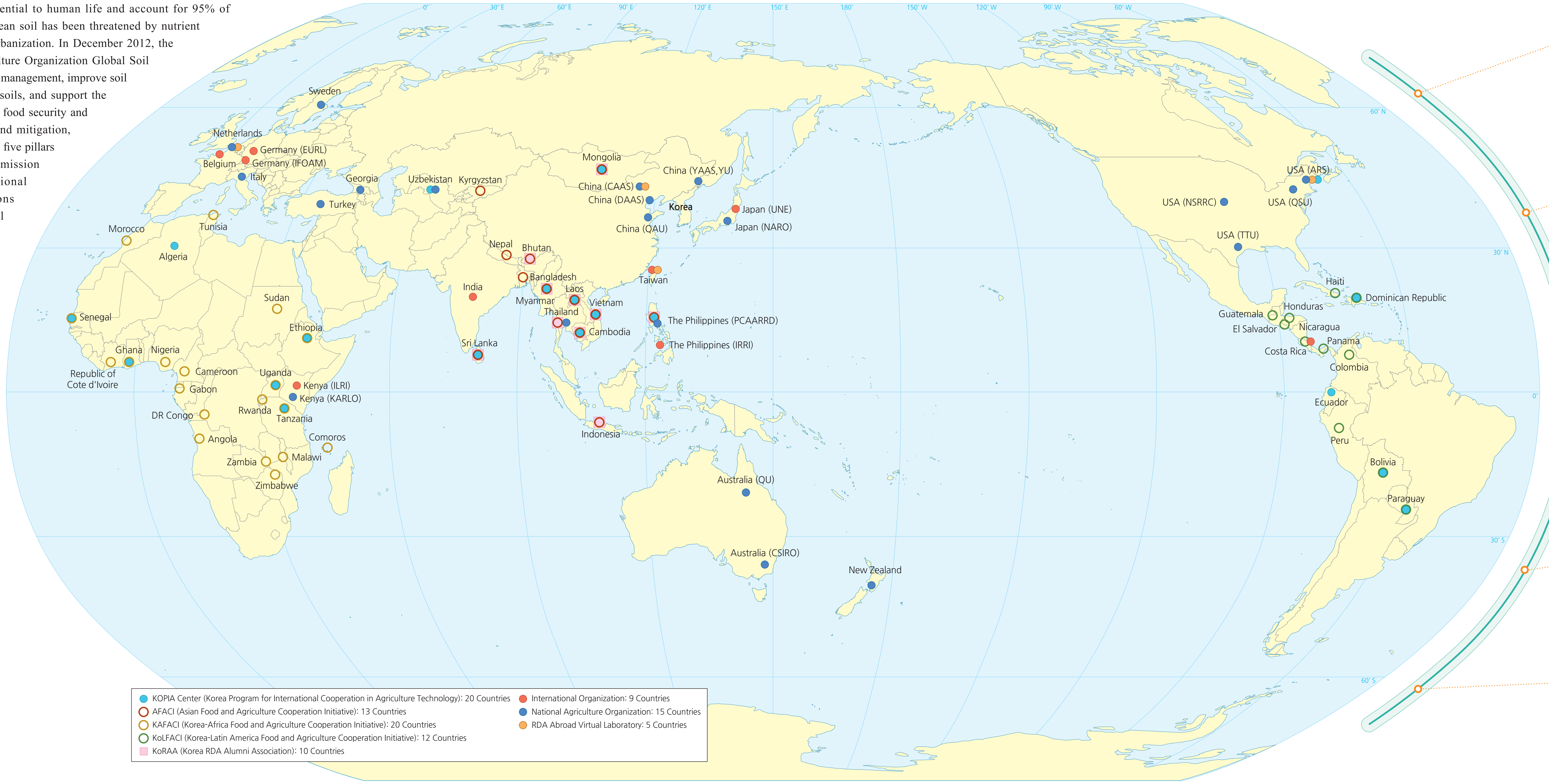
Soils provide various ecosystem services essential to human life and account for 95% of world food production. In recent times, the Korean soil has been threatened by nutrient imbalances, erosion, and soil shielding due to urbanization. In December 2012, the United Nations established the Food and Agriculture Organization Global Soil Partnership (FAOGSP) to promote sustainable soil management, improve soil governance to guarantee healthy and productive soils, and support the provision of essential ecosystem services towards food security and improved nutrition, climate change adaptation and mitigation, and sustainable development. FAOGSP establishes five pillars and promotes various activities to perform its mission effectively. Korea, along with 196 other national governments, non-governmental organizations (NGOs), farmers' associations, and international organizations, currently participates in the FAOGSP. It divides the world into eight regions and operates Regional Soil Partnerships. Twenty-four Asian countries, including Korea, Japan, and China, participate in the ASIAN Soil Partnership (ASP).

GLOBAL SOIL PARTNERSHIP

Global Soil Partnership Logo

Five Pillars of GSP and Cooperation System of Regional Cooperation

International Cooperation Related to Agriculture



1. Korea Program for International Cooperation in Agriculture Technology
- 20 Countries
- Started in 2009 (90 Businesses)

- Vietnam, Myanmar, The Philippines, Sri Lanka, Cambodia, Uzbek, Mongolia, Laos, Paraguay, Nicaragua, Bolivia, Ecuador, Dominican Republic, Kenya, Algeria, Zimbabwe, Ethiopia, Uganda, Senegal, Ghana
- Kyrgyzstan, Pakistan to be opened (2020)

2. Asian Food and Agriculture Cooperation Initiative
- 13 Countries
- Launched in 2009 (5 Businesses)

- The Philippines, Bangladesh, Cambodia, Laos, Mongolia, Nepal, Indonesia, Sri Lanka, Thailand, Vietnam, Kyrgyzstan, Bhutan, Myanmar

