SPACE AND ENVIRONMENT

KRIHS Gazette

Re-creation of Living Spaces Through Territorial Regeneration

With accelerating globalization, a major policy agenda that emerged was stimulation of the regional economy through formation of mega-economic regions across the territory. In particular, various measures are being explored to tackle the recent economic crisis. Examples include increasing domestic consumption and creating more jobs. Likewise, the goal of territorial strategies is shifting from building new infrastructures to turning existing cities or regions into more sustainable and attractive places. This effort to recreate the settlement spaces of the national territory already is visible overseas. In the case of Japan, it has driven various urban and regional regeneration projects and rejuvenated town centers and has designated Special Zone of Structural Renovation since the economic depression after the era of brisk growth. The UK also is trying to effectuate urban and regional renaissance in an effort to strengthen its urban and regional competitiveness.

Over the last 50 years, Korea has been experiencing changes in settlement spaces of the national territory together with dramatic economic growth. As a result, the urbanization rate, which was a meager 33.5% in 1966, jumped to 47.7% in 1975, and again to 81.5% in 2005. Over the last 40 years (1966–2005), the urban population increased by about 28 million whereas the population in farming and fishing villages and mountains declined by about 10 million. Except for some metropolitan cities, most provincial regions are experiencing constant population outflow, and their weak growth bases are eroding the regions' development potential, which in turn, causes population drain, creating a vicious cycle. In addition, citizens' travelling patterns are expected to become more dynamic as the spatial scope of activities has expanded due to construction of such transit systems as the Gyeongbu and Honam high-speed express trains which made anywhere within the national territory reachable in half a day.

Under such circumstances, there is growing interest in the amenities of small- and medium-sized cities and rural areas, tourism, and cultural diversity, and many multifaceted measures are being explored to

develop each region according to its unique features. Against this backdrop, this article will focus mostly on the regeneration of old ports and old industrial complexes and utilization of riverside spaces.

Regeneration of Old City Centers

A city center serves the core function of a city, and its function wanes or remains stationary when new city centers are developed. Currently, most metropolitan cities are experiencing population spurt, with significantly higher population increase at new development zones than in old city centers. According to the study on the degeneration of Korea's city centers (Paik Ki-young et al., 2006), of the city centers of seven metropolitan cities with a population of more than a million, all of them, along with four out of ten of those of cities with a population of 50,000 to a million, experienced degeneration of city centers.

Degeneration of city centers weakens various city functions – central commercial, business, settlement, entertainment, and culture – and deteriorates and downgrades the physical environment, and even can create problems among city dwellers due to urbanization. This, in turn, degrades the function of city centers and accelerates their degeneration, creating a vicious cycle (Gye Gi-suk, 2003). In a nutshell, degeneration of city centers generally is caused by absolutely poor physical conditions in all areas, i.e., residential, commercial, and business, which is fueled further by urban development strategies that focus on developing new towns and expanding cities, all of which culminate in a weakened residential function of city centers.

Various measures can be employed to solve these problems, but one of the most important strategies is to build Korea Train eXpress (KTX) stations and develop their neighboring areas because placing a mass transportation center will create a change in the spatial structure of the entire city and revive the function of city centers at metropolitan cities and small- and medium-sized cities. Also, it is important to utilize the region's unique historical and cultural resources to regenerate city centers. A case in point is Gwangju, which is trying to build a cultural capital. It is also necessary to preserve and utilize such historical assets as palaces and fortresses and modern cultural assets or international film festivals in regenerating old city centers.

Regeneration of Old Ports

There is a growing need to develop existing ports as multifunctional spaces. The port, which has been severed from the outer world, should be connected to and harmonized with neighboring urban spaces. To accomplish this, it is necessary to build a multifunctional space at idle sites that resulted from deterioration of ports and their functions, wherein lie all incorporated residential, educational, recreational, tourism, cultural, commercial, and gym facilities. The aim is to promote linked development with neighboring city centers by improving accessibility to waterfronts and making city centers more congenial.

The port redevelopment project began with the restoration of the traditional wharf of Busan North Port, which has been freed up for development due to the opening of Busan New Port in 2004. To facilitate deployment of the project, which began with the catch phrase "water space for citizens," a special law was enacted for the redevelopment of ports, dubbed "Special law for the development and use of ports and their neighboring areas." Based on this law, ten ports – Busan, Incheon, Daecheon,

Figure 1: Bird's-Eye View of Daejeon Thematic Roads and Views of Pedestrian Walks

Source: Homepage of Daejeon Metropolitan City Hall [www.daejeon.go.kr]

Figure 2: Bird's-Eye Views of Busan North Port Redevelopment Project

Source: Left – Revised master plan of Busan Port redevelopment project, by the Ministry of Maritime Affairs and Fisheries, Busan Metropolitan
          City, and Busan Port Authority, 2007.
          Right - Finalized Busan North Port redevelopment master plan, briefing material.

Gunsan, Mokpo, Jeju, Gwangyang, Yeosu, Pohang, and Mukho Ports – were designated and pronounced as redevelopment areas, and a vision was unveiled to complete the redevelopment projects by 2016 and return water-adjacent spaces to citizens. Among the port projects, the Ministry of Maritime Affairs and Fisheries, Busan City, and Busan Port Authority drew up the master plan for the Busan North Port redevelopment in 2005. The 1-1 phase of the project began in 2009, and currently private developers are being sought to undertake the redevelopment project at idle lands.

However, there are some problems regarding Busan North Port Redevelopment Project; there is insufficient linkage with old city centers. Busan North Port and the old city center stand face to face with KTX station in the middle, but it is difficult to reframe the physical spaces to link the old city center with Busan North Port and turn it into a multipurpose region. Besides, the Busan Port project is facing many obstacles, including confusion over the project direction and public facility financing issues. Many problems – issues of project deployment directions, project launch point, initiator, relevant legislations, coping measures against the port & transport workers' union, and environmental issues – are tangled together in a complex web due to the lack of a project feasibility study and government's limited support in public facilities financing. In order to solve these issues, it is desirable to phase in regeneration projects, starting from hub ports.

