Korea Land Information Survey Platform: Dynamic Statistical Mapping System for Spatial Decision Making Support

Prepared by Republic of Korea

1 This document is being produced without formal editing
KLISP

Korea Land Information Survey Platform
: Dynamic Statistical Mapping System for Spatial Decision Making Support

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0. Introduction of NGII & KRIHS

I. Project Background

II. Overview of KLISP

III. Dynamic Statistical Mapping

IV. Concluding Remarks & Future Work
Introduction of NGII & KRIHS
Mission

- To establish Geodetic datum & Geodetic control
- To make National Base map & Geo-spatial Imagery
- Geographical Names, Gazetteers and the related publication
- R&D, International Cooperation
- Dissemination of Products

Budget

- Mapping: 42,335,000
- Geodetic Survey, VLBI Projects: 19,497,000
- Labor cost: 359,500
- Other: 193,500
- Total: 62,385,000

2011, USD
KRIHS, Korea Research Institute for Human Settlement

Smile Land
KRIHS will lead the way to realize an affluent and safe territory in the 21st Century

Quick Search

President
Research Advisory Committee
Office of Audit
Vice President

National Territorial Planning & Research Division
Regional Research Division
Infrastructure Research Division
Urban Research Division
Geospatial Information Research Division
Environment & Water Resource Research Division
Global Development Partnership Center
Planning & Management Division

Center for National Territorial Plan Assessment
Center for Future Studies on National Territory
Center for Korean Peninsula & Northeast Asia Studies
Center for Urban Regeneration Policy
Center for Cultural Territorial Policy
Center for Healthy & Longevity City

National Urban Disaster Management Research Center
Center for Real Estate Market Analysis
Center for Road Policy Research
Center for Construction Economy
Center for National Territorial Policy Simulation
Government is committed to establishing National Territorial Policies for Improving Happiness of People

Opening public big data accelerates the utilization of decision making tools for establishing scientific policies.

**Government 3.0**

- **Open**
- **Sharing**
- **Communication**
- **Collaboration**

**Happiness & Safety of People**

- **Quality of life**
- **Statistical Geospatial Indicators**
- **Service GOV**
- **Capable GOV**
- **Confident GOV**

KOREA
Case of designing overnight bus routing system in Seoul using big data

- Optimal routes were designed by harnessing real time population data constructed from the locations of cellphone users at night time.
High school students made community map quickly by locating areas running short of gas; this substantially helped decision making for prioritizing gas supply when Hurricane Sandy hit the northeastern U.S.

Dr. Im, Wansoo (Founder and CEO of VERTICES, LLC, The Center for Community Mapping, NGO), an expert of developing public participatory Web GIS based on communicative decision making support system.
Juveniles and citizens participated in the programs for measuring the concentration of nitrogen dioxide in the air and provided data voluntarily as a result of citizens’ campaign for recovering blue sky.

Places that are not well known to volunteers are mapped in order to identify where to volunteer. This map was developed by students in Inje University.
Improving Survey Method

Producing dynamic spatial statistical information

As Is

• Indirect data collection system using periodicals (e.g., statistical yearbook)
• Problematic due to collection error, precision, currency, etc.
• Focusing on producing administrative boundary maps such as province and city/county/district
• Outdated maps are not quickly updated by public providers

To Be

• Direct data collection system synchronizing real time changes in areas of interest
• Location-based, rapid map production system with hierarchical, pyramid structures of spatial units
• Dynamic map provision framework to satisfy policy demand and encourage use by prosumers
Framework Act on The National Land

Article 25 Survey of National Land Information

The Minister may survey in advance the population, economy, society, culture, traffic, environment, land utilization and other matters prescribed by the Presidential Decree, when deemed necessary in order to formulate any plans or policies for the national land, or to establish the national land information system, and to prepare the annual report, etc.

Organization

- Ministry of Land, Infrastructure and Transport : National SDI Policy
- NGII: Producing and Managing of National Spatial Information.
- Center for Land Survey DB : Planning and Implement of KLISP
Structure of KLISPlatform

Supporting scientific decision-making for national policies

National Atlas

Dynamic Statistics Mapping System

Annual Reports

NTI: National Territorial Indicators

quantitative/formal data
- National Base map
- Land indicators
- Diagnostic indicators

qualitative/informal data
- Human
- POI
- Sentiment indicators

Land Information Survey Platform

Land Information Survey Platform
Dynamic Linking Statistical & Spatial Data

**Dynamic Linking**

- Spatial Information Platform
  - X, Y, Z Address
  - Linking via Address (Geocoding/Mapping)
- Socioeconomic Data
- Geo-tagged Data

**Pyramid of Indicators**

- Regional Unit (Metro/Mega region)
- Administrative BND Unit (City/County)
- Parcel/Grid Unit (100m, 500m, 1km)
Application of Statistical Mapping

◆ Who and what statistical map targets for?

**Dynamic Statistical Mapping System**
- representativeness
- quantitative
- reliability
- concreteness

**Nationwide Scale**
- Central government Policy Maker
- National Infrastructure
- Time serial Social Change
- Competitiveness

**Local Scale**
- City Government, Researcher
- Facility Accessibility
- Land use Change, Spatial Pattern

**Regional Scale**
- Metropolitan Mega Region planner
- Inter-regional flow
- Regional characteristics

**Monitoring National Capacity**
Diagnosis problem area
Dynamic Statistical Mapping
Grid-based statistical maps of building locations and related attributes

Building in Parcel (LIS)

Spatial Query

Grid Unit

Architecture Information (AIS)

Admin.BD

Parcel based Address Matching

Building count

Building Area
Building Statistical Map (Daejeon Metropolitan City)

- Convenient to understand the distributional properties of buildings by zoning code, total floor areas, old buildings, etc.

<table>
<thead>
<tr>
<th>zoning code, total floor areas</th>
<th>Old buildings, total floor areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>주거용 건물의 비율</td>
<td>노후건축물의 비율</td>
</tr>
<tr>
<td>상업 · 업무용 건물의 비율</td>
<td>노후건축물 연면적의 비율</td>
</tr>
<tr>
<td>산업 · 공공용 건물의 비율</td>
<td>노후건축물의 비율 (500m 거리)</td>
</tr>
<tr>
<td>교육 · 문화 · 복지용 건물의 비율</td>
<td>노후건축물 연면적의 비율 (500m 거리)</td>
</tr>
</tbody>
</table>
Land price Statistical map (Sejong City)

◆ Sejong Special Self-governing City

- Multifunctional Administrative City

- Project area: 73 sq km
- Project cost: KRW 22.5 trillion
  committed 9.7 trillion as of Feb 2013
- Population target: 500,000
  density: 68 person/hectare
- Completion: 2030
- Developer: Land & Housing
Land price Statistical map (Sejong City)

◆ spatial distributions of average land prices
Spatial distributions of residential houses

- Newly built residential houses (2007)
- Newly built residential houses (2013)
Building Statistical map (Sejong City)

- Spatial distributions of commercial buildings

commercial buildings (2007) vs. commercial buildings (2013)

newly built
Application of Grid-based Statistical Map

- To identify where accessibility to day care are problematic in the sense that the number of day care facilities is relatively smaller in the areas with denser population.

Distribution of infants & children

Insufficient day care facilities
Summary

• Address-based linking of heterogeneous data has enabled the dynamic production of statistical maps at a varying range of spatial unit.

• Extending this data-linking framework to other government information systems would further improve the usefulness of land survey information.

Future work

• Standardization of diverse systems for geo-addresses

• Enhancement of the methodological framework for address-based data matching
Thank you for your attention