



# Smart Water Management of Korea: history of water resource management

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K-water

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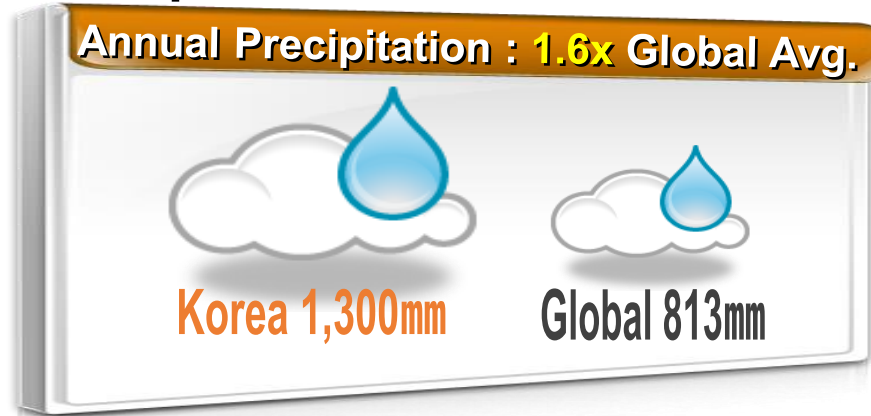
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- Stage of Development of Water Resource Management in Korea
- Smart Water Management for K-City Project Global Program
- K-items for Indonesian New Capital City



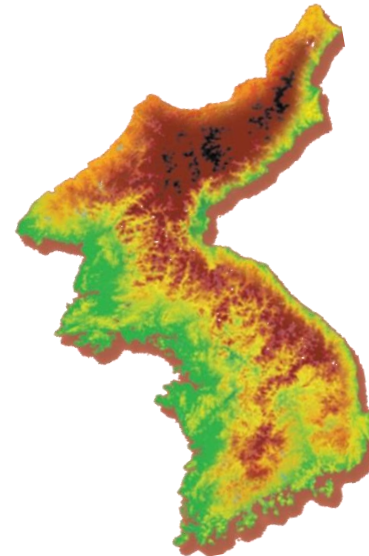
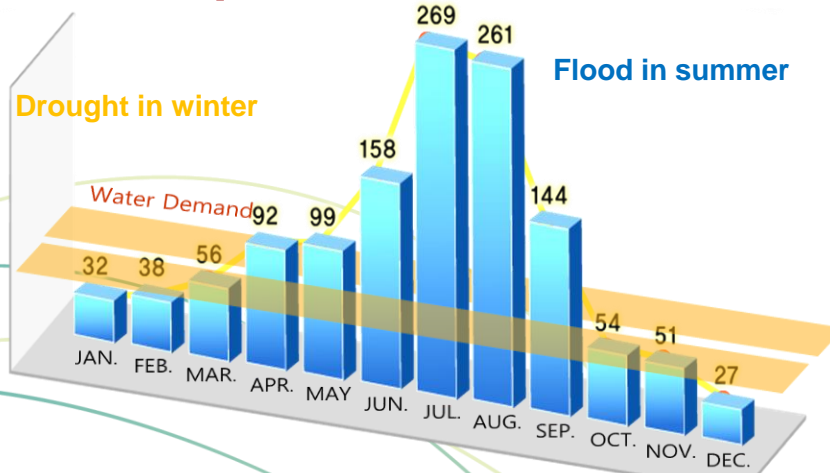
# Given Conditions of Water Resource Management of Korea

## ■ Precipitation



## ■ Unfavorable Conditions

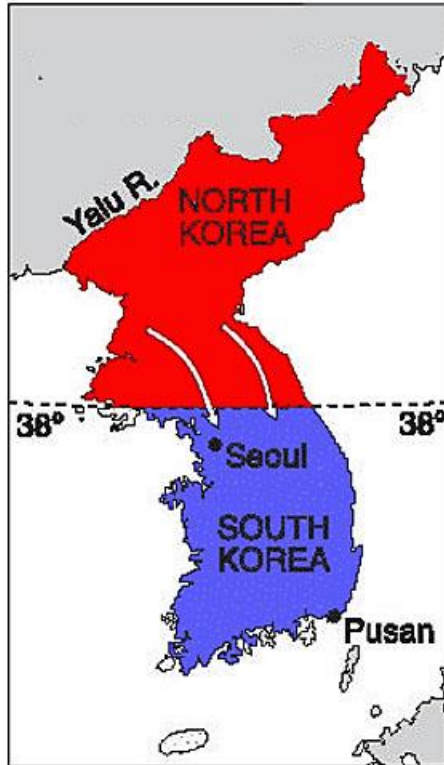
**2/3 of annual precipitation**  
**: June ~ September**



