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UN GEONOW 2024
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Land and Geospatial Systems, Natural Resources Valuation and Green Urban Development

Mika-Petteri Törhönen
Global Lead on Land

70% to Live in Cities by 2050

Globe’s population 8.5 billion by 2030.

80% to live in Africa - Asia by 2100.

50% in urban areas today.

70% / 6.3 billion live in cities By 2050.

Latin America will reach 79% urbanization.

Unwanted Land Conversion

Agriculture grows 20%, and 55% in Africa, by 2030.

Agricultural expansion converts forests to farmlands.

Urbanization turns farmlands to urban settlements.

Climate change and economic shifts cause migration.

Wealth reduces household sizes.

Housing and planned / served lands demand explodes.

Infrastructure Gap; $1.5 trillion every year until 2030

675 million people need electricity

2.3 billion need clean drinking water

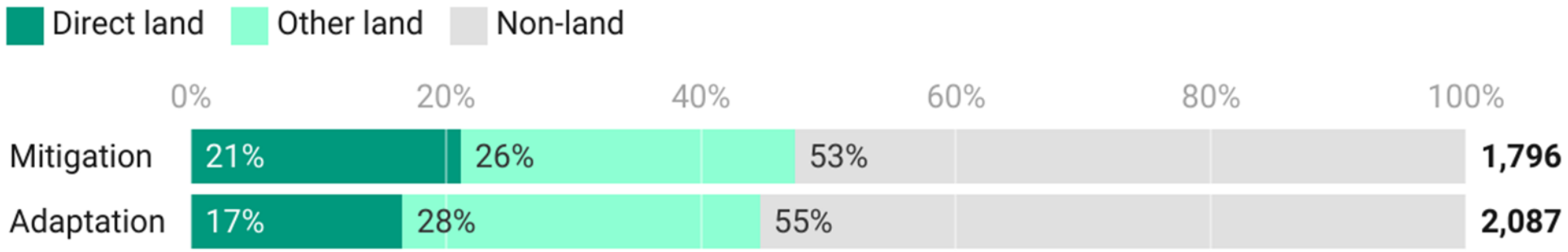
3.6 billion need safe sanitation

1 billion need access to an all-season roads

450 million live without a broadband signal

$1.5 trillion of investments every year, 4.5% of the GDP, to infrastructure in low/middle - income countries. https://www.worldbank.org/en/topic/sustainableinfrastructurefinance/overview

Almost 1 in 2 climate actions relates to land



75% of land climate actions concern

Forestry, Energy, Transport, Environment, Agriculture, and Waste sectors

The data covers Asia, the result may be different in other regions. Global Guide for Access to Land and Climate Infrastructure, The World Bank 2024.

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Land Administration and Management Evolution

Evolution of Land Administration and Management

Base: Completing Urban Land Records/Cadasters and Geospatial Foundation	Development of complete **land and building registers/cadasters, cadastral mapping,** and joint geospatial infrastructure for national and city land administrations.
Modernization: Integrated Digital Land and Urban Systems	**Digitalization, modernization and integration/interlinking** of land and building registers, and joint geospatial base with applications for land and property valuation systems, property taxes, public land management, land use planning, permitting and construction monitoring, and associated spatial data infrastructures (SDIs), land information systems (LISs) and 3D/Digital Twin solutions, and their interlinking with national eGovernment (census, legal entity, address etc. records) and municipal systems and services.
Land Use: Valuation, Land Revenue, Value Capture, Land-based Financing, Public Land Monetization, Urban Readjustment, and Integrated Spatial Planning.	User cases where digital and integrated land and urban systems are applied to for example **valuation, taxation, land-based financing, land value capture, public land monetization, urban readjustment and integrated spatial planning** applications with revenue, urban development, PPP, repurposing, regeneration or climate change adaptation and mitigation motives.

