WORLD BANK GROUP | KOREA GREEN GROWTH TRUST FUND | Ministry of Economy and Finance

KGID 2025 Green Growth: The Path to Sustainable Jobs

Introduction to K-water Data Governance

K water

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1 What is Data Governance?

"Data is the new oil of the 21st century"

Just as crude oil is refined into valuable fuels,

data governance maximizes the value of data assets.

<Gartner, 2012>

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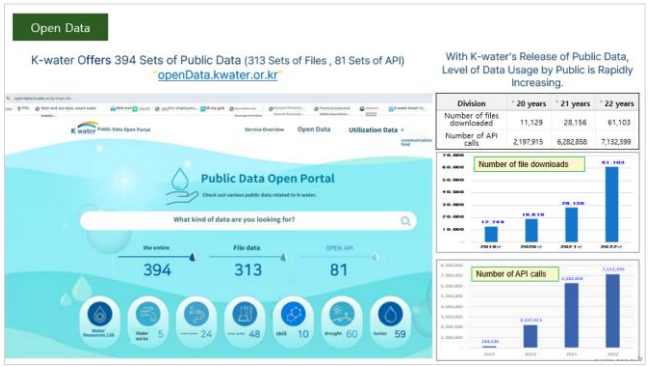
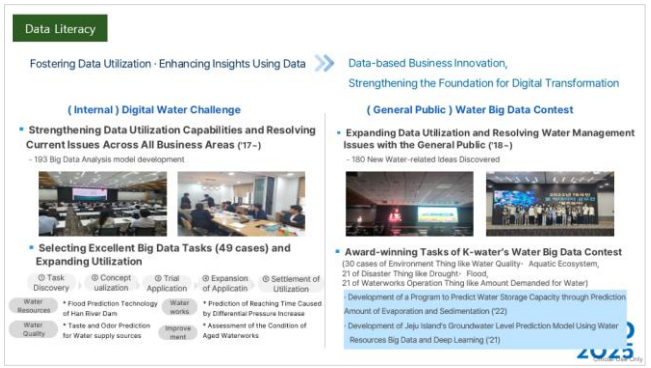
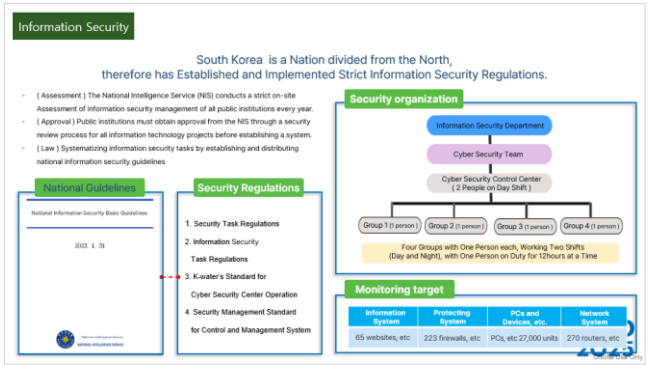
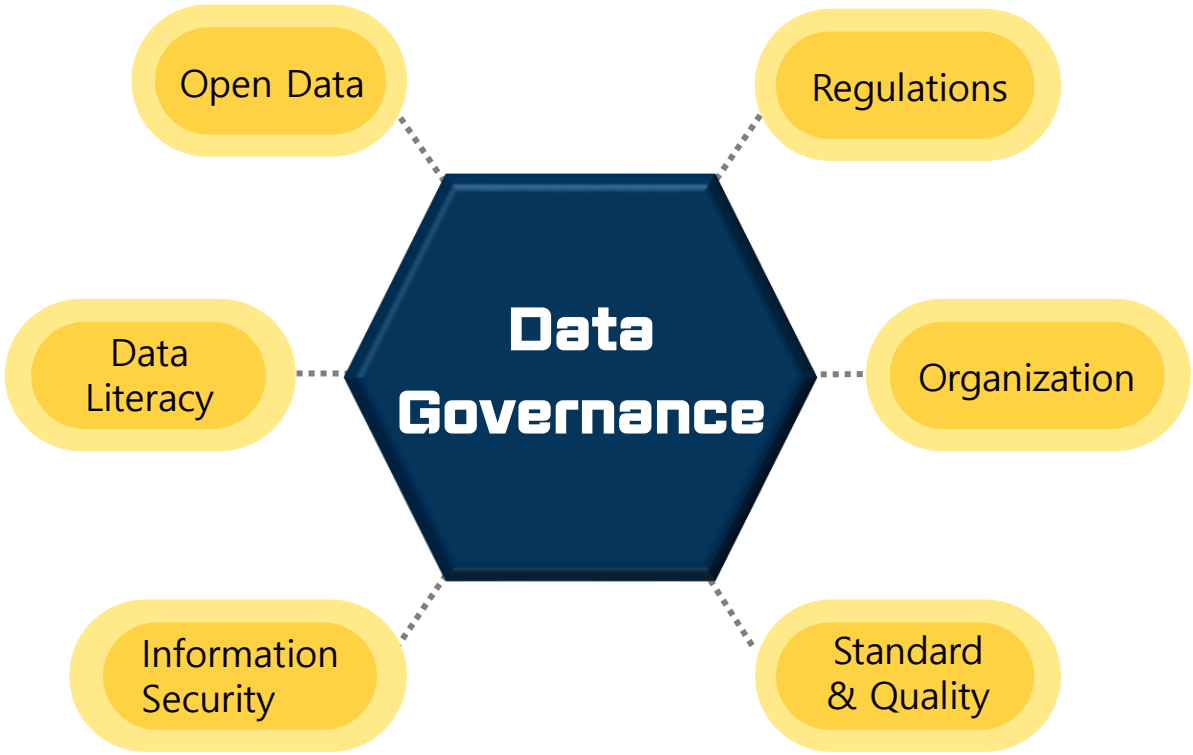
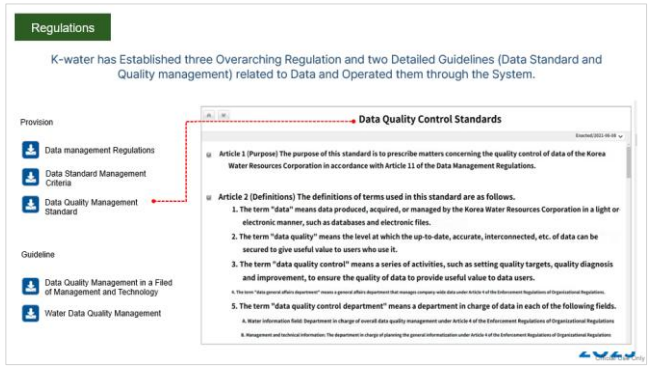
2 K-water's Data Governance