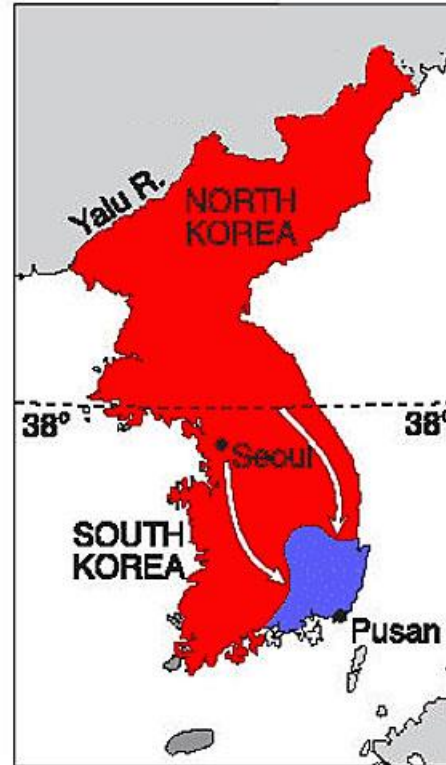
**River Regime Coeff.**  
**(Max/Min Discharge)**

Han	: 390
Nakdong	: 372
Geum	: 300
Seine	: 34(France)
Rhine	: 18(Germany)
Mississippi	: 3(U.S)