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Stage 1; Completing Records

Shared vision and objectives of land and forest agencies and cities, necessary

- Building trust and relationships
- Understanding each other's processes and targets

Single land registry and mapping to avoid overlaps

- If not possible, enhance interoperability of systems
- Establish data sharing mechanism across ministries and agencies.
- Build a GIS-based digital inventory of customary, communal/IP lands

Territorial parcel by parcel approach

- Joint legal and cadastre registration process
- Public awareness, inclusion, FPIC with IPs
- Remote sensing base mapping
- Participatory mapping to delineate land holdings
- Assisted public display of results
- Social verification of results
- Dispute resolution
- Registration of undisputed rights
- Right to appeal disputes to court

Take note to

- Involve all stakeholders
- Use local languages
- Employ CSOs and IP organizations for grass roots community development and legal empowerment

Indonesia's Success with Land Registration

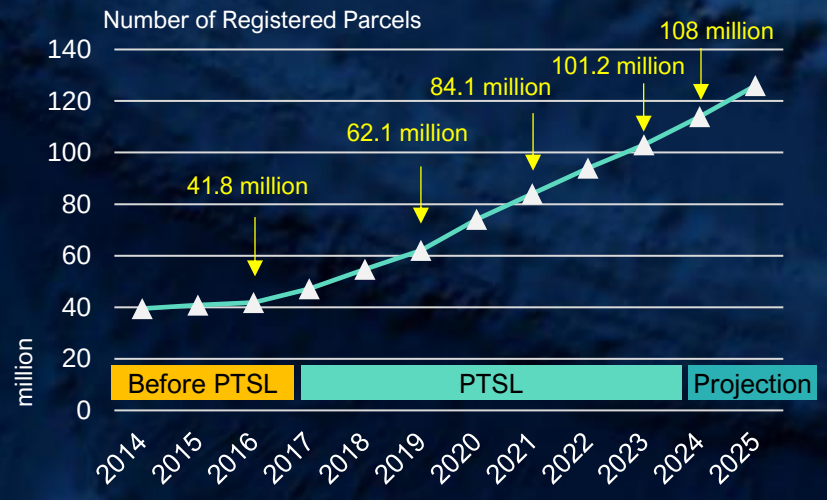
Over 60 million new land rights in 8 years!

Poverty Rate

Forest Area

Selected Districts

Land Registration Progress



Target 2024: 120 million land rights registered.

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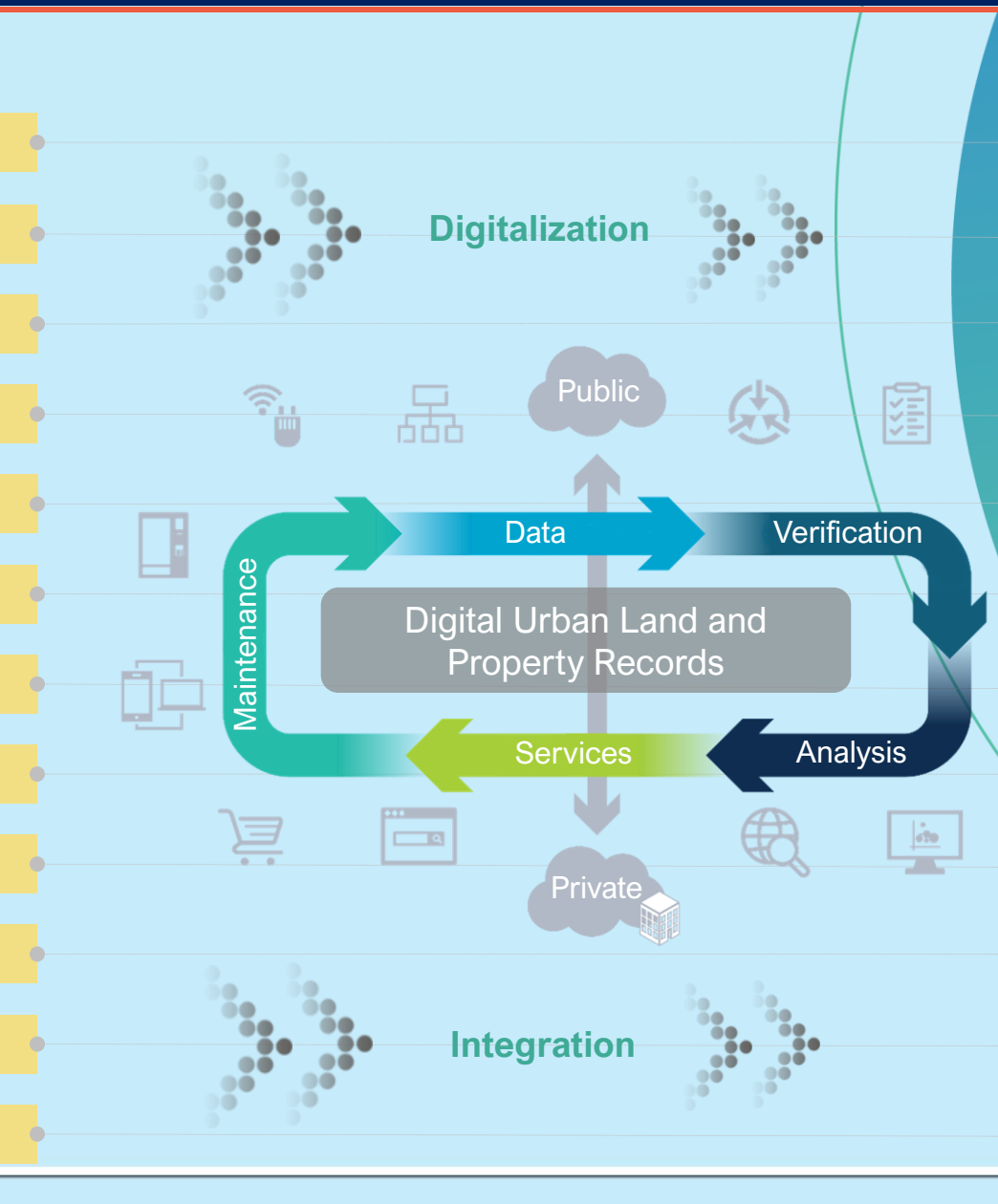
Stage 2; Digitalizing and Integrating Records