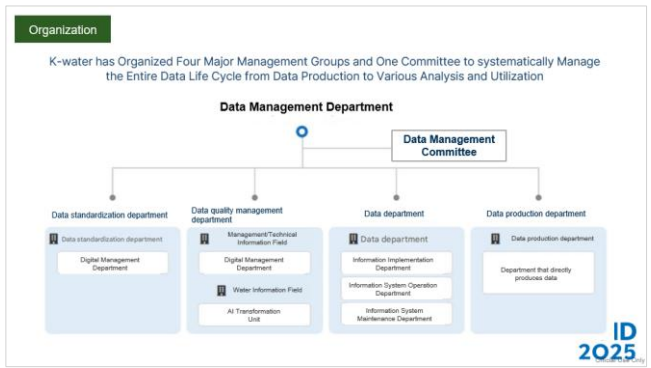


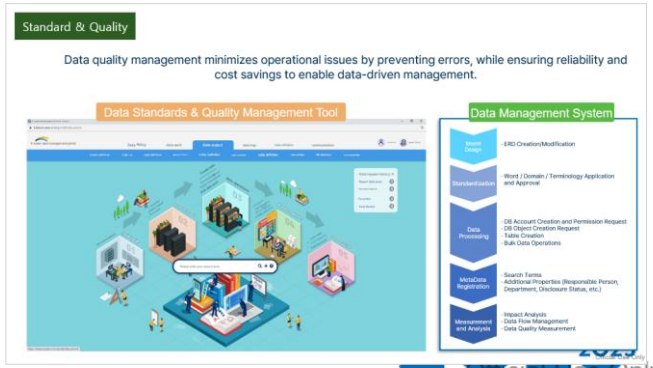












Regulations

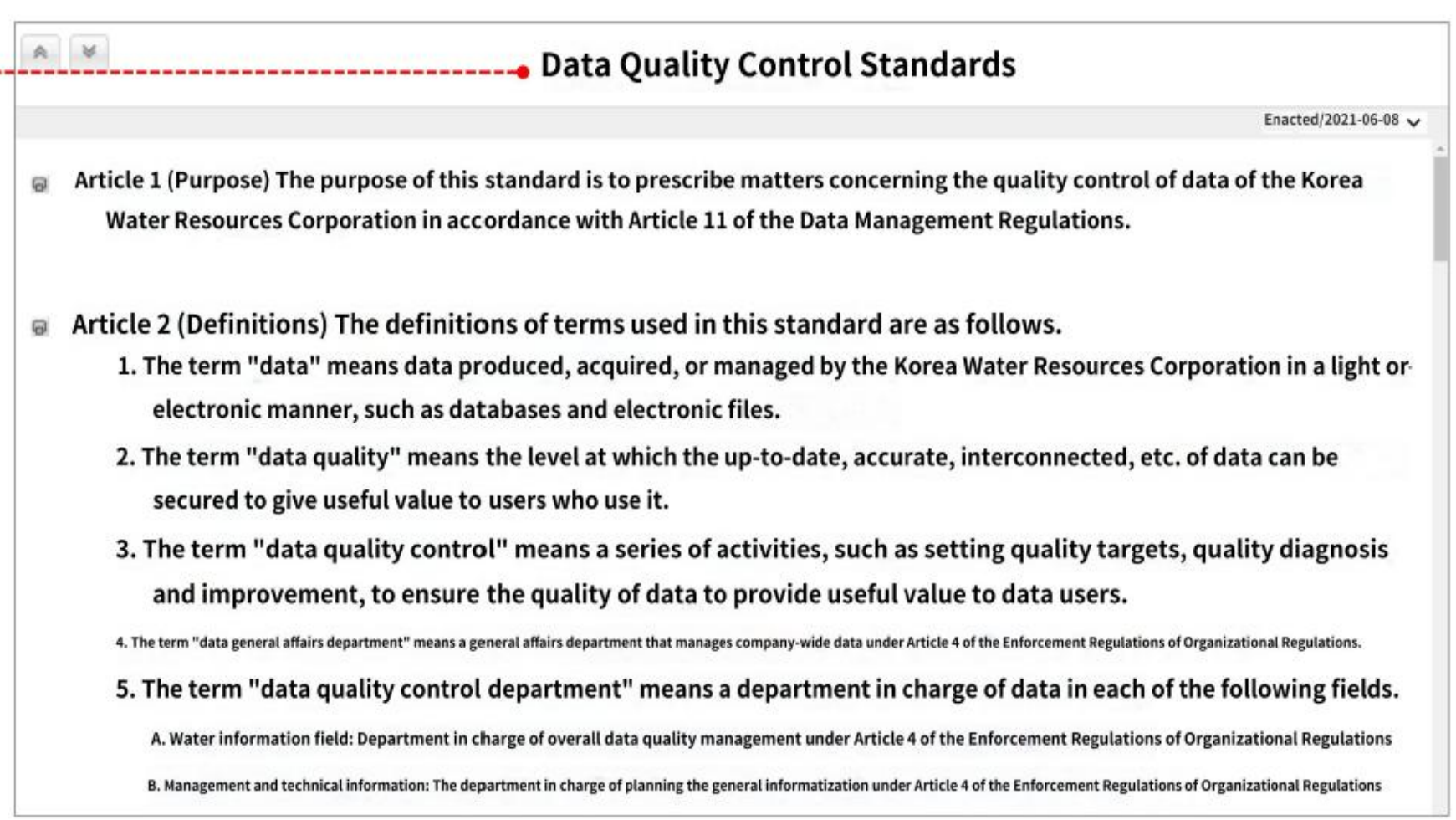
K-water has Established three Overarching Regulation and two Detailed Guidelines (Data Standard and Quality management) related to Data and Operated them through the System.

Provision

- Data management Regulations
- Data Standard Management Criteria
- Data Quality Management Standard

Guideline

- Data Quality Management in a Filed of Management and Technology
- Water Data Quality Management



Data Quality Control Standards

Enacted/2021-06-08

Article 1 (Purpose) The purpose of this standard is to prescribe matters concerning the quality control of data of the Korea Water Resources Corporation in accordance with Article 11 of the Data Management Regulations.

Article 2 (Definitions) The definitions of terms used in this standard are as follows.

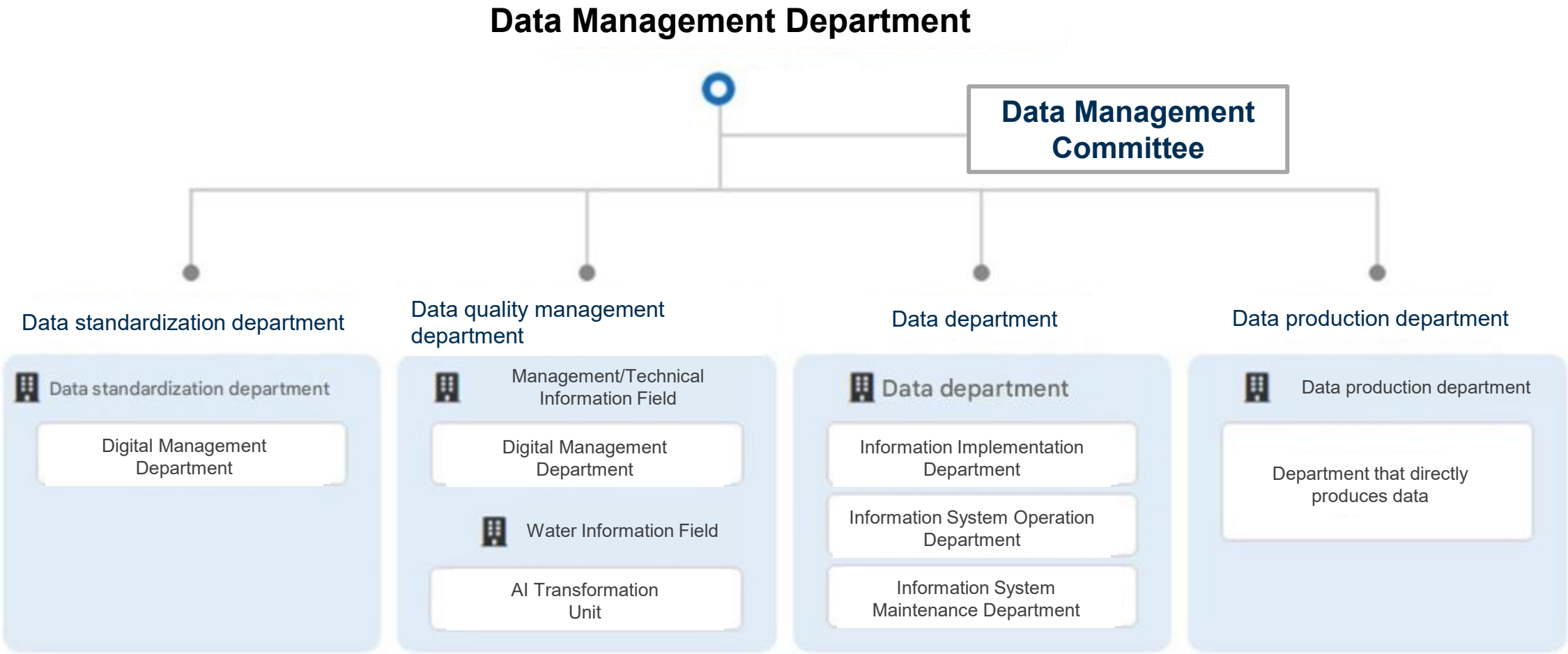
1. The term "data" means data produced, acquired, or managed by the Korea Water Resources Corporation in a light or electronic manner, such as databases and electronic files.
2. The term "data quality" means the level at which the up-to-date, accurate, interconnected, etc. of data can be secured to give useful value to users who use it.
3. The term "data quality control" means a series of activities, such as setting quality targets, quality diagnosis and improvement, to ensure the quality of data to provide useful value to data users.
4. The term "data general affairs department" means a general affairs department that manages company-wide data under Article 4 of the Enforcement Regulations of Organizational Regulations.
5. The term "data quality control department" means a department in charge of data in each of the following fields.