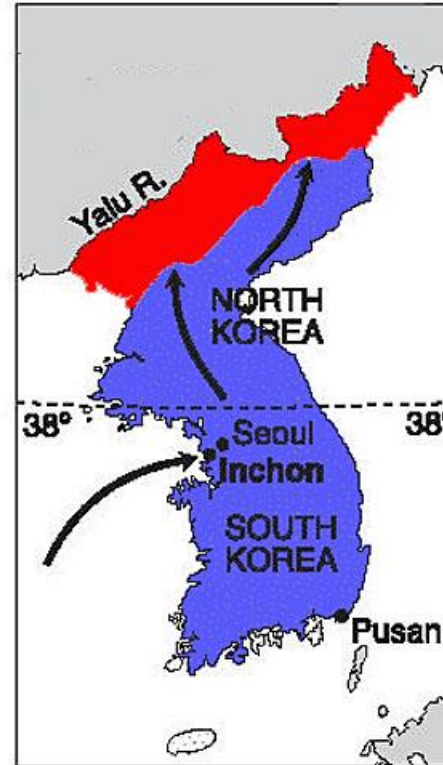
## THE KOREAN WAR IN FOUR MAPS



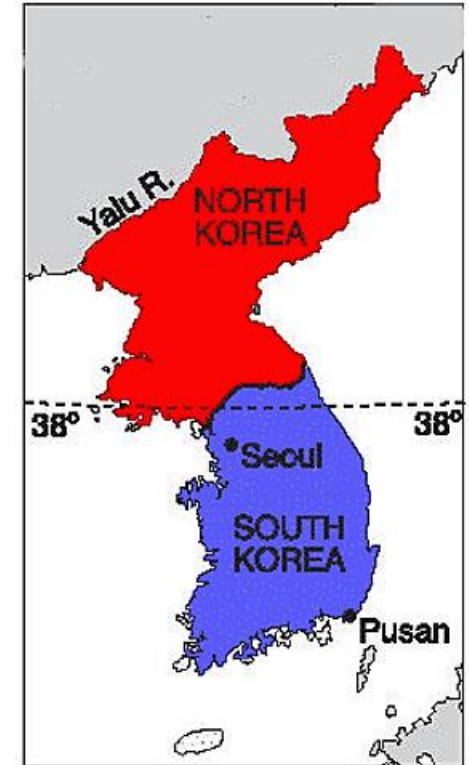
**June 25, 1950**



**Sept. 14, 1950**



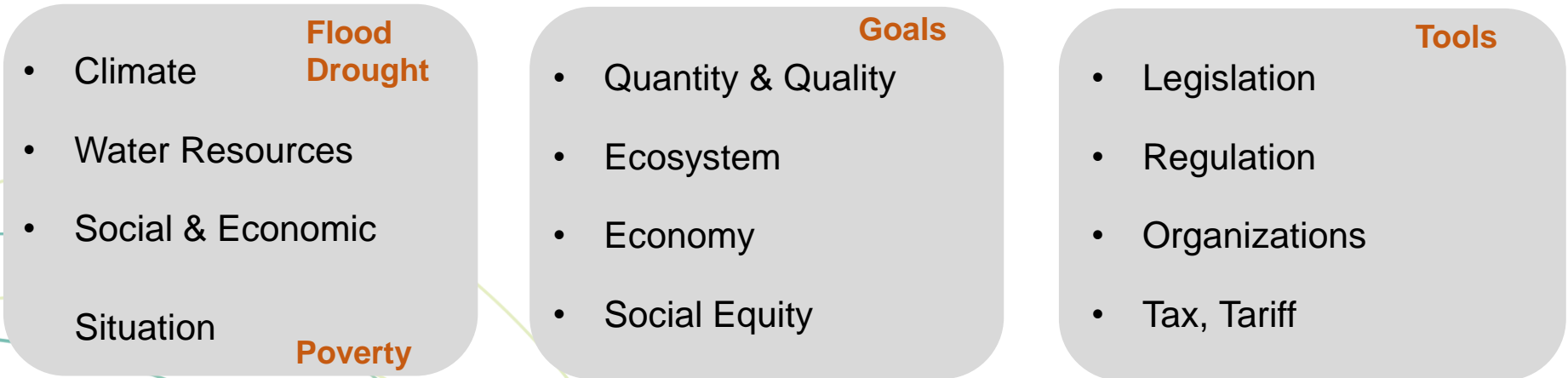
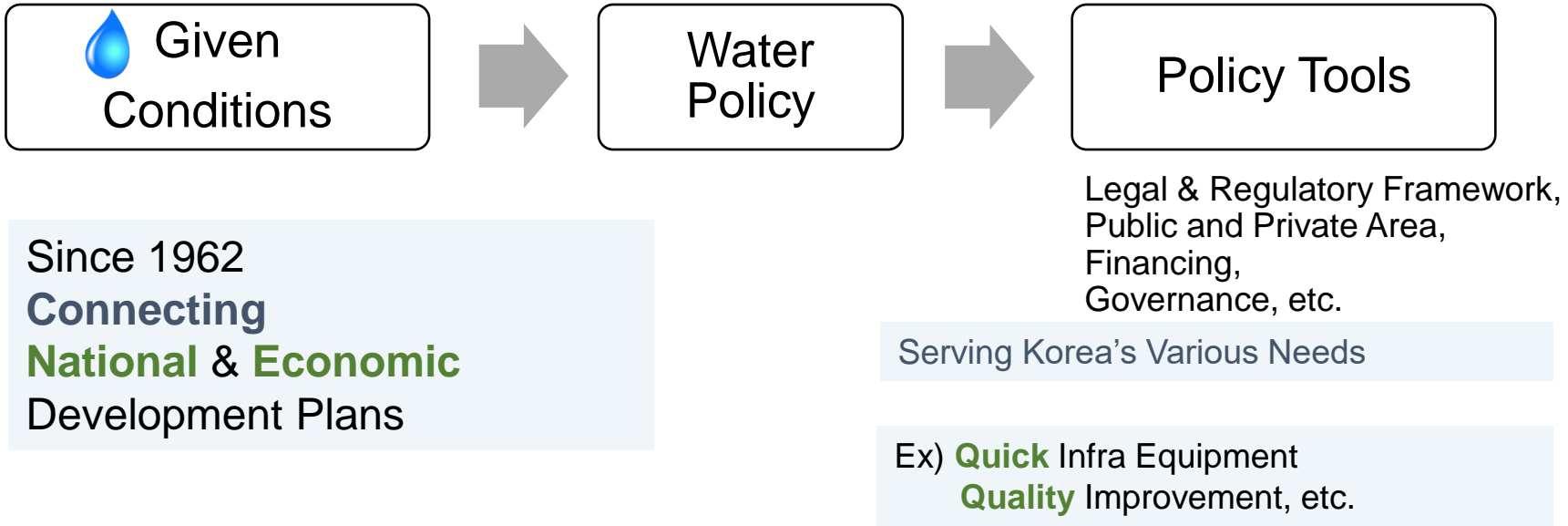
**Nov. 25, 1950**