In particular, from a national competitiveness standpoint, it is important to regenerate hub ports that lack facilities despite huge shipping volume. It is necessary to regenerate not only ports themselves but also their neighboring areas in order to stimulate the regional economy and make the ports highly profitable. It is desirable to promote a harmonious development of cities and ports, taking into account economical, spatial, historical, and cultural characteristics of existing city centers. From a spatial aspect, various methods should be sought to promote spatial linkage and enhance accessibility to neighboring areas, and from a historical and cultural aspect, they should be linked to the old fish market of existing city centers, cultural streets, or historical conservation zones. The keynote direction should be to not damage the historical identity of old ports and old city centers. From a macro perspective, ports should be viewed not only as distribution hubs but also as living space, a place for rest and leisure, a cultural space for meetings and events, and a commercial space.

Regeneration of Old Industrial Complexes

Due to their nature, old industrial complexes tend to be situated in the central cities of mega-economic regions. As of 2008, industrial complexes that are more than 30 years old are situated in central cities of mega-economic regions such as Busan or Daegu, so, in order to enhance national competitiveness, it is imperative to employ regeneration strategies for these old industrial complexes. The old industrial complexes share a common feature in that they are situated in the same region as provincial governments, as part of government's efforts to nurture export industries, and they are built based on the urban planning law since a law for the creation of industrial complexes has not yet been legislated.

Companies prefer metropolitan cities in mega-economic regions for doing business as they contain ample infrastructures and consumers. Some of their strengths include easy access to financial, design, and consulting services, experienced labor, information of unofficial kinds, and sophisticated legal or financial services, and easy formation of industry-academia networks.

In these central cities, it is necessary to attract competitive knowledge-based industries. The degeneration of old industrial complexes (industrial sites) is caused by lack of continuous environmental improvement after their creation. Lack of infrastructures (narrow road, lack of forests and parking lots), land parcel partitioning due to relocation of existing factories, reduction of company sizes, weak R&D function, and lack of industrial support functions all are factors that contribute to downgrading the city into a simple small-scaled manufacturing complex.

In an effort to solve this problem, the government revised the law in the early 1990s to regenerate industrial complexes and upgrade their structure; the upgrade project is partially completed but the physical regeneration of industrial complexes has not yet been performed.

Once the regeneration of the old industrial complex succeeds, it will serve as a new manufacturing base, or an urban multipurpose complex, that brings breath and life to the city, as well as a driver of sustainable urban economy. Expanding infrastructures, strengthening industry support functions, specializing promising industries, increasing the potential for attracting new growth engines and new industries, and regenerating urban spaces will help the complex function as a major hub, a driver of national competitiveness.

Regeneration of Riverside Spaces

In Korea, the total length of rivers, including national and provincial rivers, amounts to about 30,000 km. With small streams included, it reaches 65,000 km. Provincial rivers and small streams are strewn across the national territory like veins along the national rivers. Water is the best resource among the natural resources. When rivers are positioned in the center of cities, they will provide a pleasant environment not only for residences but also for businesses, and this will maximize productivity. Until now, the government has been deploying river restoration projects, but the incumbent administration expanded the project to include restoration of four major rivers, restoration of rivers into ecological spaces, and rejuvenation of waterfronts.

In terms of directions for the future, the areas that were destroyed by human beings should be designated as a "restoration zone" and should be restored as previously planned, and areas at city centers with a heavy population concentration should be designated as "waterfront rejuvenation zone," a recreational space for its residents. Barriers such as levies and roads should be removed to improve accessibility to rivers from cities, and cities and rivers, which before were separated, should be connected together in one piece. In addition, waterfronts should be turned into busy city space instead of a simple open space, becoming part of a city, and the urban spaces should be reorganized into water-front centered spaces, maximizing the effects of river restoration.

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Korean-Style Spatial Data Infrastructure Model and Globalization Strategies

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With the improvement of various information technologies, e.g., RFID, augmented reality, and mobile cloud computing, there has been great expansion in the use of spatial data and rapid change in spatial data infrastructure. The spatial data that was accessible through desktop computers and used

by the central government and local governments in conducting administrative works now is accessible through web and mobile devices due to progress of information and communication technology. In particular, as exemplified by the use of spatial data in such services as LBS and telematics that merge spatial data with the latest information technology, the use of spatial data is being greatly expanded.

Due to Korea's unique circumstance, i.e., division of the Korean Peninsula, spatial data has been strictly classified and was not accessible to the general public. However, since several years ago, global spatial data service such as Google Map and Google Earth began to be opened up for use by the public. This affected Korea and gradually caused its spatial data to be opened up to the public. In particular, as Apple unveiled its smartphone, disclosure of spatial data to the general public became a hot issue, as it is the basis for rejuvenation of the spatial information industry, and the speed of opening up spatial information to the general public is expected to increase. As the number of spatial data providers multiplied and the kind of spatial data supply devices became more diverse, more emphasis began to be placed on basic infrastructures such as framework data and standards, and distribution of spatial data.

Development of NGIS

Korea has been implementing the first, second, and third stages of the master plan for a national geographic information system (NGIS) since 1995. Meanwhile, it also has been constantly engaged in the establishment of a national spatial information system, which includes building a database and clearinghouse, and standardizing and developing spatial data technologies. As a result, the government and related organizations have achieved a feat equivalent to what GIS advanced nations in the West have achieved over the last 30 to 40 years, using its nationally-driven GIS system, or national geographical information system. The national GIS industry, namely, the national spatial informatization project, spearheaded improvement of

administrative efficiency of the government and civil affairs, as did the e-government project, an administration informatization project. In addition, although there still are many limitations, it has given rise to a new private business field called the spatial data industry and has influenced many service industries that use GIS. As such, GIS-based informatization is spreading rapidly across the society and the demand for GIS also is rising.

Roadblocks to the Development of NGIS

However, on the flip side, there are several problems in the spatial information field. When looking at just the spatial information technology itself, the potential problems include technological reliance on foreign countries and difficulties in penetrating overseas markets. These factors hamper development of the GIS industry. However, if we assume that spatial data infrastructure is vital to informatization of the national territory, the problem is graver. In other words, infrastructures are social overhead capitals that are fundamental to the operation of our society and companies, and problems in these infrastructures will create confusion not only in the infrastructure itself but also in other industries that use these infrastructures – and, in the end, the society as a whole. Until now, theoretically, nationwide spatial informatization was said to include establishment of spatial infrastructures, but there is a very wide gap between the theory and the reality.