Digital and Integrated Land Administration

Core Functions

- Land and Property Register
- Cadastre, cadastre map
- Building Register
- Address Register
- Base Mapping
- Valuation
- Taxation
- Asset Management
- Land Acquisition
- Planning
- Permitting
- Monitoring



Digital era, Modernized

- 100% Coverage, Link **eGov**
- 100% Integrate with LR, Link **eGov**
- Integrate to Cadastre, **eServices**
- Link **eGov**
- Standardize **SDI**, Link to **NSDI**
- Mass Valuation, Link to **eGov**
- Market Value Based
- Asset Monetization
- Market Value Based
- Integrated 3D Applications
- Capturing BIMs
- Automatic Change Detection

Digital, Integrated and 3D Land and Urban Systems

Rights, Assets, Values, Revenue, Services

Land Use Plans, Permits, Construction

Digital Twins, 3D Land Records

Real Time Information Flows

Joint Geospatial Platform, and Integrated Land, Cadastral and Building Records

Open Data

Integrated

Democratized mapping

DISASTERS Disaster Risk Management

TRANSPORT Green transport

IoT / AR / Digital Twin

ENERGY

3D Land Records, BIM, Prop Tech

BUILDINGS

Resilient Land Delivery System

LAND USE

Routes Optimization

WASTE

Satellite Imagery

Drone UAVs

AI

Service Layers

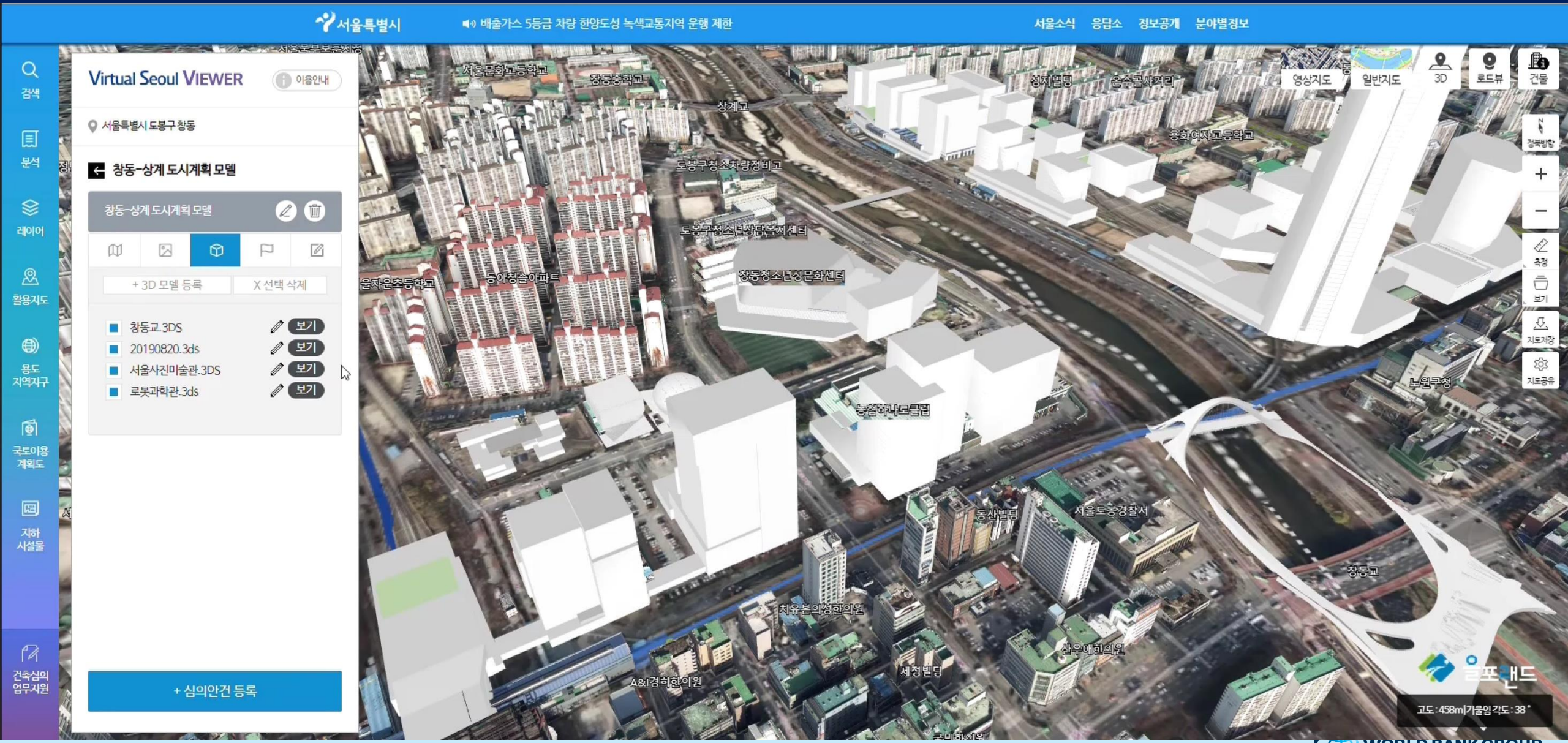
Universal Reference

Land, Assets, Utilities

Regulations and Standards

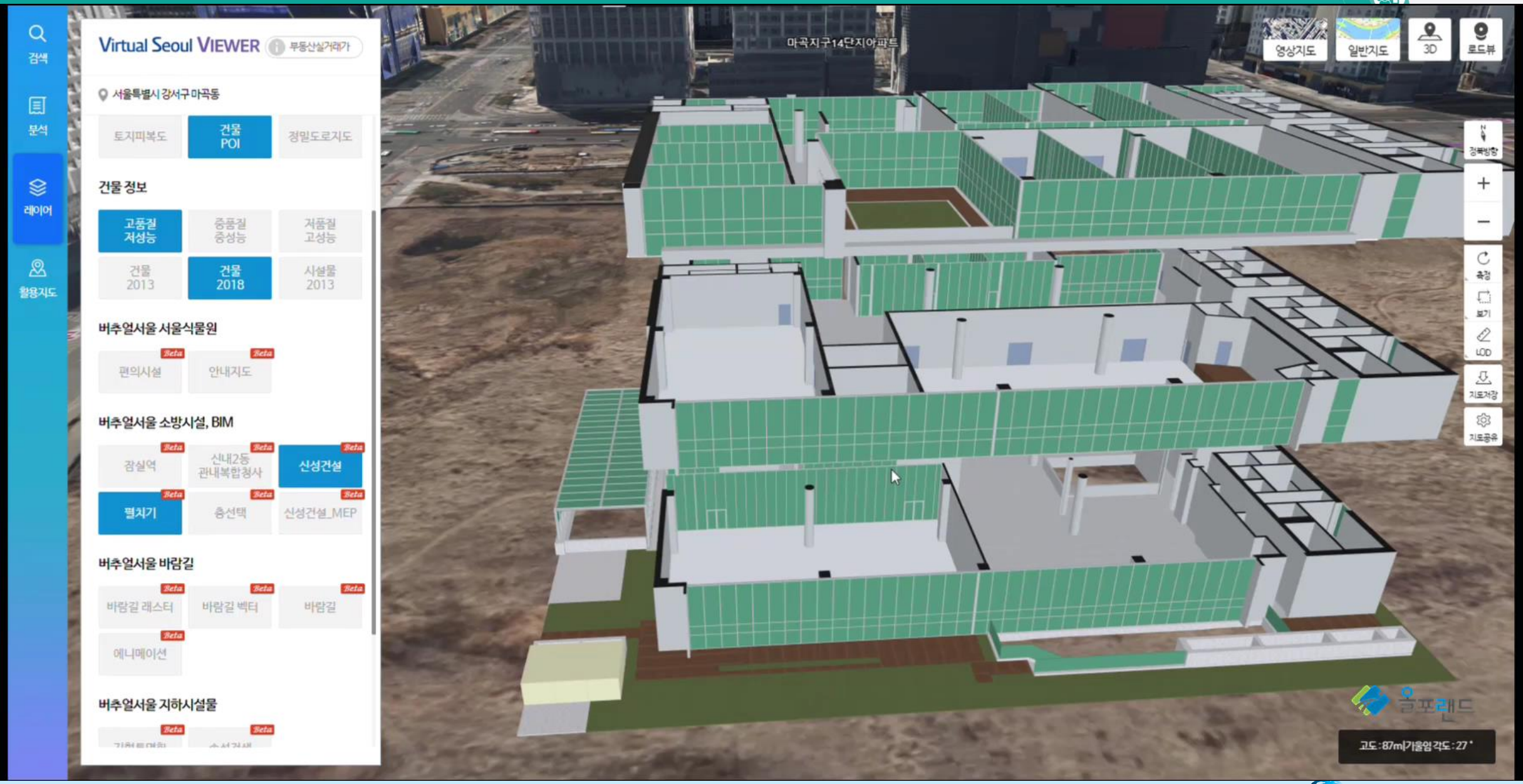
Geospatial Framework Enables LOW-CARBON SMART CITIES