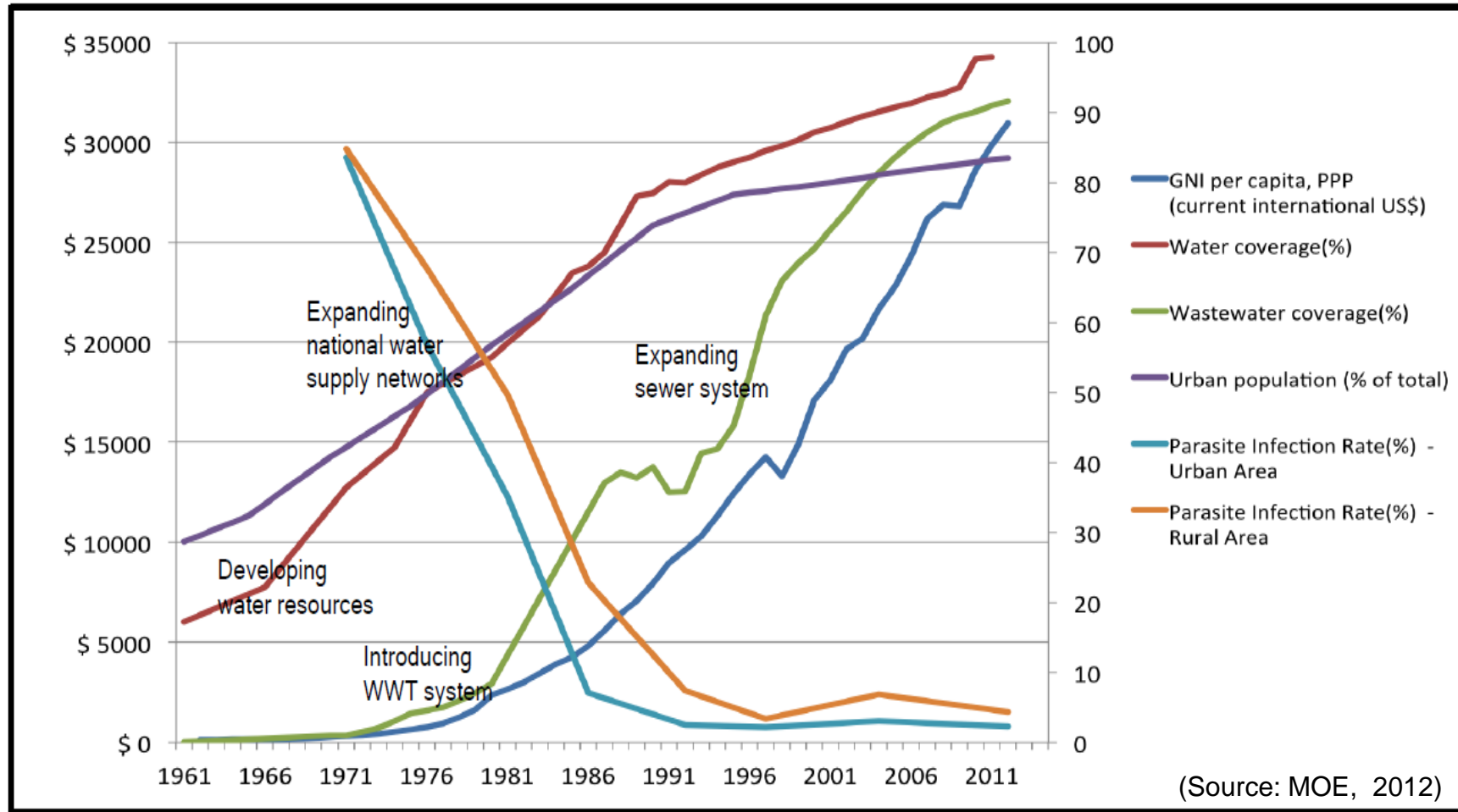
**July 27, 1953**

**The Korean War: 25 June 1950 ~ 27 July 1953**

# What we can do? “Policy” Formulation – Implementation - Evaluation



# Korea's Water Sector Achievements (1)



\* GNI is the total domestic & foreign output claimed by residents of a country  
$$\text{GNI (Gross National Income)} = \text{GDP} + \text{Money flowing from Foreign Countries} - \text{Money flowing to foreign countries}$$



# Korea's Water Sector Achievements (2)

## GNI & Water Supply/Sewerage Coverage

Indicator	1961	1980	2000	2012
GNI per Capita (\$)	85	2,340	17,110	30,970
Water Supply Coverage (%)	17	55	87.1	98.1
Sewerage Coverage (%)	2	8.3	70.5	91.6



Photos: Homes on the Cheonggye in the 1960s(left), and the stream as it looked in 2014(right), Seoul, Korea.  
Credits: Seoul History Museum (left); iStock/Tanjala Gica (Right)

# Water Development Path

Development of  
multipurpose dams for  
water supply, flood  
protection, hydropower

- Soyanggang Dam (1973)
- Andong Dam (1977)

**1965-80**  
**Industrialization**

Development of multi-  
regional supply systems

**1981-90**  
**Choice & Concentration**

**1991-2000**  
**Phenol Accident**

Sewerage  
Enlargement

**2009~**  
**Climate Change**

Sustainable water  
management for  
climate change

**2001~2008**  
**Eco-Friendly Strategy**

Eco-friendly development  
& management of water  
resources



# Threshold of GDP was not a precursor to the sanitation drive

Country	GDP per capita in 1960 (in USD)	National improved sanitation coverage rate in 2000
South Korea	\$155	100%
Ghana	\$183	10%
Liberia	\$170	12%
Senegal	\$249	43%
Zambia	\$227	41%
Zimbabwe	\$280	40%

Source: World Bank and UNICEF/WHO

The overall strategy and vision came first, and the sector investments from a variety of sources were sought after.

(Source: Achieving total sanitation & hygiene coverage within a generation – lessons from East Asia, WaterAid 2015)



# Smart City Development: A Duplicable good example of Korea



## Busan Eco Delta City(Eco Delta City)

Area	11.77km <sup>2</sup>
Population	76,000 people(30K households)
Functions	Residence, commerce, R&D, Logistics, and etc.
Project by	Busan Metropolitan City K-water Busan Metropolitan Corp.





# Smart Technologies Demonstrated in EDC

## ● Development Concept of Busan City

### 1. A WATERFRONT ECO CITY

where you can experience the abundance of an eco-friendly residential city

- A city surrounded by water and waterfront grasslands
- Greener Urban Eco Parks
- Transit Oriented Development for the Environment and the Future
- A city where you can enjoy walking and running
- An abundant environment created by smart urban planning

### 2. GLOBAL WATERFRONT CULTURAL CITY

that adds culture and infrastructure to three waterways

- A canal-walk type commercial & business district
- Rivers bring enjoyment, multi-functional cultural & leisure district
- Pedestrian-oriented waterfront space for everyone
- Waterfront leisure & specialized complexes for enjoying the waterfront environment

### 3. FUTURE LOGISTICS & SERVICE CITY

for Korea's brighter tomorrow

- Best geographical location for the Logistics Hub
- Nurture eco-friendly high-tech industries and MICE industries of the future
- Multi-regional transportation & road construction plans
- Build an international maritime transportation & port services cluster including maritime transportation, finance and insurance





# Smart Technology in Water Sector, Busan EDC



## Precipitation monitoring & urban/water-related disaster response

Small-sized precipitation forecast radars and prepare for flooding and integrated water-related disaster response system

1



## Low impact development (LID)

Customized green infrastructure at public facilities, lands, and buildings

2



## Stream quality improvement

Eco-filtering system to improve the natural water source quality

3



## Water recycling system

Highly advanced treatment for 100 water reuse

6



## Smart water management (SWM)

ICT application in all water supply processes for live monitoring and remote control of water quality and quantity