Not enough spatial information infrastructure was built when the NGIS project was rolled out, and the project faced many problems, e.g., unreliable base map and standards, duplicate database creation and

Figure 1: Cause-Effect Diagram of Problems in NGIS
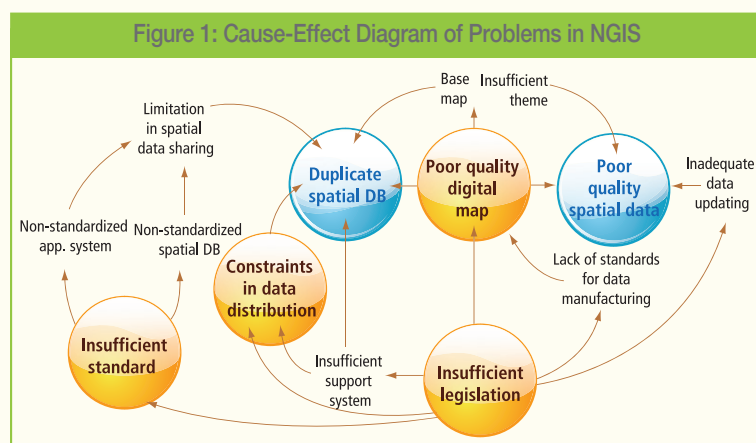
management, lack of distribution, insufficient legislation, and stopgap measures. In order to tackle current problems in national geographic information system, the fundamental issue, i.e., information sharing, should be dealt with.

Korean Spatial Data Infrastructure

A Korean-style spatial information infrastructure is called Korean Spatial Data Infrastructure (KSDI). In a narrow sense of the term, KSDI refers to framework spatial data, spatial data standardization system, and spatial data distribution system; in a broad sense, KSDI includes the aforementioned elements plus implementation system and legislation, and in the broadest sense, it includes all of the former elements plus foundational technology and manpower. Each of these elements and their relationships are defined in a model. Framework data is the crux of spatial data infrastructure, and therefore is defined, from the perspective of its role and purpose, as "core data commonly used by various fields that serve as the basis or reference to the location of other data. It is the basis for the production, management, and utilization of other spatial data."

The role of the spatial data standardization system is to prevent duplicated production of framework data and provide common standards for management and distribution of data. Standard-related activities refer to activities conducted during the entire life cycle of a standard: planning & development, establishment, compliance, maintenance, and management (user feedback) activities. At the planning & development stage, stakeholders' demands and social, technological, and environmental changes should be monitored and demands of users should be investigated and incorporated into planning. Establishment of standard refers to development of regulations that spatial data producers and users should follow, under a mutual agreement. The parties involved and their roles in each of these stages should be specified. Compliance with standards refers to the work of checking/certifying whether products that applied spatial standards indeed comply with those standards and whether spatial data/function applied in each product is compatible with one another. Maintenance and management of standard refers to receiving user feedback so that latest spatial data standard can be applied in products.

For spatial data sharing, there needs to be a distribution system that allows for uninhibited flow of spatial data. For spatial data distribution, the framework data should be distributed first and the distribution of thematic data should follow. The framework spatial data should be collected centrally and distributed through disseminating organizations. Distribution of data should be made possible at all times via a distribution network, and a set of

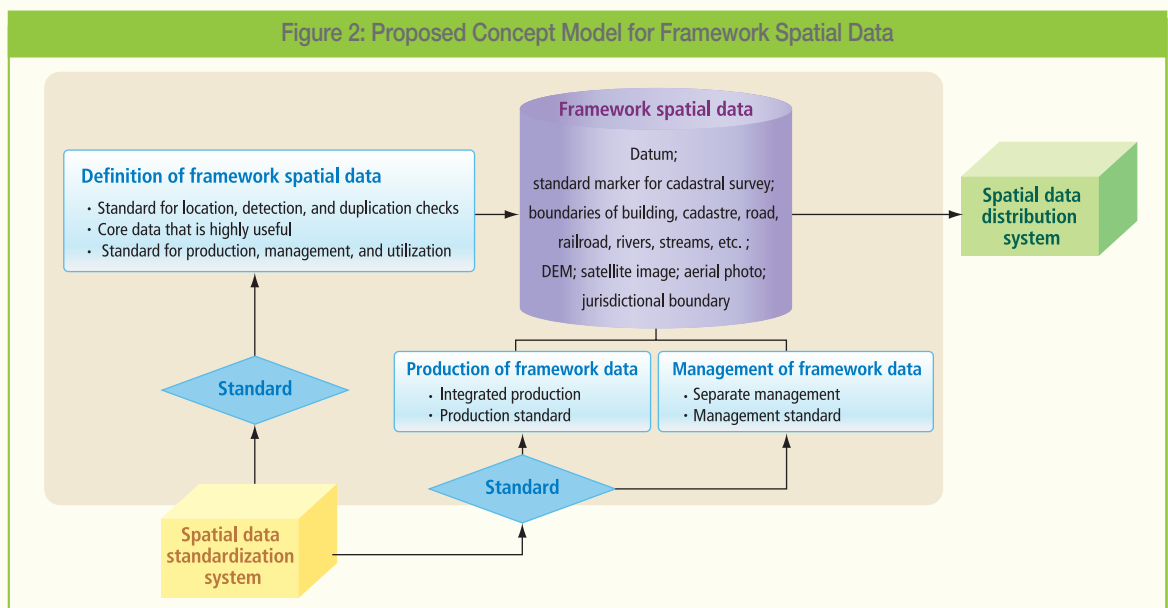Figure 2: Proposed Concept Model for Framework Spatial Data

Definition of framework spatial data
· Standard for location, detection, and duplication checks
· Core data that is highly useful
· Standard for production, management, and utilization

Framework spatial data
Datum;
standard marker for cadastral survey;
boundaries of building, cadastre, road,
railroad, rivers, streams, etc. ;
DEM; satellite image; aerial photo;
jurisdictional boundary

Spatial data distribution system

Standard

Production of framework data
· Integrated production
· Production standard

Management of framework data
· Separate management
· Management standard

Standard

Spatial data standardization system

Figure 3: Proposed Concept Model for Spatial Data Standardization System

Spatial data standardization system

Spatial data standard

3. Establishment

2. Suggestion

4. Provision

Establishment of standards
Standard-related activities

Standard planning & development
Standard-related activities

Checking compliance with standard and collecting user feedback
Standard-related activities

1. Participation

6. Feedback

5. Application

Standards of data, service, inspection, procedure, etc.