3. Korea-Africa Food and Agriculture Cooperation Initiative
- 20 Countries
- Launched in 2010 (7 Businesses)

- Angola, Cameroon, Democratic Republic of the Congo, Republic of Côte d'Ivoire, Ethiopia, Gabon, Ghana, Kenya, Malawi, Morocco, Nigeria, Senegal, Sudan, Tunisia, Uganda, Zimbabwe, Comoros, Rwanda, Zambia, Tanzania

4. Korea-Latin America Food and Agriculture Cooperation Initiative
- 12 Countries
- Launched in 2014 (4 Businesses)

- Bolivia, Colombia, Costa Rica, Dominican Republic, El Salvador, Guatemala, Haiti, Honduras, Nicaragua, Panama, Paraguay, Peru

5. RDA Abroad Virtual Laboratory (Overseas Resident Researcher Dispatch)
- 5 Countries
- Promotion of 38 Projects with 25 Research Institutes

- International Rice Research Institute (IRRI), World Vegetable Center (Worldveg), Chinese Academy of Agricultural Sciences (CAAS), US Agricultural Research Service (ARS), Wageningen University & Research (WUR)

6. Overseas Alumni Association
- 10 Countries, 3,302 People
- Foreigner Training Performance (1972–2019) : 119 Countries 6,188 People

- The Philippines, Indonesia, Thailand, Vietnam, Sri Lanka, Cambodia, Myanmar, Mongolia, Bhutan, Laos

Hosting UNCCD COP10

As desertification and land degradation spread globally, the United Nations declared the UN Decade for Deserts and the Fight against Desertification (UNDDD) to be carried out from 2010 to 2020 to establish strategic measures to counter the problems. As a leading country that has overcome heavy land degradation and successfully achieved reforestation, Korea serves as a pioneering example in the global movement against desertification.

Joined by 137 country representatives and personnel from international organizations and NGOs, the Tenth Session of the Conference of the Parties to the United Nations Convention to Combat Desertification (UNCCD COP 10) was held in the Changwon Convention Center in October 2011. Korea hosted a UNCCD session in Asia for the first time. More than 3,000 participants representing governments and international and non-governmental organizations (NGOs) attended.

The Changwon *Initiative* was adopted during high-level talks. The initiative appealed greatly to participants with its main points: 1. Agreement on long-term perspectives of the UNCCD and establishment of a scientific foundation; 2. Building partnerships to mitigate desertification and land devastation effectively; 3. Increased mobilization of resources that includes the private sector; 4. The establishment of the Land for Life Award to encourage sustainable land management.

As a host country of the UNCCD COP10 held in Changwon in 2011, Korea consistently contributes to the movement against desertification in Asia and the rest of the world. Taking into consideration that both desertification and land devastation cause a serious setback to poverty eradication in developing countries, Korea aims to build a foundation for its independent pursuit of developing countries by running various cooperative projects.

Afforestation Project to Prevent Desertification in China

Each spring, Korea suffers a great deal of damage caused by yellow dust from the drylands of northern China. Various afforestation projects are being carried out in inland China to counteract the source of the issue. In particular, the Kubuqi Desert in Inner Mongolia, China has an ongoing project that is held alongside cultural festivals to solidify environmentally cooperative relations between the two countries and foster friendships among youth.

The Afforestation Project to Prevent Desertification in China, which started in 2007, planted approximately 4.77 million poplars and desert willow by 2019. The Korean Forest Service provides financial support. The Korea Forestry Promotion Institute, the Communist Youth League of China, and the Dalate Qi local government of Inner Mongolia are jointly participating. This project will be promoted by 2021, and Korea-China forest cooperation will be continuously promoted through joint research between Korea and China and the discovery of new cooperative projects.

Greening Drylands Partnership

As part of the Changwon Initiative, the Greening Drylands Partnership promotes a series of sustainable land management projects to counter environmental issues in arid regions, such as desertification and drought, by utilizing networks to transfer knowledge and know-how from international organizations to developing countries. In particular, this partnership recognizes that Korea's experience in successful reforestation and afforestation projects may contribute to the economic prosperity of developing countries and decrease devastated land areas in African regions.

The partnership's first project (2012–2013) was carried out in Ghana, Morocco, and Tunisia. The second project (2013–2014) was carried out in Peru, Ecuador, Benin, and Ethiopia. The third project (2015–2016) focused on Kazakhstan, Kyrgyzstan, and Tajikistan. The fourth project (2015–present) focused on Mongolia, the fifth project (2017–present) focused on Armenia and Belarus, and the sixth project (2018-present), in progress, focuses on Niger, Togo, and Burkina Faso.

Mongolian Greenbelt Afforestation Project

Acknowledging an agreement from the Korea-Mongolia summit in 2006, the Korean Forest Service launched a large-scale afforestation project and established a plantation area of about 3,046 ha in Lun Soum and Dalanzadgad Soum in Mongolia from 2007 to 2016. During this period, Siberian elm and Sea Buckthorn, which are resistant to the arid climate, and Saxaul, a native tree of the Gobi Desert, were planted. The trees planted at the beginning of the project grow to about 4–6 m and become a forest. The Korean Forest Service started to transfer the plantation areas to the Mongolian government. In 2019, 824 ha of plantation area were transferred. In addition, the Korean Forest Service plans to create an urban forest in Ulaanbaatar by 2021. This urban forest will provide a shelter for urban residents in Ulaanbaatar who are suffering from severe pollution.

The Mongolian Greenbelt Afforestation Project reduces the source of yellow dust by planting trees in the desert, informs the Mongolian people of the importance of preventing desertification, and encourages them to participate in global environmental issues. At the same time, Korea contributes to international environmental protection by actively participating in the prevention of desertification.