A. Water information field: Department in charge of overall data quality management under Article 4 of the Enforcement Regulations of Organizational Regulations

B. Management and technical information: The department in charge of planning the general informatization under Article 4 of the Enforcement Regulations of Organizational Regulations

Organization

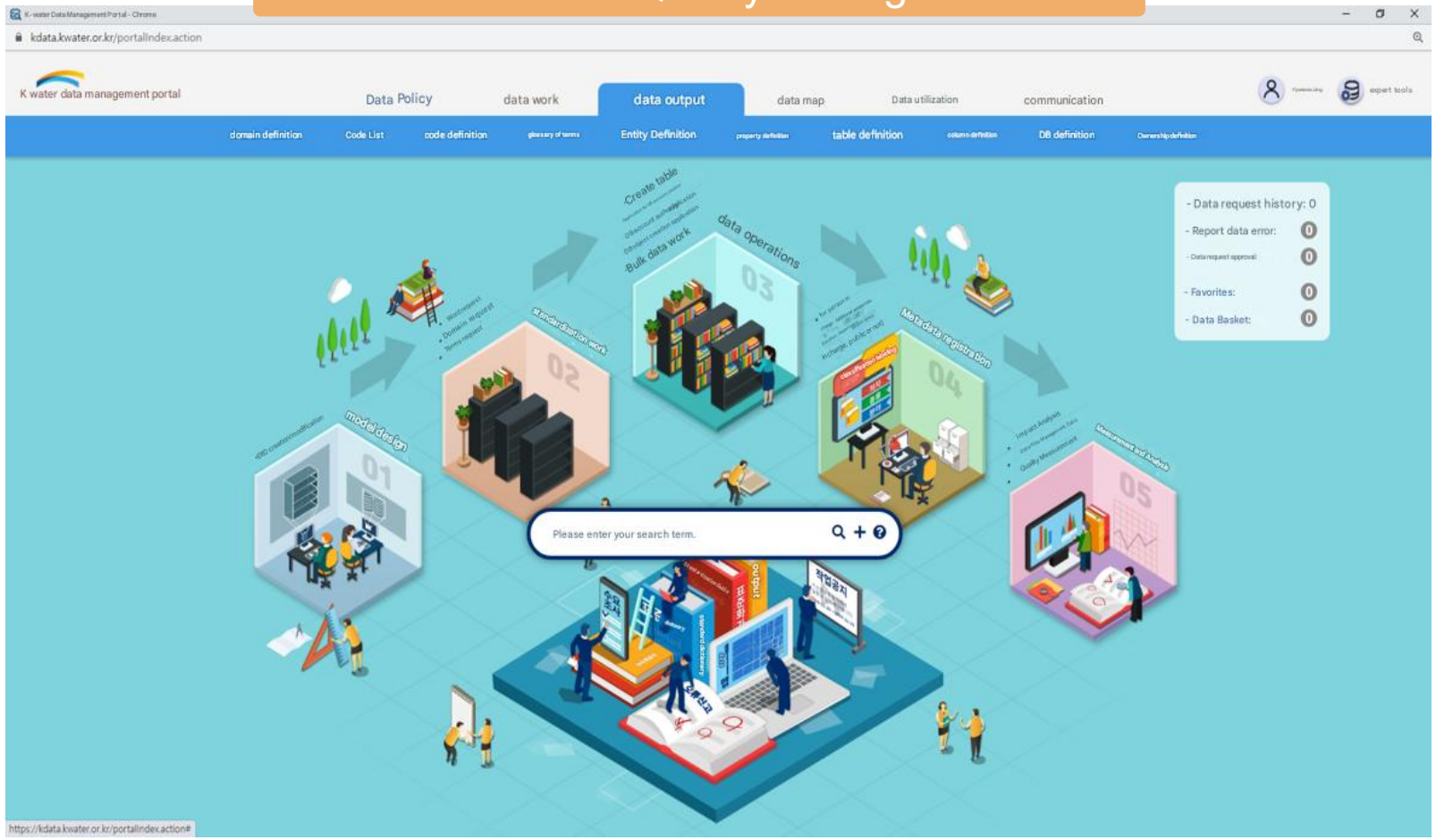
K-water has Organized Four Major Management Groups and One Committee to systematically Manage the Entire Data Life Cycle from Data Production to Various Analysis and Utilization



Standard & Quality

Data quality management minimizes operational issues by preventing errors, while ensuring reliability and cost savings to enable data-driven management.

Data Standards & Quality Management Tool



Data Management System

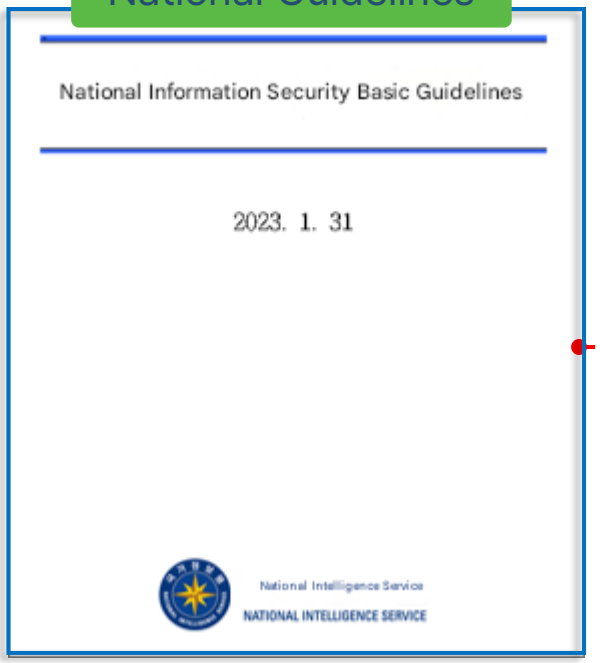
Model Design	· ERD Creation/Modification
Standardization	· Word / Domain / Terminology Application and Approval
Data Processing	· DB Account Creation and Permission Request · DB Object Creation Request · Table Creation · Bulk Data Operations
MetaData Registration	· Search Terms · Additional Properties (Responsible Person, Department, Disclosure Status, etc.)
Measurement and Analysis	· Impact Analysis · Data Flow Management · Data Quality Measurement

Information Security

South Korea is a Nation divided from the North, therefore has Established and Implemented Strict Information Security Regulations.