3D Cadastre and Smart Cities

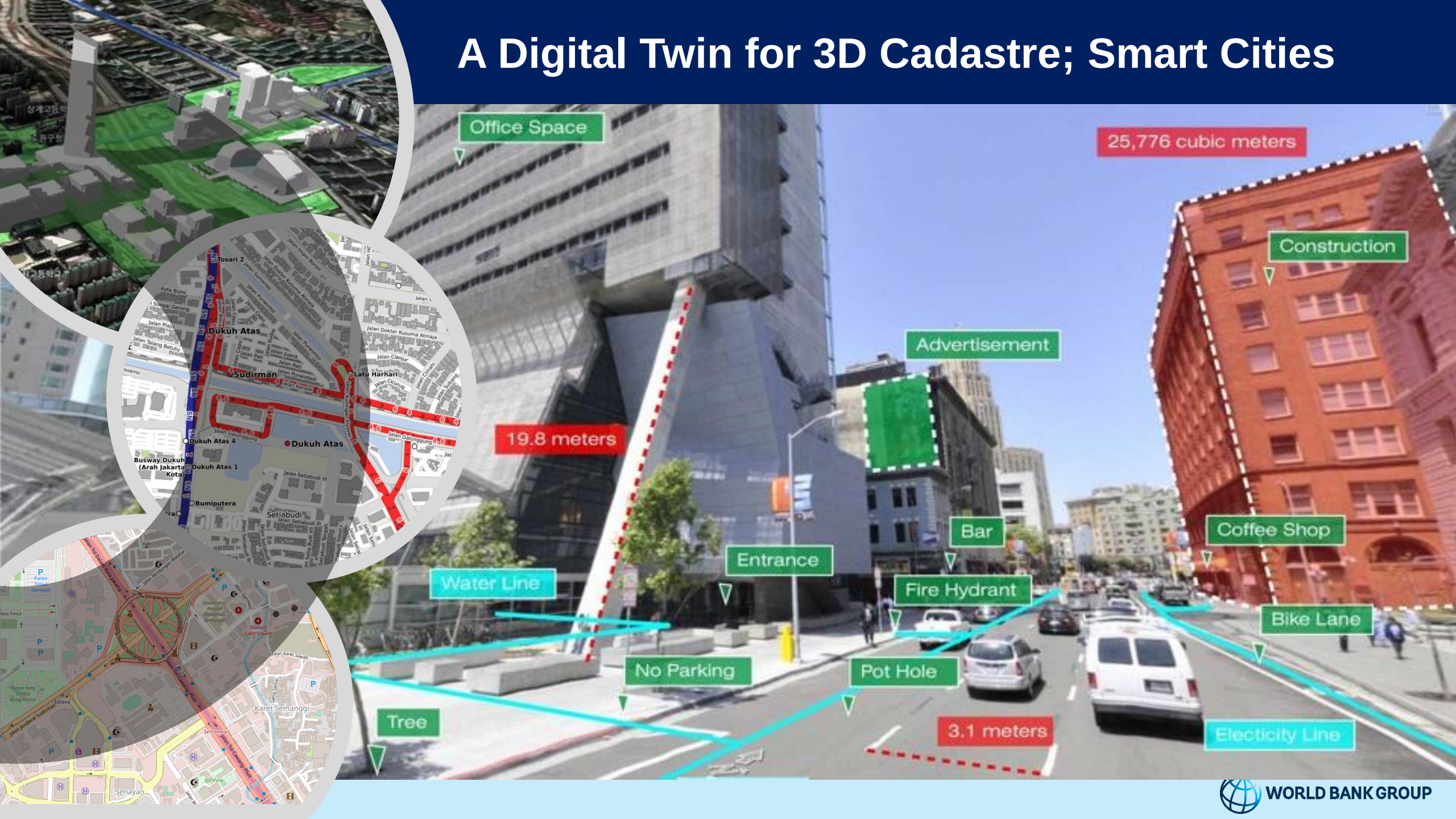


BIM Design Data

Indoors data query



A Digital Twin for 3D Cadastre; Smart Cities