5

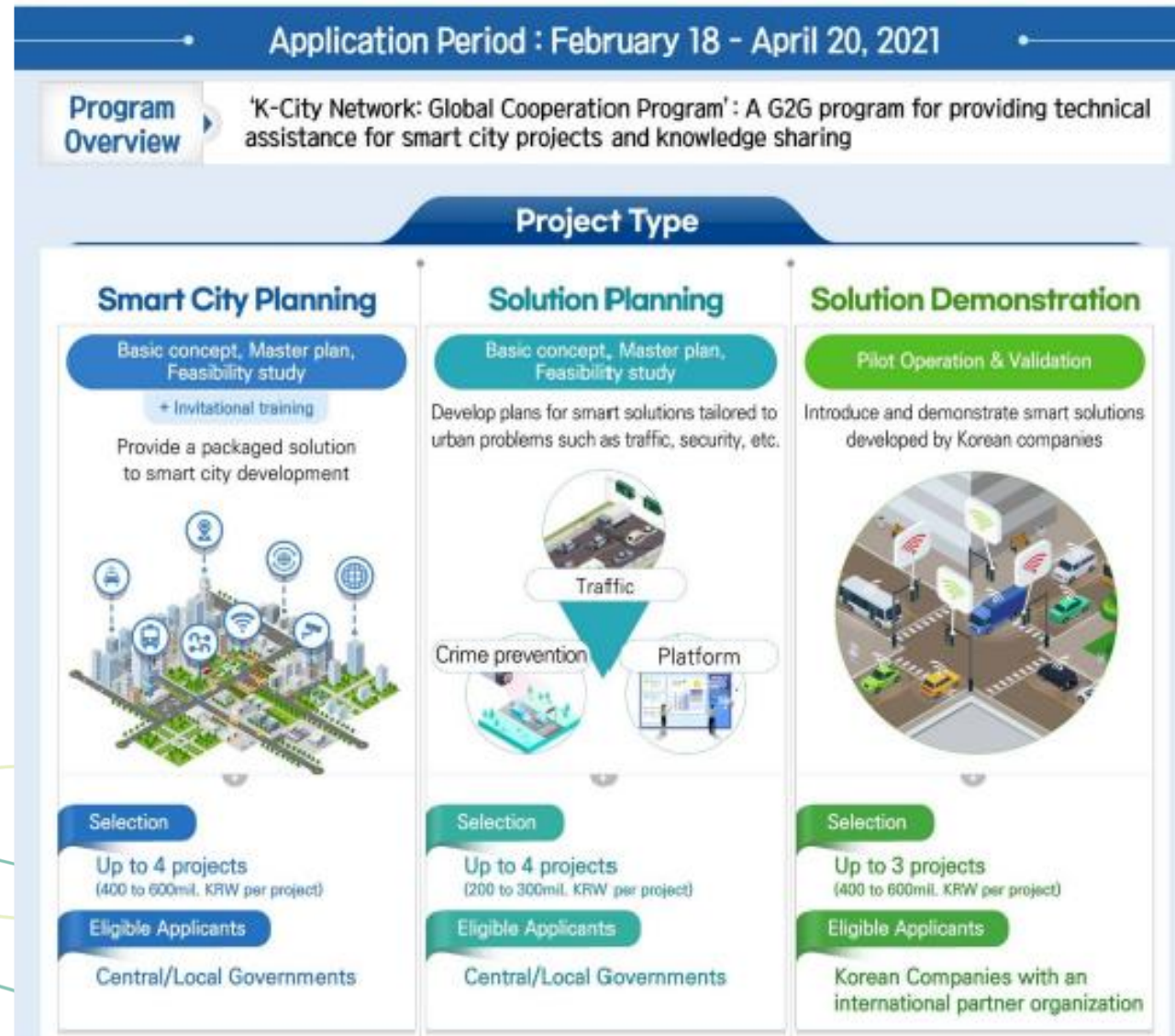


## Smart water treatment plant

Multi-story water treatment facilities for supplying freshly treat water from locations that are closer to users