- (Assessment) The National Intelligence Service (NIS) conducts a strict on-site Assessment of information security management of all public institutions every year.
- (Approval) Public institutions must obtain approval from the NIS through a security review process for all information technology projects before establishing a system.
- (Law) Systematizing information security tasks by establishing and distributing national information security guidelines

National Guidelines


National Information Security Basic Guidelines

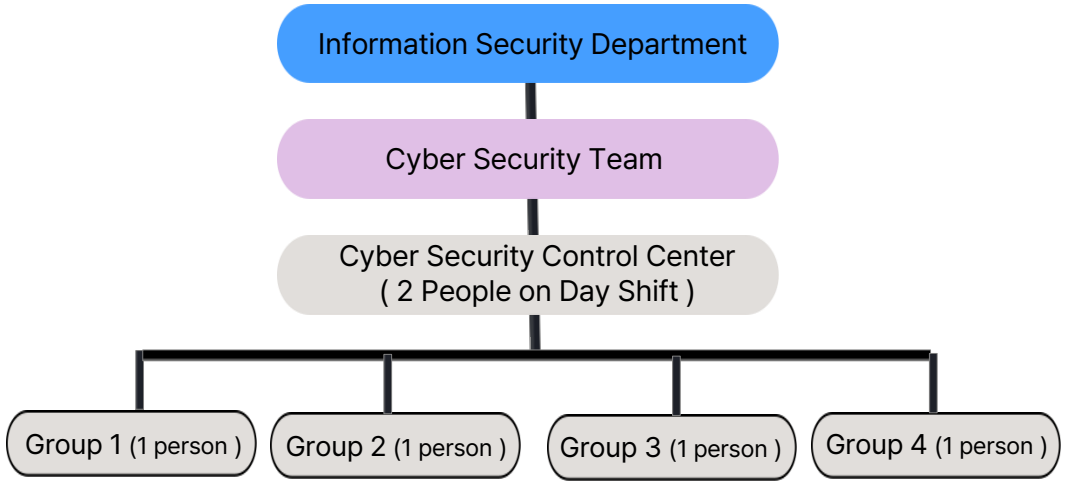
2023. 1. 31

National Intelligence Service
NATIONAL INTELLIGENCE SERVICE

Security Regulations

1. Security Task Regulations
2. Information Security Task Regulations
3. K-water's Standard for Cyber Security Center Operation
4. Security Management Standard for Control and Management System

Security organization



Four Groups with One Person each, Working Two Shifts
(Day and Night), with One Person on Duty for 12hours at a Time

Monitoring target

Information System	Protecting System	PCs and Devices, etc.	Network System
65 websites, etc	223 firewalls, etc	PCs, etc 27,000 units	270 routers, etc

Data Literacy

Fostering Data Utilization · Enhancing Insights Using Data

Data-based Business Innovation,
Strengthening the Foundation for Digital Transformation

(Internal) Digital Water Challenge

- **Strengthening Data Utilization Capabilities and Resolving Current Issues Across All Business Areas ('17~)**
  - 193 Big Data Analysis model development


- **Selecting Excellent Big Data Tasks (49 cases) and Expanding Utilization**

① Task Discovery → ② Concept ualization → ③ Trial Application → ④ Expansion of Applicatin → ⑤ Settlement of Utilization

Water Resources	* Flood Prediction Technology of Han River Dam	Water works	* Prediction of Reaching Time Caused by Differential Pressure Increase
Water Quality	* Taste and Odor Prediction for Water supply sources	Improve ment	* Assessment of the Condition of Aged Waterworks

(General Public) Water Big Data Contest

- **Expanding Data Utilization and Resolving Water Management Issues with the General Public ('18~)**
  - 180 New Water-related Ideas Discovered


- **Award-winning Tasks of K-water's Water Big Data Contest**

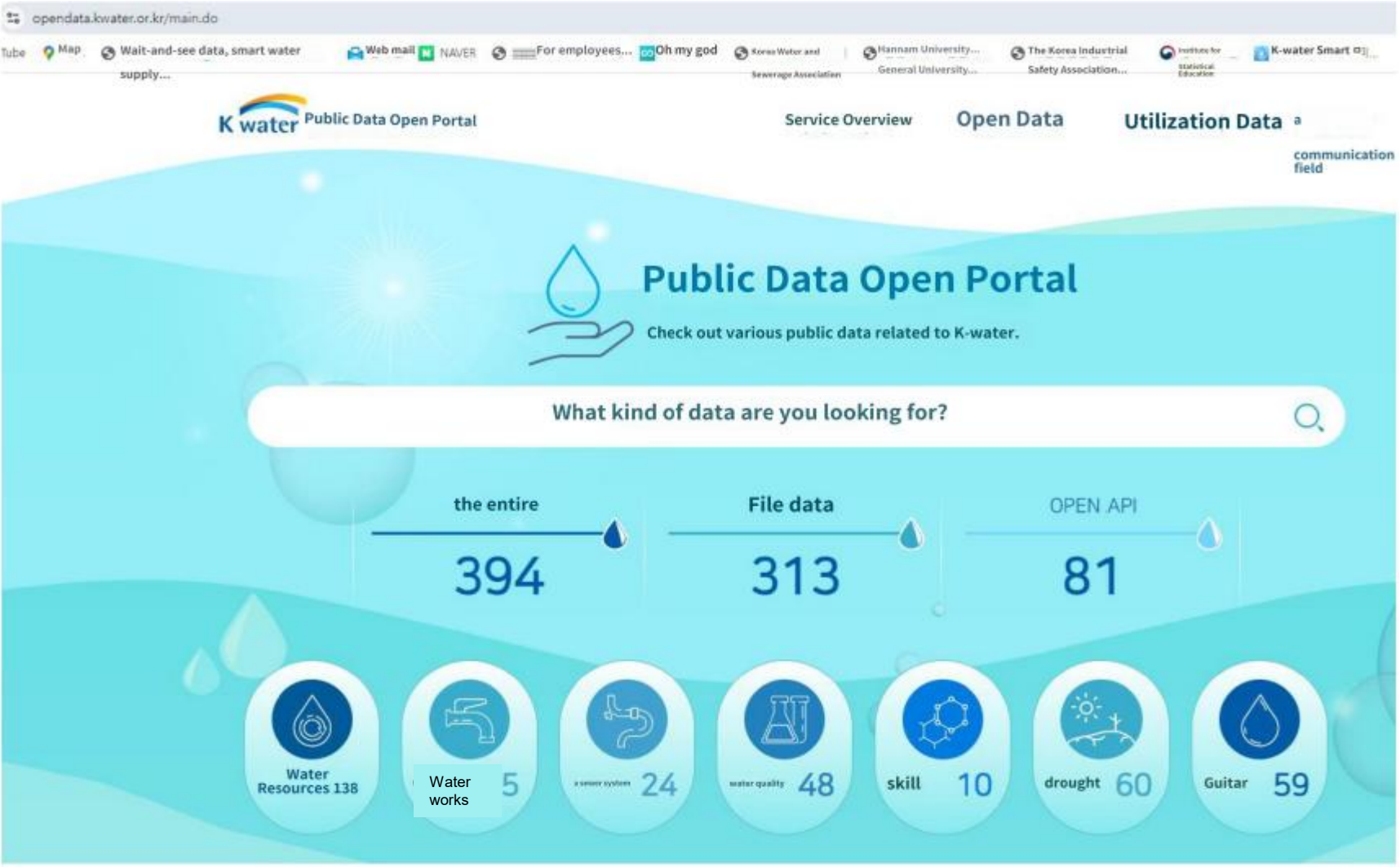
(30 cases of Environment Thing like Water Quality· Aquatic Ecosystem,
21 of Disaster Thing like Drought· Flood,
21 of Waterworks Operation Thing like Amount Demanded for Water)