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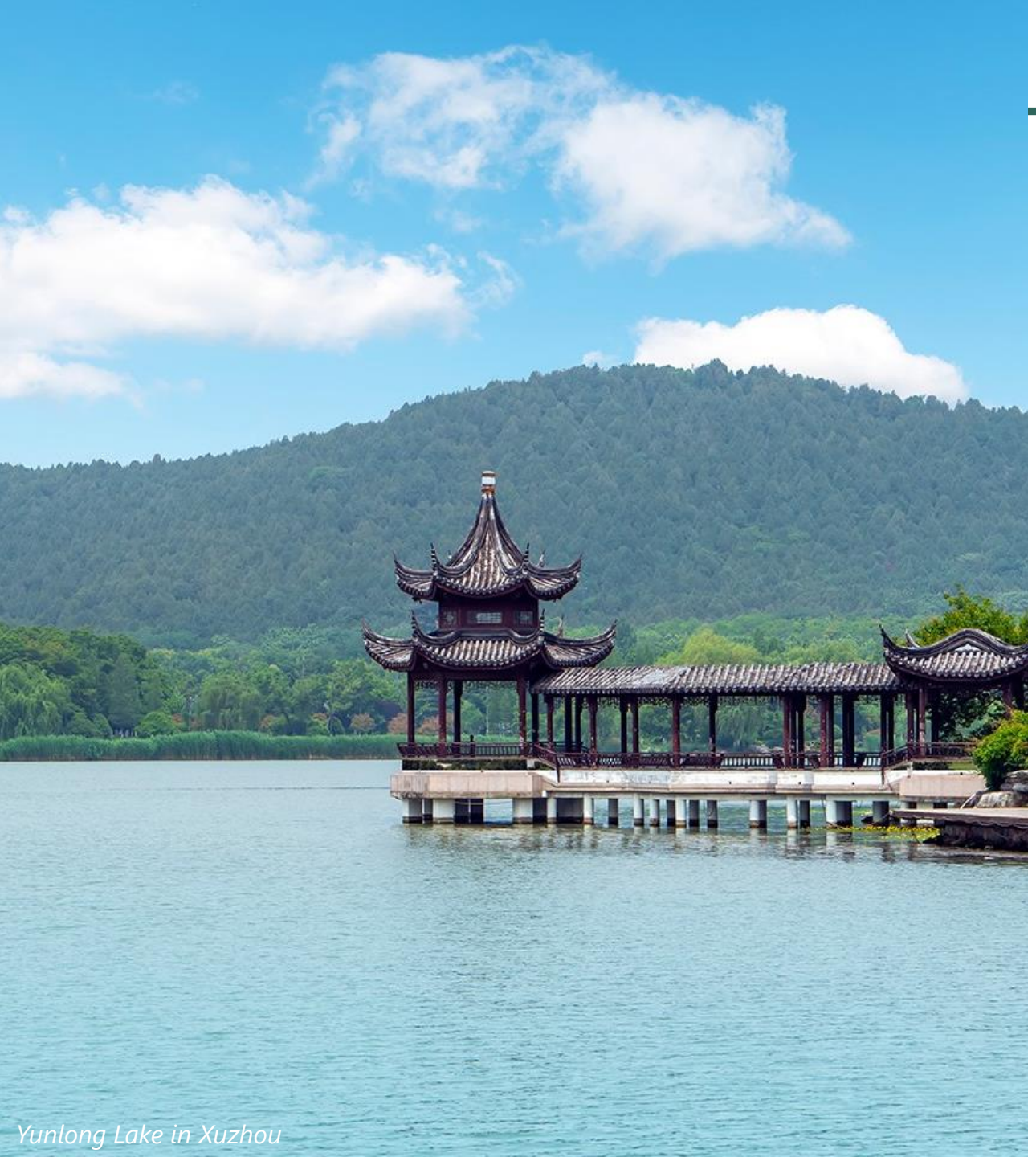
Stage 3; Applying Integrated Records