Applying, developing, and revising standards

Framework spatial data

Spatial data distribution system

Parties interested in the standard

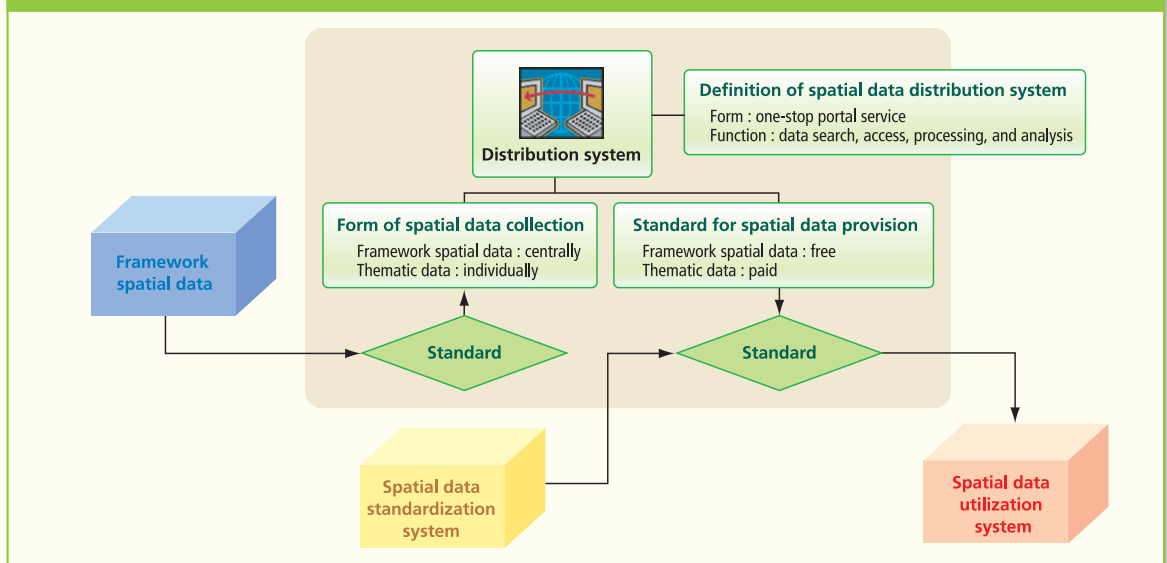Parties interested in the standard

procedures and technologies should be employed to distribute the data. As in collecting spatial data, there should be specific guidelines in providing spatial data that suggest the kinds of technologies and procedures that should be used. The guideline includes the cost of distributing spatial data and copyright for secondary use of data. They serve as rational basis for distribution activities.

Spatial data distribution system should be established in the form of a one-stop service. It should make spatial data easily accessible and should be user-friendly, incorporating simple web-based maneuvering and analyzing functions. The distribution system should be defined as the activity of collecting and supplying framework spatial data based on a standardized system.

A spatial data implementation system refers to the matters related to parties involved in the management and operation of framework data, spatial data standardization system, and distribution system.

Figure 4: Proposed Concept Model for Spatial Data Distribution System

Distribution system

Definition of spatial data distribution system
Form : one-stop portal service
Function : data search, access, processing, and analysis

Framework spatial data

Form of spatial data collection
Framework spatial data : centrally
Thematic data : individually

Standard for spatial data provision
Framework spatial data : free
Thematic data : paid

Standard

Standard

Spatial data standardization system

Spatial data utilization system

Globalization Strategies

The globalization strategies of the spatial data infrastructure model involve turning years of experience and knowledge in establishing a national GIS system into a territorial database and, through it, penetrating overseas markets. The strategy is to utilize our strengths and opportunities and minimize weaknesses and threats. Strength(S)–Opportunity(O) strategy is building a successful model for overseas market penetration. Using the increasing ODA fund, we should target developing nations that request us to construct spatial data and build a successful overseas market penetration case. Strength(S)–Threat(T) strategy is pioneering markets of developing countries where there is not much competition. Futile competition with foreign conglomerates should be avoided as they possess stable products (software) based on years of R&D and experiences. Weakness(W)–Opportunity(O) strategy is complying with international standards and opening up technology sources. In order to realize globalization, international standards are essential, so specialized pools of talent need to be cultivated that can comply with international standards, and the technology that has been developed needs to be opened up and shared with developing countries. Weakness(W)–Threat (Threat) strategy is strengthening national muscles by concentrating capabilities. As external competition is unavoidable, the country needs to first concentrate its internal capabilities to improve its national strength and meet external challenges.

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Nest Housing Strategies for Social Integration

The government plans to supply a total of 1.5 million "nest housing" for low income households without housing ownership, by 2018, in an effort to improve the residential life of ordinary citizens. One million houses (66%) will be built in the capital region and half a million in the provinces (34%). The type of housing to be provided includes ownership housing, long-term rental housing, and permanent rental housing. If the nest housing is supplied as planned, the ratio of the stock of public rental housing will be elevated to 11% by 2018, which is on par with the figure of advanced nations. It will greatly help stabilize and improve citizens' residential life.

However, in supplying public rental housing en masse, there needs to be an in-depth review of potential problems that may arise due to clustering of a certain class of people. Until now, not enough review has been conducted on the effects of mixing different income groups prior to actually mixing rental housing and ownership housing, and this resulted in conflict and segregation among the residents of different types of housing. Therefore, it is necessary to examine thoroughly if a mixture of housing types stigmatizes or has a negative effect on the self-esteem of residents of rental housing, and investigate the cause of conflicts.

In order for the supply of rental housing to be conducive to stabilizing residential life of ordinary citizens, not only the supply volume but also the proper method of mixing different types of housing should be reviewed. Efforts are underway to realize social integration through the supply of nest housing, but specific strategies have not yet been suggested. Therefore, it is necessary to examine the problems of current public housing complex and explore ways to minimize social segregation and achieve social integration.

Classification of Housing Types

Depending on the location of the rental housing relative to the ownership housing, it can be classified as follows: "independent type," where rental housing

stands alone in a complex of its own; "adjacent type," where rental housing is situated next to ownership housing; "intra-complex mix type," where rental housing is located together with ownership housing within the same complex; and "intra-building mix type," where rental housing and ownership housing are mixed within the same building unit.

Residents are sensitive to building designs and the location of building units and welfare facilities, and in many cases, the difference in these factors creates social and psychological isolation.

Compared to the neighboring ownership housing, "independent type" rental housing usually is built in development districts along the roads, making them susceptible to noise. However, rental housing has some advantages in terms of accessibility to mass transportation. In the case of "intra-complex mix type," the original intent was to have the residents of different housing types share main gates and car lanes, but in many cases, they are separated physically by roads or elevation differences.