· Development of a Program to Predict Water Storage Capacity through Prediction Amount of Evaporation and Sedimentation ('22)

· Development of Jeju Island's Groundwater Level Prediction Model Using Water Resources Big Data and Deep Learning ('21)

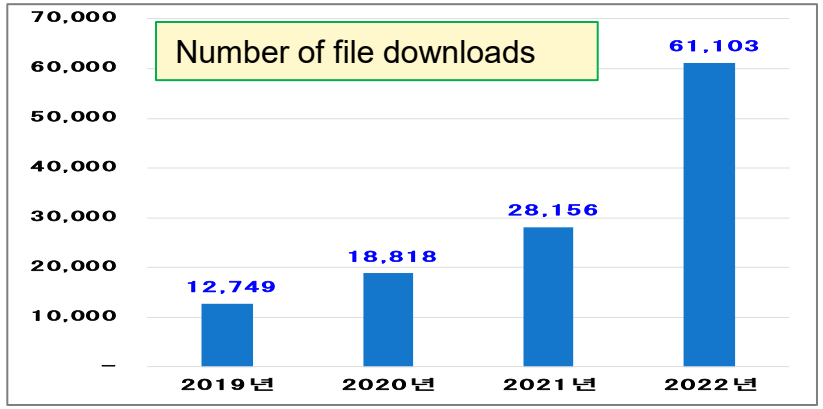
Open Data

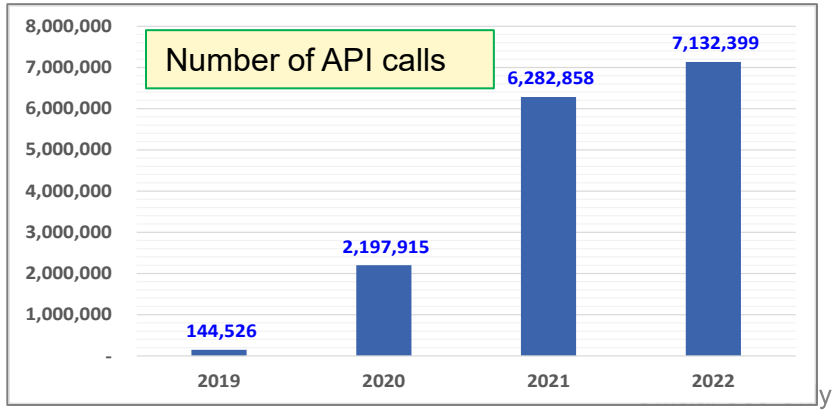
K-water Offers 394 Sets of Public Data (313 Sets of Files , 81 Sets of API)
"openData.kwater.or.kr"



With K-water's Release of Public Data, Level of Data Usage by Public is Rapidly Increasing.

Division	' 20 years	' 21 years	' 22 years
Number of files downloaded	11,129	28,156	61,103
Number of API calls	2,197,915	6,282,858	7,132,399





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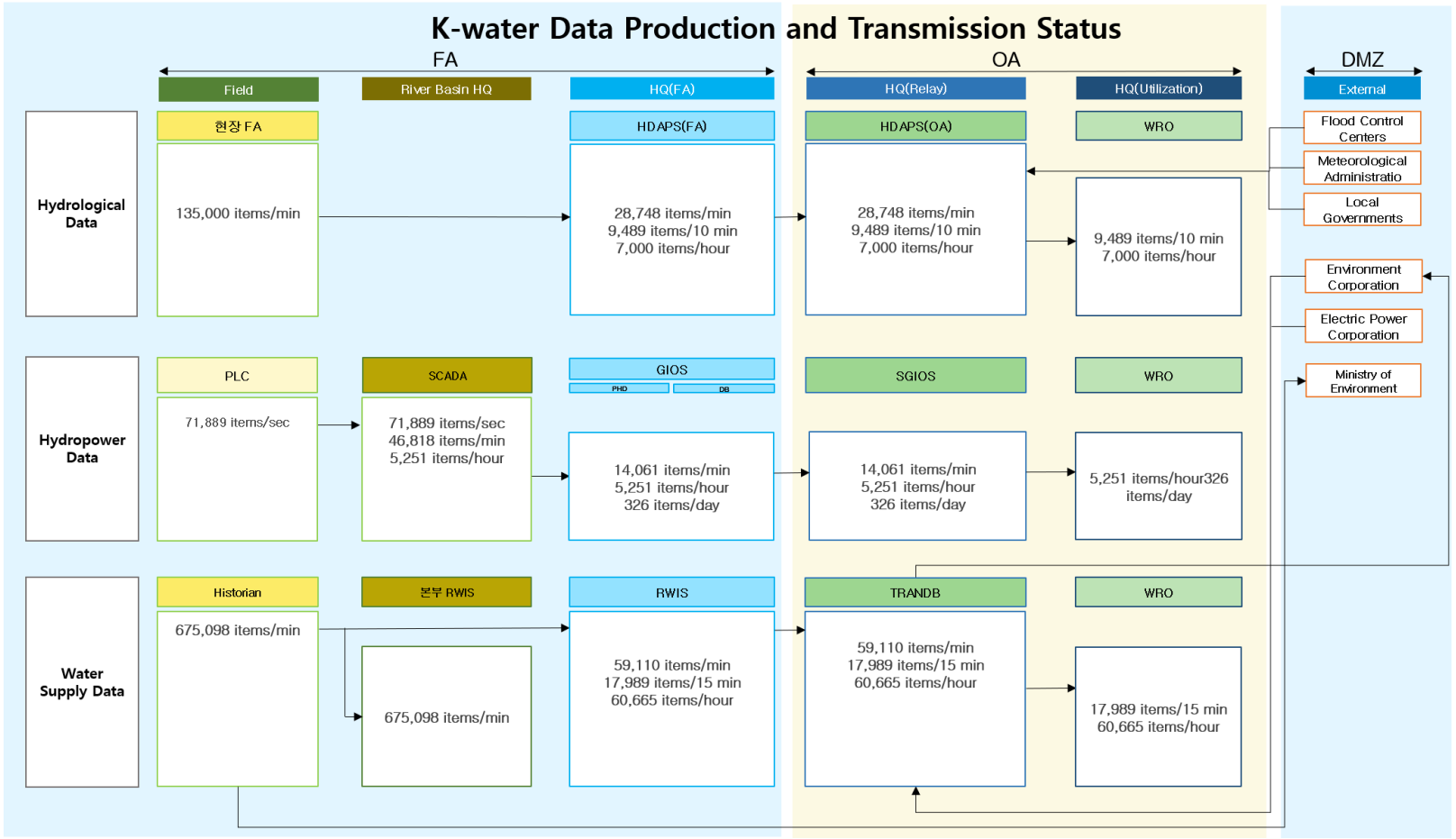
3 K-water's Data Status and Issues

K-water produces ~7.4B daily data points from 150K sensors, storing 200M and sharing 2.5M, but inconsistent formats from field-specific systems and insufficient metadata management limit integrated utilization.