Yunlong Lake in Xuzhou

China’s Sample

- China's **unprecedented urbanization** has yielded **socio-economic gains,** but also **resource constraints** and **environmental degradation** challenging sustainable urban development.

- The planning policies (general land use planning 1986, city clustering 2014 etc.) have balanced land area expansion and city development, but the system of **municipal financing has relied on public land leasing incentivizing urban sprawl.**

- National Plan on New Urbanization 2015 champions **sustainable, transit-oriented urban development** and underscores **enhanced urban planning systems**.

- China is committed to fostering **ecological civilization** marking a shift from a resource-intensive growth model to **green and high-quality growth.**

Shizishan Chu King's Mausoleum in Xuzhou

The **Ministry of Natural Resources (MNR)** emphasizes the need to improve **urban planning and resilience** focusing on urban resource carrying capacity, real estate data, and disaster management and natural resource valuation abilities.

Yaowan Ancient Town in Xuzhou

- China is dedicated to the **comprehensive integration of all public, private, and communal land, property, and resource records**, ensuring clear and unambiguous coverage.

- Country's **property valuation system** for construction lands covers already most cities and allows **expansion to natural resources.**

2013 The Central Government of China's idea to **compile the balance sheets of natural resources**

2015 **Pilot** for Compilation of the Balance Sheets of Natural Resources.

2020 MNR's **Natural Resources Survey and Monitoring System** to become the basis for natural resources accounting.

- **Natural resources balance sheets** are prepared in **monetary** terms combining economic and environmental values.
- **Natural resource asset price assessment and monitoring system** developed to continuously assess economic and environmental values of natural resources enabling cities' natural resources balance sheets to reflect environmental performance.

Xuzhou Garden Expo Park

- China has advanced cadastre, registration and valuation systems, but the **integration of all records on lands, properties, and resources to one land parcel-based system** (a prerequisite for efficient land management) has not been fully achieved nationwide.

- The pilot in Xuzhou demonstrates a model for nationwide roll out bearing potential for a **large global public good impact** to climate goals.

- The results will be **relevant to cities beyond China** seeking balance between urban growth and environmental preservation.