4

# K-City Network Global Program



# K-City Network Global Program

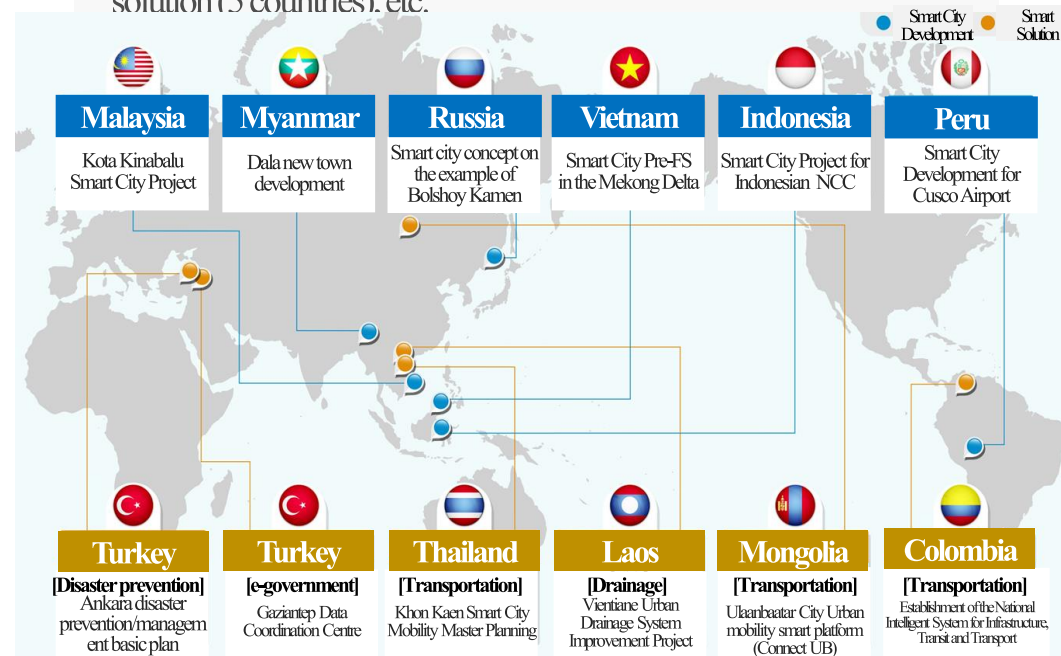
MOLIT is promoting **"K-City Network"**, aimed at creating a Korean smart city through intergovernmental cooperation in overseas cities

## Program Outline

Program Name	「2020 K-City Network」Global Cooperation Program
Support Details	<ul style="list-style-type: none"> <li>Support for smart city planning for smart city development projects promoted by foreign governments, etc.</li> <li>Supporting Korea's smart city development experience and knowledge sharing through invitational training</li> </ul>
Purpose	<ul style="list-style-type: none"> <li>Finding smart city cooperation projects and establishing smart city construction plan in collaboration with foreign governments</li> <li>Pursuing mutual economic development by sharing and disseminating excellent technologies from each country</li> </ul>

## Selection Result of "2020 K-City Network: Global Cooperation Program"

- A total of 80 cases in 23 countries applied
- Final 12 projects (11 countries) selected
- 6 cases of smart city development (6 countries), 6 cases of smart solution (5 countries), etc.





# Project Scope

Carry out tasks such as “Smart City Basic Plan, and Pilot Projects in Transportation and Water Management Sector” for the New Capital relocation area

## Content Scope

### Smart City Basic Plan and Proposal of Project

- Appropriate zone for Smart City basic plan
- Smart City basic plan and proposal of Smart City pilot project
- PPP scheme for smart solution business

### Integrated Water Resource Management and Smart Water Management

- Analysis of water management system in Indonesia
- Basic conceptual plan for the construction of IWRM and SWM
- Proposal of pilot project in water sector

### Regional Metropolitan Transportation and Smart Urban Transportation

- Review transportation infrastructure and systems
- Basic conceptual plan for the construction of RMT and SUT
- Proposal of pilot project in transport sector

## Spatial Scope

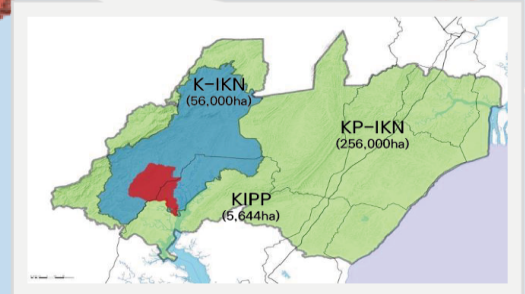
Eastern Kalimantan of Borneo

Eastern Kalimantan

Relocation of the  
New Capital

## Temporal Scope

300days from contract date



# Smart City Direction (Vision and Strategy)

➤ Changing urban conditions and increasing need of Smart City

Vision

Global Smart Metropolis Leading Innovative Growth and Future Life

Mission

“Realization of a future city where new urban spaces and city values are created and continuous innovation and growth are created”

Goal

01

Establish integrated national identity

02

Economic, environmental and social sustainability

03

Smart city accoring to international standards

Realization Strategy

## Strategy 1 : Creating a new urban space

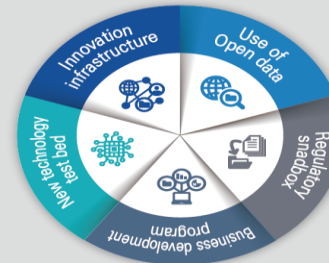
- 1 Spatial structure to organically reflect and accommodate smart technologies
- 2 Creating innovative spaces reflecting urban functions and specialized industrial clusters



Future city model

## Strategy 3 : Continuous urban innovation DNA

- 3 Urban innovation platform for fostering and spreading future new technologies
- 4 Realization of digital city environment based on DATA-NETWORK-AI convergence



Future growth engine

## Strategy 2 : Creating new city values

- 5 Flexible response and adaptation to future demands
- 6 Creation of a new living culture city that encompasses all generations and classes

New Life Style

Eco-friendly city

Cultural city

Win-Win Community

Urban sustainability



# IKN Development Concept (Creating new urban spaces)

“Securing national innovation growth engines through Smart City development in Indonesia’s capital relocation area”