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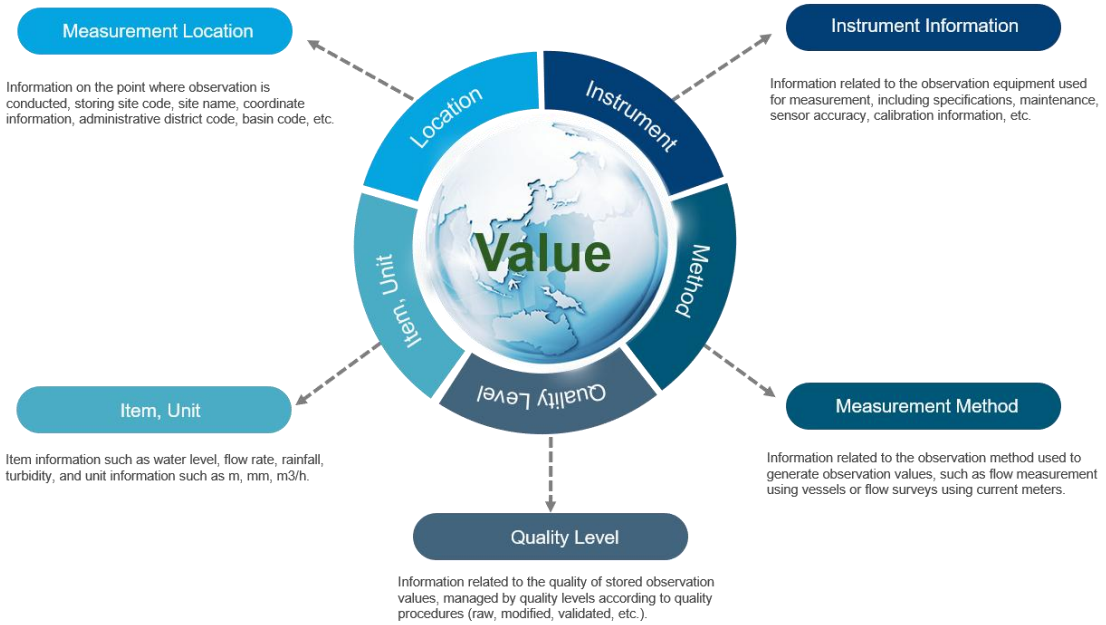
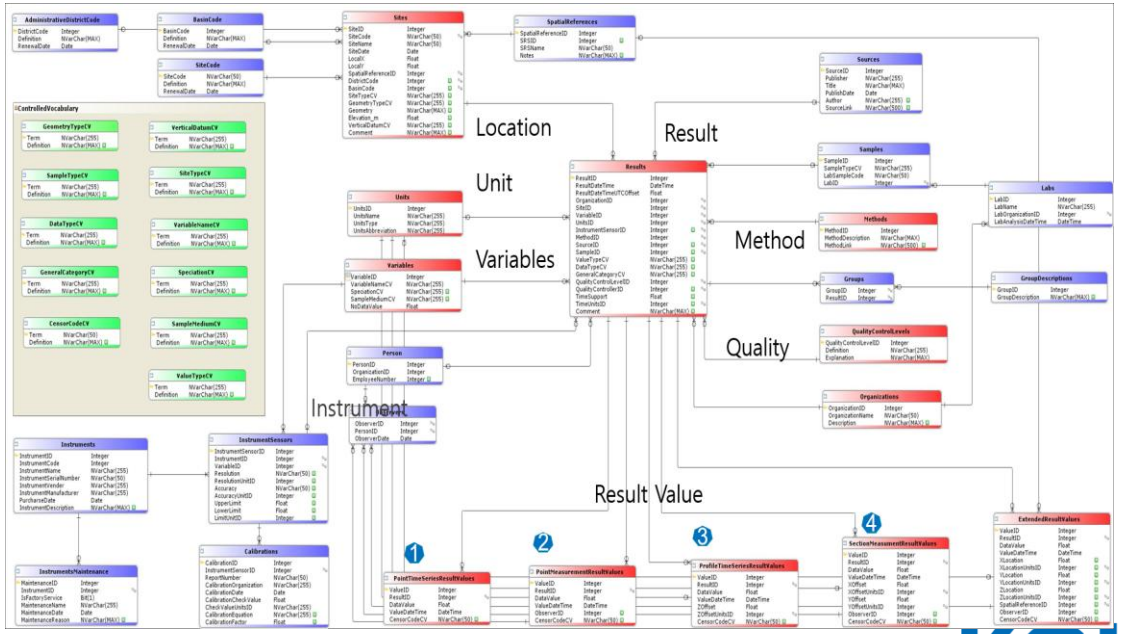
4 K-water's Data Lake

Logically and organically connecting universal attribute information of observation data centered on observation values, inspired by the U.S. CUAHSI Observation Data Model (ODM).

☞ Provides a data foundation for realizing integrated water management through integration of observation data from various fields and forms



<K-water Observation Data Model Concept>



<Entity Relation Diagram>

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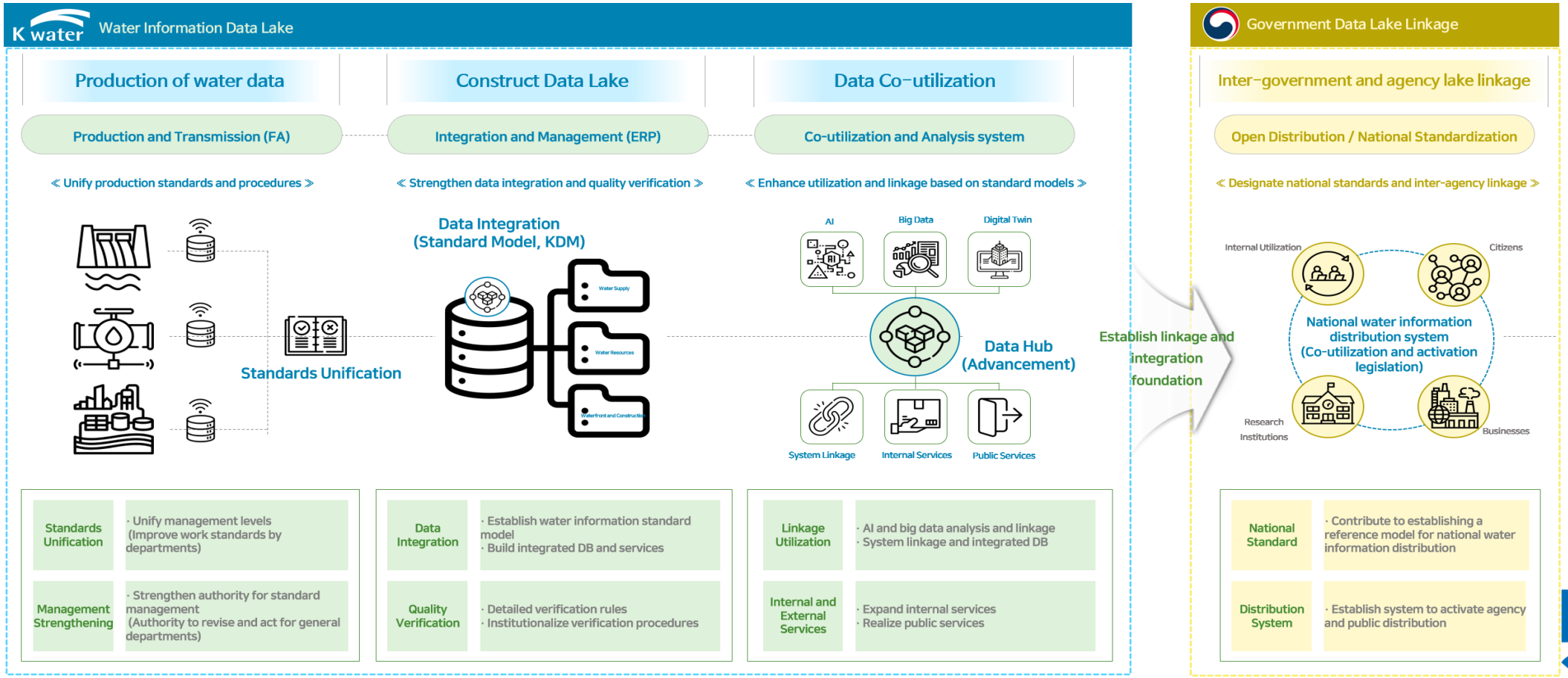
4 K-water’s Data Lake

The water information data lake is currently utilized for data analysis, while planning foundations for national and inter-agency linkage and integration.