In the case of "intra-building mix type," rental housing and ownership housing are staggered by floors, with shared-use elevators. In most cases, rental housing tends to face noisier area or direction. "Adjacent type" housing is separated from ownership housing by pedestrian walks or barriers, and separated from schools, parks, or welfare facilities. If schools border either ownership housing or rental housing, a wall is erected in between in many cases. A wall is erected to prevent residents of rental housing from passing the complex of ownership housing to commute to school, and the same is true with rental housings as seen in figure 1.

In the case of "intra-building mix type," this kind of problems does not appear since rental housing and ownership housing are located within the same building unit. However, even in this case, separate entrances sometimes are installed, inhibiting contacts between the residents. Even within the same building, ownership housing sometimes has stairways, whereas rental housing has aisles, creating different appearance.

In the case of "intra-complex mix type," or "intra-building mix type," the basic idea is to allow residents of both types of housing to share welfare facilities. However, in most cases, the superintendent's office or shared-use facilities tend to be located nearer the buildings with ownership housing, creating inconvenience for rental housing residents.

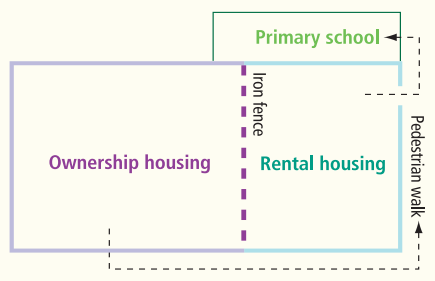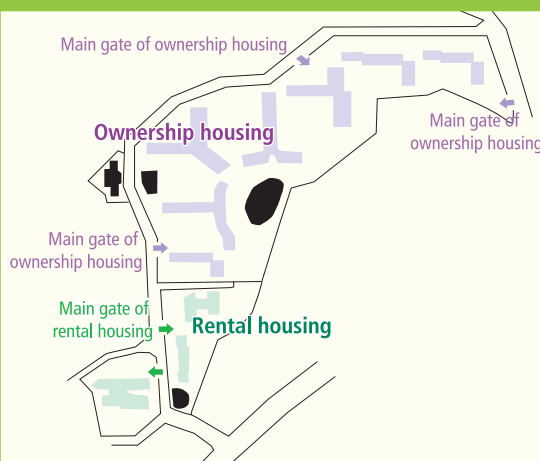Figure 1: School Commute Obstructed by a Wall ("adjacent type")

Figure 2: Rental Housing Complex ("intra-complex mix type") -on a slope, separated by a retaining wall

In the case of "independent type" rental housing, the appearance is different from its neighboring ownership housing as it has aisles. This is one of the causes of the feeling of isolation. In the case of "adjacent type," different materials or colors often are applied to the two types of housing. Even though the same builder undertook the work, in case of ownership housing, the lower floors were colored in light orange whereas for rental housing, the color was light green, creating a different appearance.

In the case of "intra-complex mix type," in some cases, the name of the complex or building numbers are written differently to distinguish the two types of housing. According to a survey, most buildings use a series of numbers, but in some complexes, the names on the building outer walls are written differently (English is used for ownership housing whereas Korean is used for

Figure 3. Segregation Between Rental Housing and Ownership Housing
("intra-building mix type" and "intra-complex mix type")
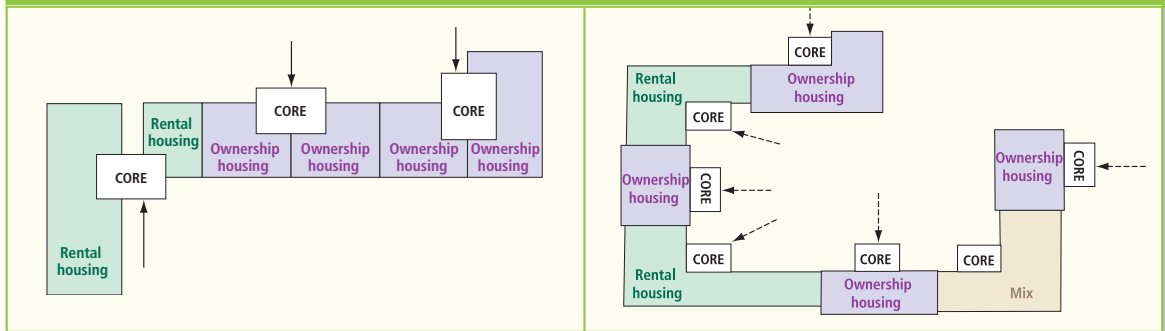
rental housing). Within the same complex, in most cases, the buildings with ownership housing are marked by stairways whereas the buildings with rental housing are marked by aisles.

In the case of "intra-building mix type," which is being supplied recently, consideration is given to eliminate segregation between rental housing and ownership housing, so there does not exist a significant difference between the two types of housing space-wise or exterior-wise. In particular, the assortment of small apartments and mid- and large-sized apartments within the same building unit helps create diverse features and landscape.

Effect of Housing Mix

Types of housing mix affect the degree of anti-social behavior and the feeling of alienation. It was found that in some cases, residents in ownership housing registered a different dwelling location because they did not want to send their kids to the same school as the residents in rental housing; or when the children enter elementary school, residents would relocate to a different region; or prevent rental housing residents by installing bars in parking spaces; or attach different stickers on the cars depending on the housing types, fueling feelings of isolation.

The most rampant form of anti-social action occurring in a rental housing complex is damaging property, throwing away and stacking waste, and graffiti, which are most visible in "independent type," or "adjacent type," of housing. In this type of permanent rental housing complex, where a whole group of alcoholics resides, violence after drinking

and picking fights emerged as serious problems. Urinating within elevators also was one of the problems. In the case of "independent" or "adjacent" type, it was found residents themselves opted to alienate themselves from residents of neighboring complexes. This phenomenon appeared more among residents of permanent rental housing.

Housing Mix Strategies

Building nest housing has some advantages over having only rental housing, as it introduces diversity. Both ownership housing and rental housing are included in the concept of nest housing and they are conducive to social integration. However, there needs to be some specific strategies in planning a mixed complex. First, in order to promote mixture of households, specific guidelines should be established, taking into account location, size of the building, and other factors. Second, characteristics other than income levels should be considered when supplying rental housing. It is important to mix not only different income brackets but also different age groups. Third, not only should there be a mix of ownership housing and rental housing, but various forms of rental housing should be mixed to remove the stereotypical view that rental housing is inferior to ownership housing. Finally, it is important to eliminate physical discrimination when planning housing complexes.