Pilot in Xuzhou, Jiangsu Province

- **Application of natural resources values in urban planning in Xuzhou** can serve as a model for other cities in China and beyond

- **Core question**: How can urban areas grow and thrive economically while **preserving and enhancing their natural resource base?**

Category	Sub-category	
Land resources assets	Cultivated land	
	Orchard land	
	grassland	
	Commercial land	State-owned commercial land
		Collective land for commercial activity
	Residential land	State-owned land
		Collectively owned land
	Industrial land	State-owned land
		Collectively owned land
Forest resource assets	Woodland resource assets	
	Trees	
Mineral resources assets	coal resource	
	Iron ore resources	
	Grey rock resources	
	Gypsum resources	
Water resources assets (selectable)	surface water	
	underground water	
Wetland resource assets (selectable)	Wetland resources	

May 2024

Guangzhe Chen @Guangzhe... · 14/5/24

The @WorldBank is committed to scaling up land sector investments through our new Global Program. Over the next 5 years, we aim to improve tenure security for 100M people, develop climate-smart land use plans, and enhance land administration for climate goals.

1 5 157

August 2024

Guangzhe Chen @Guangzh... · 30/8/24

Scaling up investments in land tenure and administration is critical to closing the global infrastructure gap and for equitably tackling climate change. Learn more about what we are doing to address these challenges in my latest blog 👇
blogs.worldbank.org/en/voices/why-...

3 4 447

Global Program on Land for Climate Goals

'A global program that ensures security of tenure and access to land for climate change mitigation and adaptation'

Global Land Tenure Security

- To strengthen land policies, laws, registration, and regularization to improve land tenure security of Indigenous Peoples, Local Communities, and public and private owners of forested, rural, and urban areas for SDG 1 (No Poverty) and household-level climate actions.

Women's Land Rights

- To improve women's access to land ownership and control, advancing SDG 5 (Gender Equality) and Stand for Her Land Campaign.

Climate Sensitive Land Use

- To improve regularization, planning and management of urban lands, contributing to SDG 11 (Sustainable Cities and Communities).

Access to Land for Climate Actions

- To improve land administration systems and management of lands to realize bioenergy, afforestation and renewable energy investments and transition away from coal.

Climate Change and Land Use in Indonesia

Critical Gaps

Sustainable Land Use

Land use change is Indonesia's biggest driver of GHG emissions. Deforestation and fires have accounted for over 35% of Indonesia's emissions (Indonesia CCDR).

Green Investment

Business permitting and licensing have been complicated and lacked transparency, exacerbated by poor spatial data. This situation often leads to land conflict, destruction of HCV, impediments to green investments, and worsened environmental degradation.

Social Inclusion

Customary land rights and forest tenure remain insecure, trapping vulnerable communities in poverty and disincentivizing sustainable landscape management.

Solutions

Strengthening spatial planning and land tenure security are key to reduce Indonesia's emissions *and* implement climate change adaptation measures.

1. Direct new agriculture and infrastructure away from high-carbon and sensitive ecosystems
2. Urban densification and planning to reduce further encroachment and build resilient cities
3. Clarify tenurial and administrative status of different land functions
4. Secure land rights for the most vulnerable communities, including indigenous peoples

Integrated Land Administration and Spatial Planning Project (ILASP, US$653 million)

Objective: to strengthen climate-informed spatial planning, land tenure security and land administration in Indonesia.

Component 1
Integrated Spatial Planning

- Detailed spatial Planning (RDTR)
- Regional spatial planning (RTR-KSN)

ATR/BPN

Component 2
Land Tenure

- Comprehensive Land Records
- Adat land rights
- Village Boundary Setting

ATR/BPN, KEMENDAGRI

Component 3
LIS and Valuation

- Land Information System
- Land Value Zone Maps

ATR/BPN

Component 4
Large-Scale Base Maps for Climate Action

- Universal 3D (including height) Imagery and Base Maps
- 3D Thematic Maps (building, utilities, etc.)
- ICT Infrastructure and S/W, Capacity Building

BIG

Component 5
Project Management

- Project Management
- Legal and Regulatory Support
- Institutional Strengthening

All Agencies

- Sustainable Urban Development and Economic Growth for Local Governments
- Climate Resilience and Environmental Sustainability
- Improved Business and Investment Climate
- Disaster Preparedness, Climate Risk Management, Universal SDI for All
- *Adat* Recognition, Communal Lands and Gender Equality

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Thank you for listening

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