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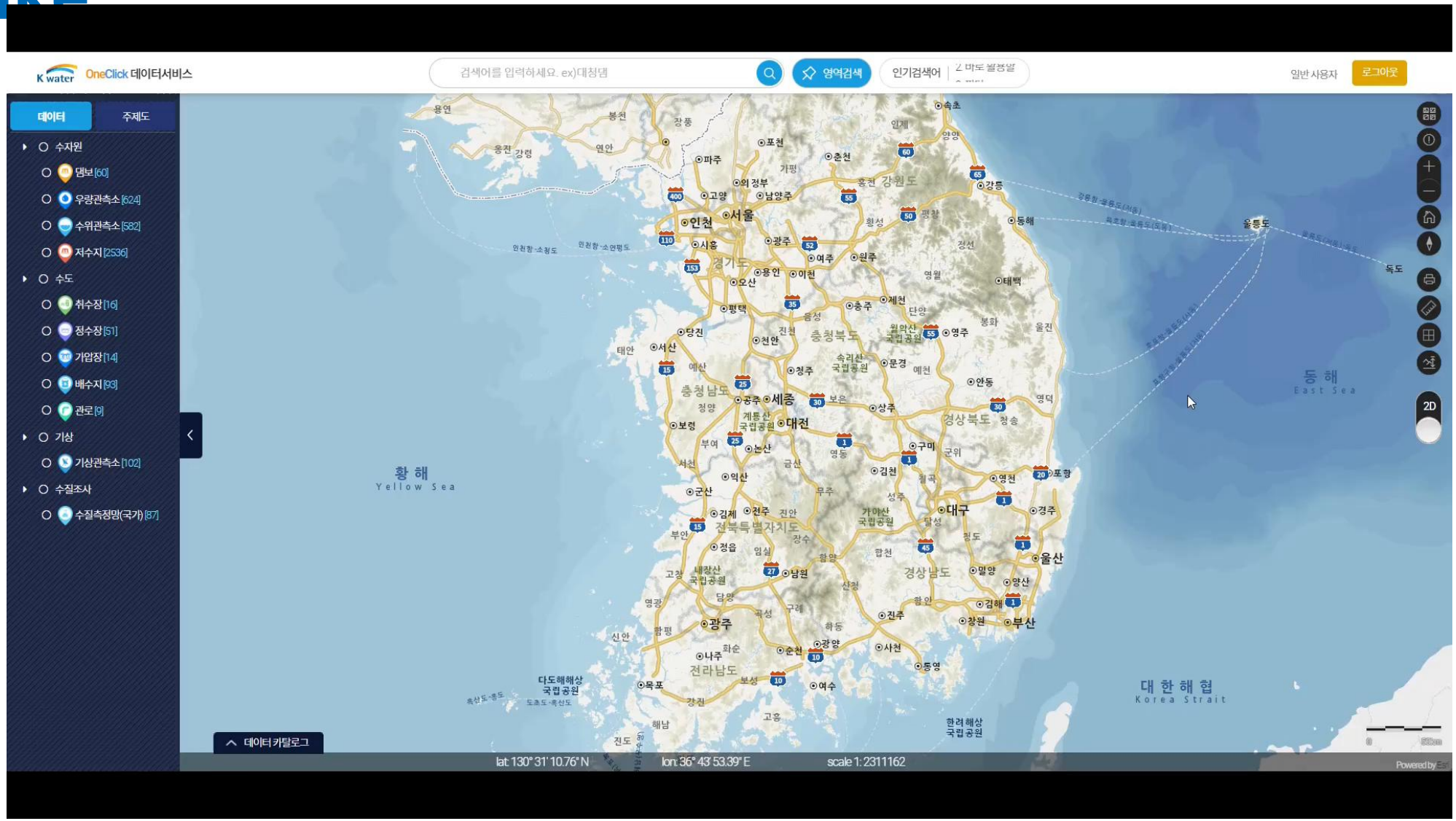
4 Demonstration on K-water's Public Data Lake



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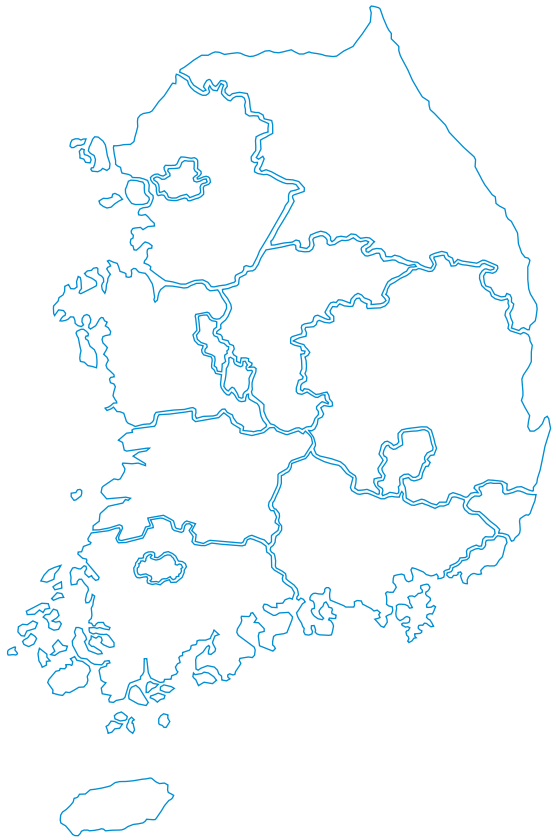
(Use Case)

5 Water Supply Efficiency Improvement SaaS

Achieved water service rate of 85% or higher for 125 local governments nationwide through data-based water main maintenance and block system operation, accumulating know-how



Aging Water Supply Maintenance Project

Project Period: 2017~2024 (8 years / 3~5 years per project)

Project Target: 125 local governments, 171 projects

Project Scale: 3,332 km of water mains, 4 water purification plants

Project Budget: 2.1 billion USD

Project Purpose: Improve water service rate (85% or higher)

Selection Method: '15 Ministry of Environment evaluation of aging pipes and feasibility study for maintenance projects

Main Project Contents

- Establishment of water main block system, renovation of aging water purification plants
- Improvement of water service rate per block unit (water main maintenance, leak detection and repair)

Achievements

Water service rate improvement (53.1% → 90.1%)

Management improvement 130 Million USD/year

Carbon reduction 17,110 tons CO2/year

Normal water supply even during extreme drought

- Sinan County

Complete lift of restricted water supply after 45 years

- Namhae County

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(Use Case)

5 Water Supply Efficiency Improvement SaaS

Based on years of accumulated technology for water supply network efficiency improvement, global expansion is being pursued through SaaS development

Project Overview

- ✓ (Project Name) Cloud Native Based Global Water Supply Efficiency Improvement (SWNM) SaaS Development Service
- ✓ (Duration) 2024 ~ 2026
- ✓ (Content) Development of 4 core modules: ① Network Monitoring, ② Leakage Analysis & Detection, ③ Water Pressure Management, ④ Dashboard