With the above-mentioned basic principles, a housing complex can be planned according to mix type, mix ratio, and housing size. There are various methods of mixing, e.g., mixing buildings or clusters, or mixing within a building unit, and they

should be applied differently based on the size of the construction. In the long run, it seems desirable to mix different types of housing within building units together with mixed buildings within the same complex, depending on the characteristics of the district and the size of the construction.

The mix ratio should follow the standard prescribed in the law on the creation of an integrated complex, and comprehensive socioeconomic factors – demand for nest housing, population growth rate, forecasted household changes, transport accessibility – should be investigated and used in determining the ratio. The size of the housing complex should be determined based on thorough examination of the housing supply status, demand demographics, and

regional characteristics, rather than applying a one-size-fits-all solution.

Based on these standards, in order to apply the concept of social integration in designing mixed complexes, physical barriers that trigger isolation first should be removed. Second, various type of mixes (physical, economical, and class) should be considered when making design blueprints, and third, diverse type of designs should be considered to promote social integration. More detailed design guidelines for urban planning, complex planning, and building planning, can be generated through these design directions.

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Scheme for Building a Green Territory and Green Transportation

Background and Concept of Green Growth

Since the industrial revolution, the dramatic increase in the use of fossil fuels and the ensuing greenhouse gas emissions have caused global warming. Global warming has served to create major disasters on earth such as heavy rain and drought and the destruction of ecosystems, and it has come to be seen as a threat to humankind. This has attracted increased interest and concern over global warming. To resolve the problem, countries, especially advanced nations, have formed pacts such as the Kyoto Protocol and the Bali Roadmap to tackle climate change at a global level.

Korea ranks sixth in terms of its greenhouse gas emission footprint and first in terms of its rate of emission increase (based on the year 2005), which is quite high from a global standpoint. This is due to its economic and social structures, which are highly dependent on industries that consume great amount of energy, which makes it difficult to respond rapidly to climate changes, and also due to the low level of green industries and technologies.

Currently, fossil fuel is rapidly becoming depleted due to worldwide economic growth, and is

exhibiting its limitations as demonstrated by increasing environmental pollution. To overcome this energy crisis, advanced countries are mustering efforts to expedite the development of eco-friendly new and renewable energy and are providing policy support to expand its use.

Against this backdrop, Korea is driving green growth to respond to the shift in the paradigm toward environment-friendliness and create new growth engines that will turn the tide of recent low growth.

Green growth refers to achieving balanced growth by harmonizing economic growth with environmental preservation, maximizing synergistic effects through the virtuous cycle of the two, pursuing green revolution in daily life and improved quality of life, and solidifying Korea's standing among nations.

On August 15, 2008, in a speech commemorating the 60th anniversary of the foundation of Korea, President Lee Myung-bak set "low-carbon, green growth" as the national vision for the next 60 years. Since then, the Presidential Committee on Green Growth has been formed to deliberate government's policies, plans, and action plans, and the Framework

Act on Low-Carbon, Green Growth was enacted.

In addition, it formed the National Strategy and Five-Year Plan for Green Growth to set the standard for green growth while at the same time building a foundation to achieve the goal of green growth and induce the active participation of relevant entities. Since cities, transportation, and the construction sector are very important for promoting green growth as 90% of Korea's population live in cities, the central and local governments are working together to actively execute strategies for the creation of a green territory and green transportation, especially in cities.

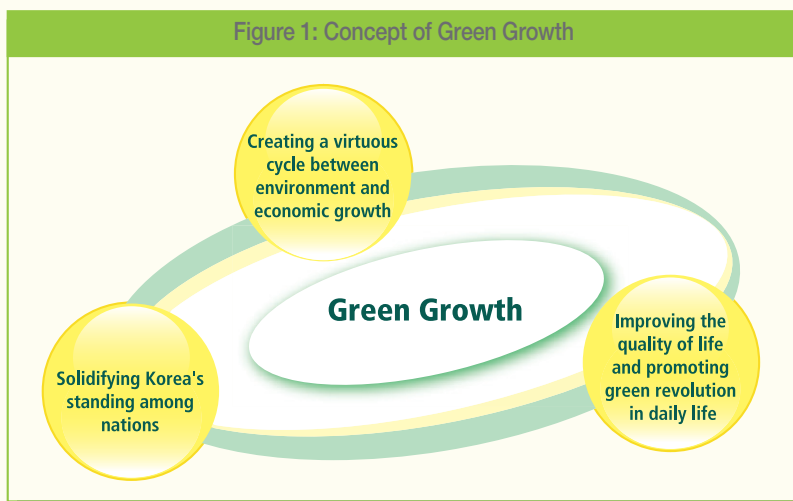## Strategies for Creating a Green Territory and Green Transportation

The creation of a green national territory and a green transportation network is one of the ten policy directions of the National Strategy for Green Growth. It is part of an effort to conform with the global trend of mitigating carbon and expanding green buildings and transportation networks by reforming the structure of the national territory. Its implementation strategies are as follows:

Creation of a green territory and green cities

Three detailed strategies have been set up to create a green territory and green cities.
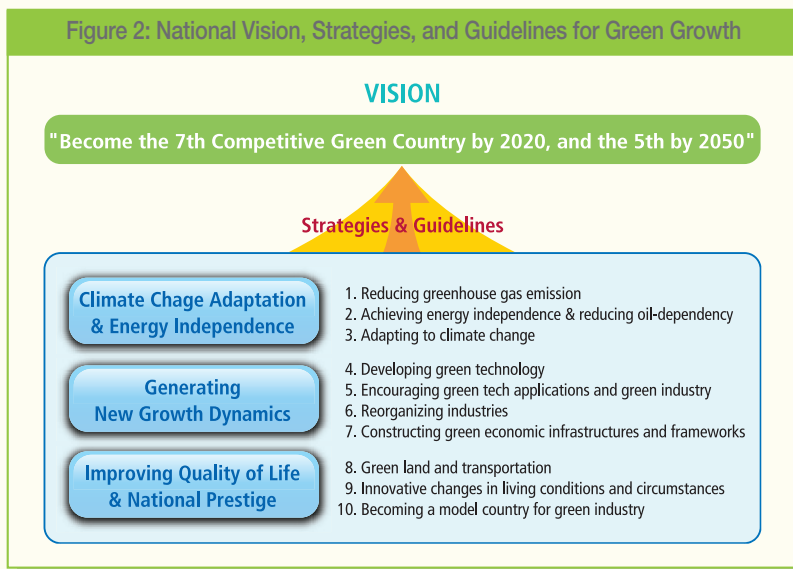
The first is the creation of a new grand green territory of low-carbon green growth. The measures

Figure 1: Concept of Green Growth

Creating a virtuous cycle between environment and economic growth

Green Growth

Solidifying Korea's standing among nations

Improving the quality of life and promoting green revolution in daily life

Source: National Strategy and Five-Year Action Plan for Green Growth in the homepage of the Presidential Committee on Green Growth

Figure 2: National Vision, Strategies, and Guidelines for Green Growth

VISION

"Become the 7th Competitive Green Country by 2020, and the 5th by 2050"

Strategies & Guidelines

Climate Chage Adaptation & Energy Independence
1. Reducing greenhouse gas emission
2. Achieving energy independence & reducing oil-dependency
3. Adapting to climate change

Generating New Growth Dynamics
4. Developing green technology
5. Encouraging green tech applications and green industry
6. Reorganizing industries
7. Constructing green economic infrastructures and frameworks

Improving Quality of Life & National Prestige
8. Green land and transportation
9. Innovative changes in living conditions and circumstances
10. Becoming a model country for green industry

Source: National Strategy and Five-Year Action Plan for Green Growth in the homepage of the Presidential Committee on Green Growth

include building a national territory wherein resources are recycled and environmental conservation and economic growth join hands, establishing a management and preservation plan for ecological corridors that nourish the Korean Peninsula (e.g., Baekdu mountain range, DMZ, islands and coasts, the five mega-regional ecological corridors, and the ecological axis restoration project); and building and expanding green regional

hubs around four major rivers, Saemangeum, along the coast, and in other areas.

Second is reshaping regional and urban structures to be conducive to low-carbon green growth. Some of the measures include linking city, countryside, and forest resources while implementing supra-regional resource-recycling type of development centered on such areas as KTX stations; improving institutional measures related to urban planning for the creation of low-carbon green cities; developing Korean-style low-carbon green growth models; promoting low-carbon urban regeneration projects; and developing, designating, and supporting new cities for testing low-carbon energy-saving measures.

Third is building a safe territory, securing carbon sinks, promoting green territory by building a basic database, the means of achieving which include supporting the assessment of territorial and urban impact and establishing countermeasures against climate change; preserving those places highly valued as carbon sinks, such as forests, urban forests, farmland, water resources, and marine resources; constructing an integrated database of the national territory such as an energy and climate map; and establishing a map illustrating areas vulnerable to climate change.

Expansion of ecological spaces

Four specific strategies have been established for the expansion of ecological spaces. First is expanding green zones through the systematic management of conservation areas. More specifically, it includes the designation and expansion of domestic and global conservation zones, nurturing ecological tour hubs, systemizing environmental information of conservation zones based on monitoring the activity of major eco zones nationwide (wetland, coastal sand-dunes, deserted islands, etc.).

Second is enhancing the quality and efficiency of ecological spaces. The measures to achieve this include restoring the health of rivers and expanding ecological and cultural spaces through renewal of covered or damaged rivers, systematic restoration of areas whose eco systems have been damaged and areas left behind by the relocation of military installations, and amplification of daily ecological spaces by more active implementation of regulations on the ratio of ecological spaces.

Third is enlarging and linking symbiotic urban ecological spaces. Relevant measures include expanding multi-functional ecological spaces within cities by providing favorable habitats for bio-species; tackling floods; securing water resources; strengthening connections with ecological spaces by building an urban ecological network linked with a mega-regional ecological axis; expanding daily green spaces by creating low-carbon forests and urban parks through public support, at the same time constructing information bases such as biotope maps for the expansion of ecological spaces; and the systematic management of ecological spaces.

Fourth is providing an institutional basis for the expansion of ecological spaces. Some measures include building financial bases by, for example, more actively establishing and utilizing the eco system conservation fund; securing ecological spaces and advancing green development by reforming planning techniques and systems; and soliciting citizen participation to expand ecological spaces by offering various incentives.

Expansion of green buildings

Three specific strategies have been established to expand the number of green buildings. The first is to organize and build institutional bases related to green buildings in preparation for climate change. Relevant measures include more stringent application of energy-saving designs and functions, the establishment of a national-level energy-monitoring system for buildings, and the development and distribution of carbon-mitigating, green building construction techniques.

Second is creating social conditions conducive to increasing the number of green buildings. Related measures include invigorating the green building certification system for buildings and energy efficiency rating systems; fostering such professionals as evaluators to increase the supply of green buildings; and developing and distributing guidelines for the design, construction, and maintenance of green buildings, while providing incentives to promote green buildings.

Third is establishing measures to increase the number of green buildings in use, more specifically, by developing and increasing the supply of environment-friendly low-energy homes, or green homes by region; the greenification of public

buildings by adopting such means as new renewable energy, resource-recycling and resource-saving measures; the establishment of green schools; and the creation of green welfare facilities.

Establishment of a green transport system

Four specific strategies have been formulated to build a green transport system. The first is expanding the use of low-carbon green transport, the means of which include changing the road transport-oriented system into a green transport-oriented system; energizing rail transport by introducing high-speed and light railway trains and subway trains; diversifying green transport modes by activating coastal water transportation; and greenifying road transportation by expanding green highways.

The second strategy is building a green transport system by facilitating transits by providing alternative transportation links and promoting public transportation. Relevant measures include the development of an integrated transit center, the supply of more transportation for transit such as the expansion of bus rapid transit (BRT), and controlling transport demands through such methods as parking quotas or congestion fees.

The third strategy is powering growth by developing and disseminating green transport technologies. Some measures include building a foundation to commercialize environment-friendly vehicles such as hybrid or electric vehicles, developing green transport technologies such as those used to build the Intelligent Transport System (ITS), and developing and applying eco-friendly logistics facilities and equipment.

Fourth is building a foundation for reducing logistics cost and energizing green logistics. Relevant measures include the introduction of a green logistics certification system, activating green logistics by such means as green logistics partnerships, reducing logistics cost by building common logistics infrastructures for transport, delivery, and storage, and advancing ports to the next level by building low-carbon green ports.