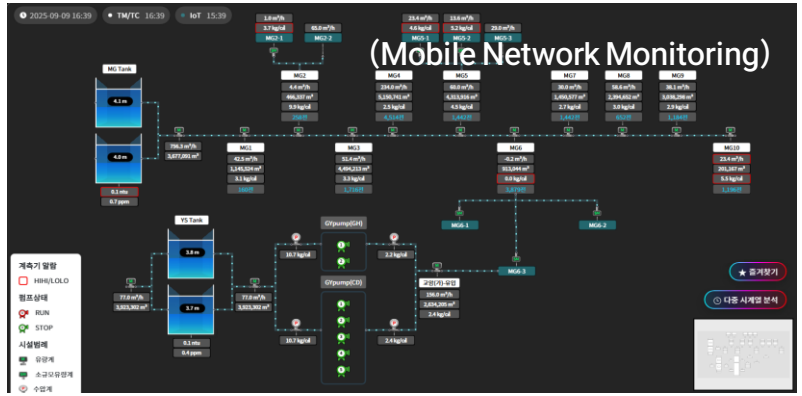
3 Major Super-gap Technologies Digital Productization Directive: CEO
| 2024.2 |

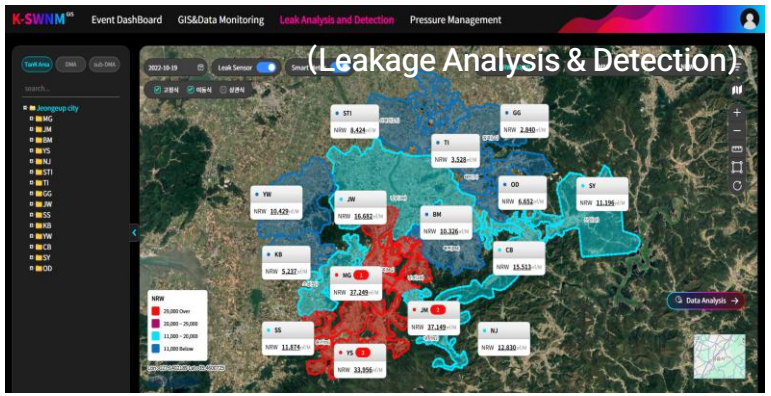
K-water Global TOP2 Vision Declaration and Super-gap Acceleration Strategy
| 2024.6|

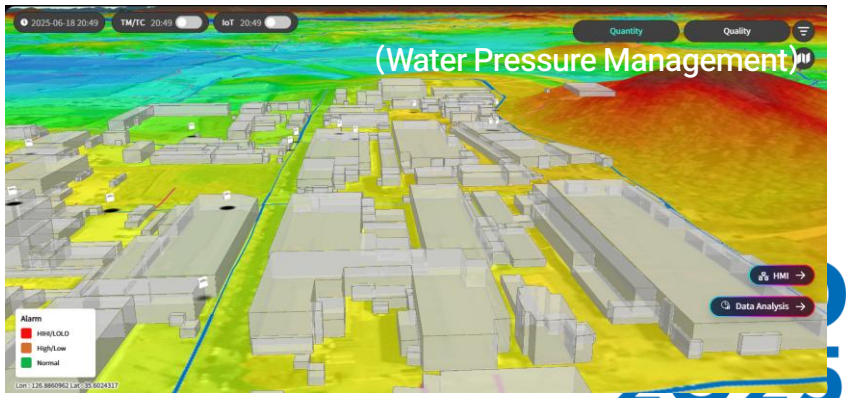
Global SWNM SaaS Service Development Start (Jeongeup City)
| 2024.7~10|

Indonesia Denpasar SaaS Overseas Pilot Demonstration
| 2024.11|

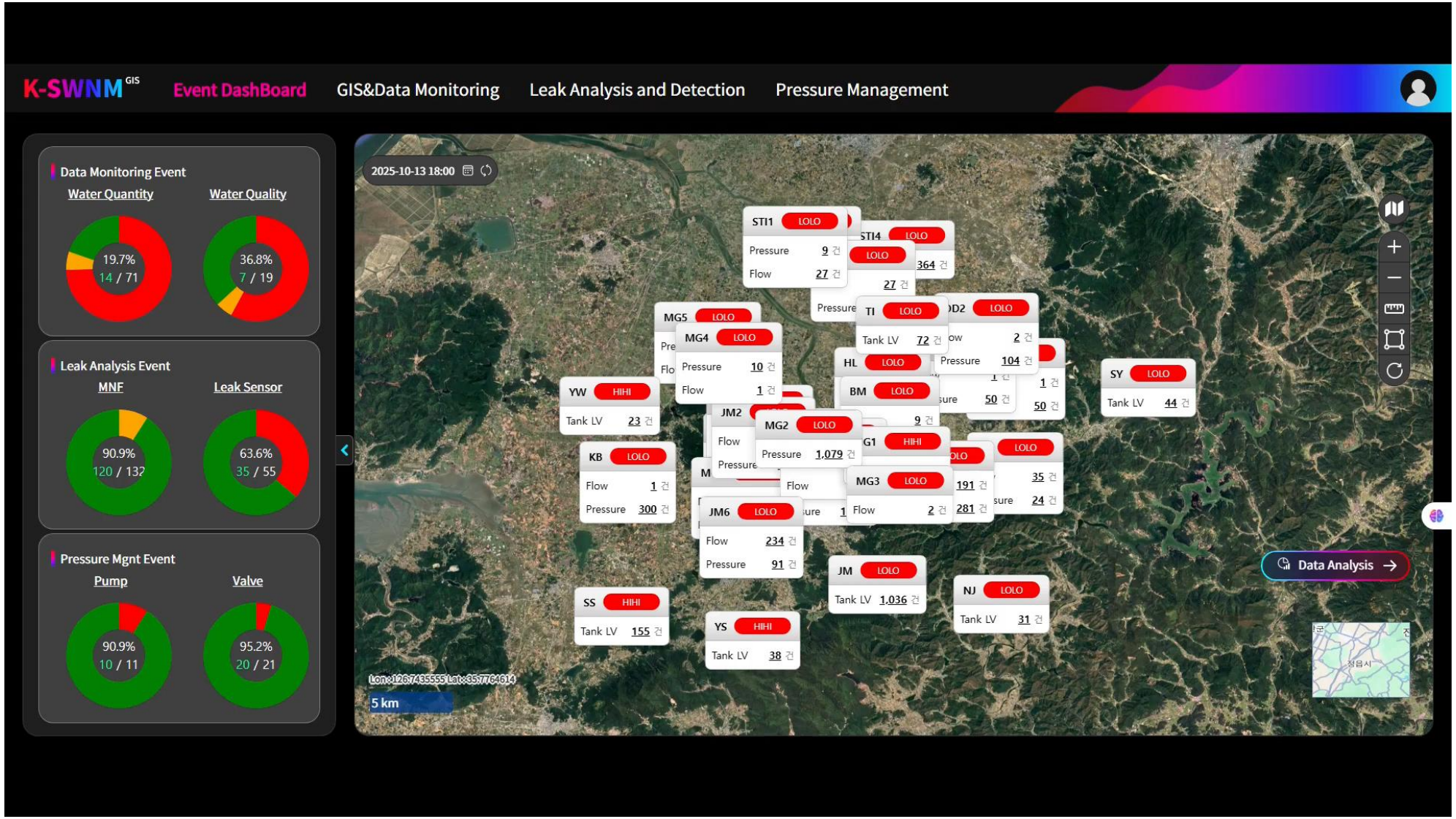
Global Brand Launch and Full-scale Overseas Market Application
| 2025.12~ |







5 Demonstration on SWNM SaaS



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Thank you

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