Promoting bicycle riding

Four specific strategies have been formulated to promote the use of bicycles. The first is to consolidate the role of bicycles as a green transport mode and as a means for regional development. Related measures include solidifying their role as a means of transport by reforming laws related to bicycles, building a system to promote efficient management of bicycle policies and generating statistics and providing education thereof, creating a new business model using bicycle-related industrial technology, and creating bases for the spread of bicycle-oriented culture by launching inter-city bicycle associations etc.

The second strategy is building a bicycle-friendly environment for the ubiquitous use of bicycles. Relevant measures include establishing concepts and basic scheme of bicycles as intermodalism, creating conditions for the ubiquitous use of bicycles, allocating a certain section for bicycle paths on pedestrian walks rather than on roads, and providing various incentives to encourage the use of bicycles for commuting.

The third strategy is building a bicycle-oriented culture that would help publicize local areas. Relevant measures include building a nationwide bicycle network similar to the European Green Way, one that links border regions, coasts, and riverside paths, and developing bicycle tour programs and national pilgrimage programs to promote the development of regions.

In summary, Korea has set and is pushing green growth as the national paradigm to cope with climate change and energy crisis and boost economic growth. In particular, from a long-term perspective, the territory, transportation, and the construction sector are very important. The strategy of creating a green territory and green transportation is transforming the national territory and cities into energy-saving structures. More specifically, it refers to reducing carbon emission from buildings by constructing green buildings, minimizing carbon emission from the transportation sector by building a green transportation network, and expanding the use of bicycles. It also includes building a green territory by preserving all such eco spaces as forests and rivers that are worth preserving. Ultimately, the goal is to reduce carbon emission by saving energy and promote carbon absorption by securing eco spaces and carbon sinks.

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INTERNATIONAL COOPERATION

Symposium on Sejong's Future Paradigm

KRIHS and eight other institutes co-hosted an international symposium on "The Future Paradigm of Sejong City as a Creative City" on April 6, 2010, in the KRIHS auditorium. The goal of the symposium was to review overseas case studies and derive implications for the development of Sejong City. Professor Axel Busch, director of TOPOS in Germany, and three other speakers gave presentations. It is expected that the result of the presentations and discussions would be used as a reference in the development of Sejong City.

OECD-KRIHS Workshop

OECD met with KRIHS, the local team for National Urban Review, on April 13, 2010, to discuss urban spatial structure and challenges Korean cities are facing in deploying green growth strategies. The goal is to facilitate the ongoing research of OECD regarding Korea's "National Urban Review." The themes of the morning and afternoon sessions were "Review of the urban structure of Korea" and "Challenges in implementing green growth strategies in cities of Korea." Professors and KRIHS and OECD specialists engaged in in-depth discussions on the subjects.

Overseas Urban Development Workshop

KRIHS held a workshop on "Shifting Paradigms" on April 20, 2010, with Mr. Timothy H. Haahs as the guest speaker. This is one of the monthly workshops related to overseas urban development. Mr. Haahs, the president of Timothy Haahs & Associates and chair of the inaugural Urban land Institute South Korea Conference, spoke about the shift in preference over types of housing and community, stating that people prefer smaller houses in self-sustaining communities. It was followed by an active Q&A session.

KRIHS Signs an MOU

KRIHS signed an MOU with the Barlett School of Planning at the University College London on May 4, 2010. The areas of cooperation include programs offered at either institution for the development and strengthening of cooperative relationships between the two institutions, particularly in the area of urban and regional research and planning. KRIHS formed an MOU with many institutions around the world, but this is the first MOU KRIHS has signed with an institution in the U.K.

Training Program for Officials from African Countries

The 2010 Urban and Regional Development Program sponsored by the Korea International Cooperation Agency (KOICA) was held in the KRIHS auditorium from May 11 through May 28. As this year is designated "The Year of Africa" by the Korean government, nine government officials from four African countries of Cambodia, Cote d'Ivore, Morocco, and Tunisia were invited to join the training program. They had a chance to learn about Korea's experiences with urban and regional policies and visit related sites including Busan-Jinhae Free Economic Zone Authority and Korea Expressway Corporation. It is expected that the relationship formed through the program will help enhance partnership between Korea and the African countries.

NEWS & ANNOUNCEMENTS

KRIHS Receives "Excellent Research Institute Award"

KRIHS was selected as an excellent research institute and received the "Prime Minister's official commendation." Every year, the National Research Council for Economics, Humanities, and Social Science (NRCS) selects excellent research institutes among 23 government-funded research institutes under the Prime Minister's Office, based on the institute's contribution to the society through its research. In the past, KRIHS was recognized for its excellent research capabilities and achievements: It was nominated an excellent research institute by NRCS in 2005, 2006, and 2008, and selected as the best institute by the Ministry of Strategy and Finance in 2006. The 2009 award ceremony was held on February 5, 2010 in the conference room of NRCS. It was an occasion for KRIHS to renew its commitment toward producing creative and leading research outcomes.

Symposium for Promoting Hanok

"Technology and Policy Symposium for the Promotion of Hanok (traditional Korean housing)" was held on February 9, 2010, at the auditorium of the National Museum of Korea. It was a place to unveil the outcome of the research on the assessment of the environmental impact of Hanok and its promotion, undertaken by the Architecture and Urban Research Institute, which is an affiliate organization of KRIHS, and Korea Institute of Construction Technology at the request of the Ministry of Land, Transport and Maritime Affairs. About 200 persons, including staffers of provincial self-governments, Hanok experts, and the general public attended the symposium. It was a venue for people of various backgrounds – self-governments, academia, and private developers – to exchange their opinions regarding the inheritance of a traditional construction culture.

Policy Conference Related to Bike Use

KRIHS and four other institutes co-hosted a "Policy Conference for Upgrading and Implanting Bike-Using Environment and Culture" on April 26 at the National Assembly Memorial Hall. Dr. Ryu Jai-young, director of National Infrastructure & GIS Research Division of KRIHS, and Dr. Baik Nam-cheol, director of Advanced Transport Research Division in Korea Institute of Construction Technology, were among the presenters. This is the first conference of the Korea Bicycle Federation, which was established in October last year. Diverse and fresh measures to promote the use of bicycles were explored at the conference, including building bike paths network across the national territory, using private capitals in building bike facilities, and providing tax incentives to those commuting to work or school more than a certain distance by bicycles.