## WELL-BEING

Providing a pleasant living environment for urban residents  
Increasing income through future-oriented job creation



## SMART

Promote sustainable smart city development  
Integrated operation and management of smart transportation and infrastructure



## GREEN

Eco-friendly city development in response to climate change  
Preservation of natural environment and ecosystem



Urban architecture are (available land)



Regional Planning boundaries



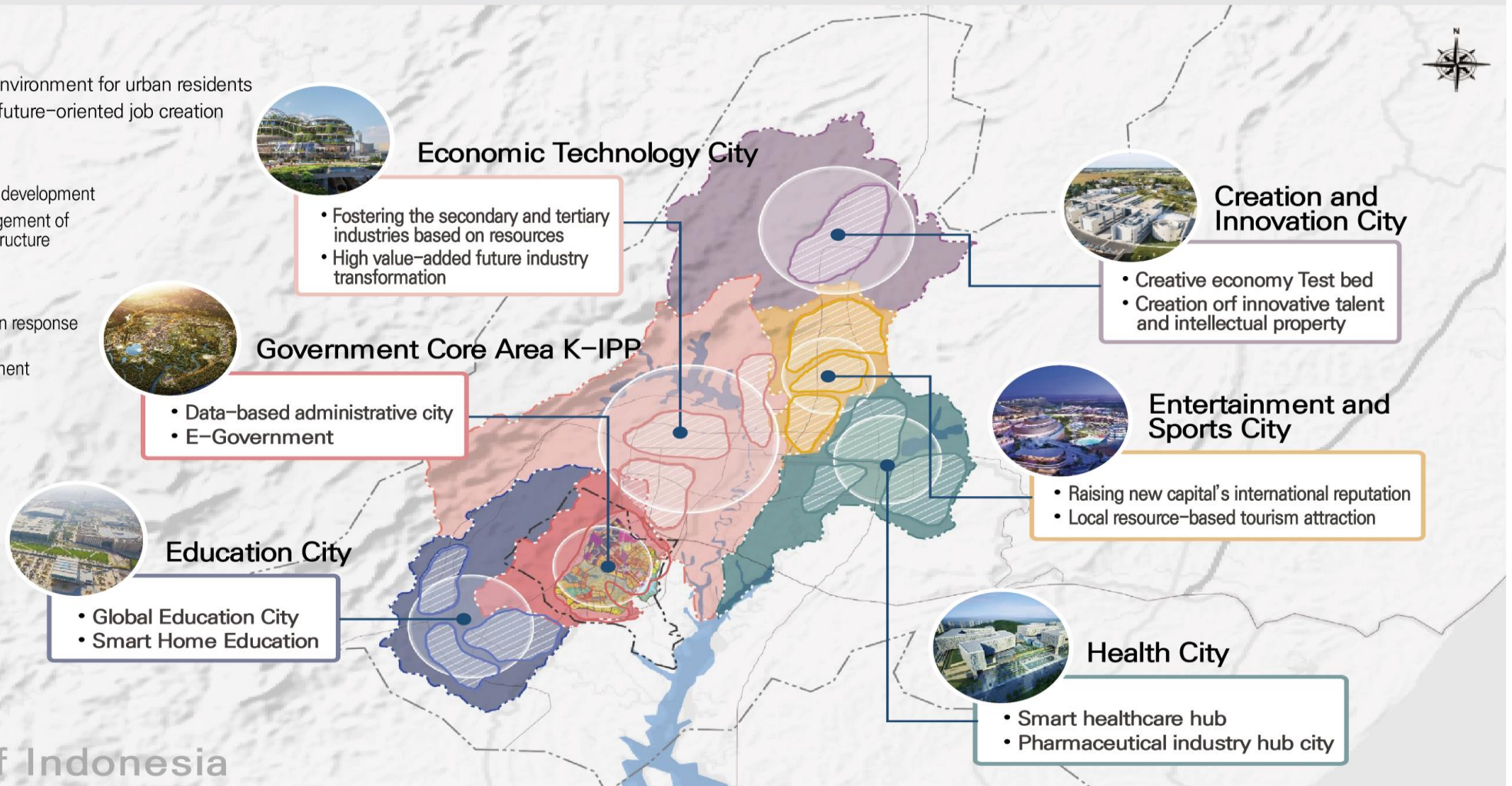
K-IPP



Highway

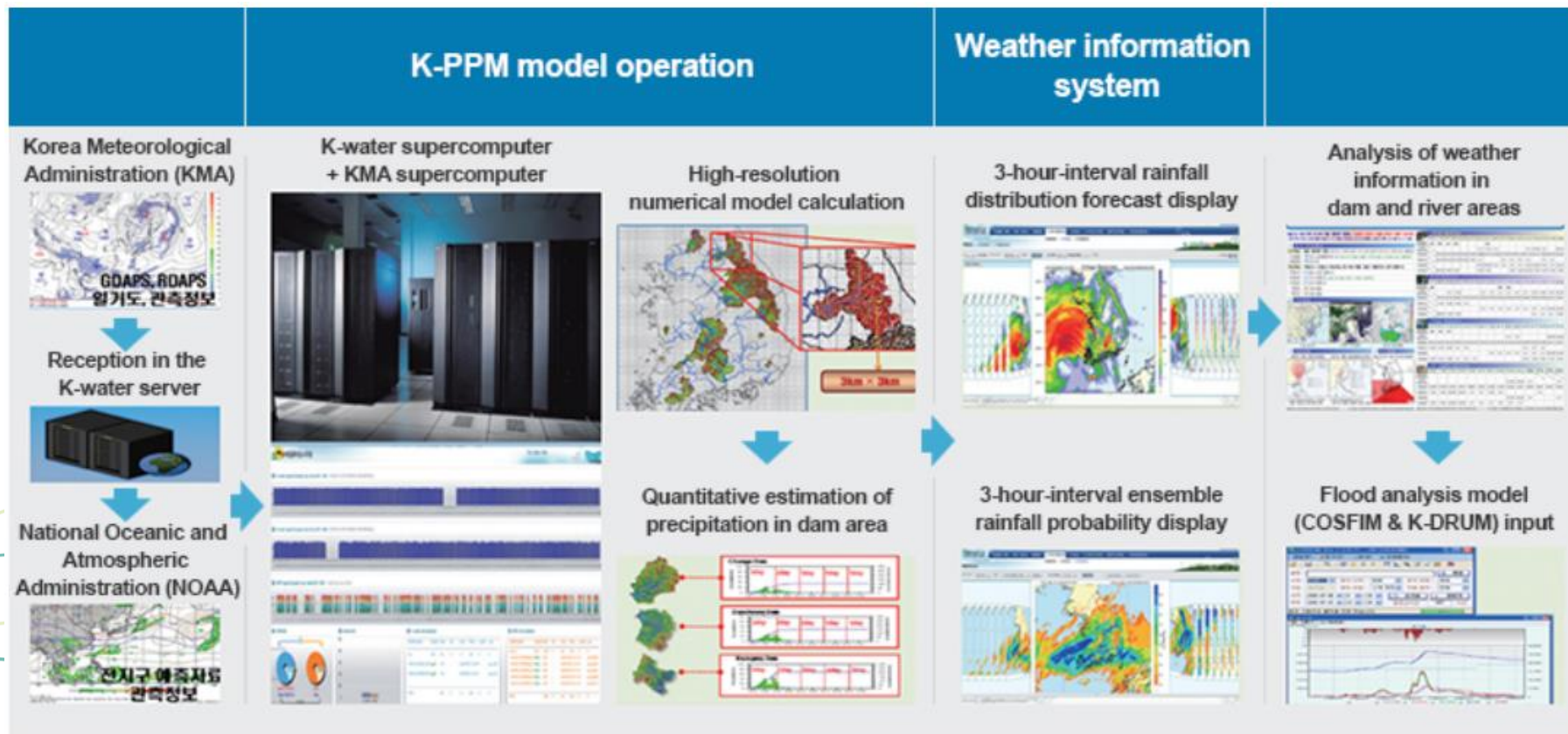


Planned road



# (K item 1) Integrated Water Resource Management System

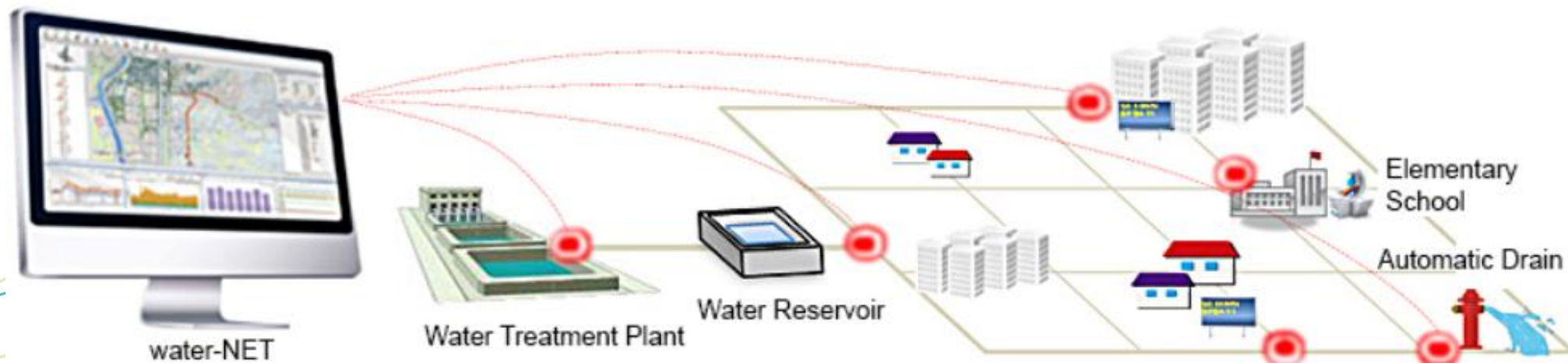
- Supercomputer-based precipitation forecasting system (PFS) and uses it to apply advanced water management.
- Precipitation Prediction Model (K-PPM) has been constructed as a 3×3 km high resolution grid system to take account of the detailed geographical characteristics of dam and reservoir areas.
- Provides data on precipitation forecasting for five days on an hourly basis (120 hours) four times a day.





## (K item 2) Intelligent Operation of Water Network

- ICT-based water operation systems to acquire, monitor and control all relevant data on a real-time basis from the whole water supply systems ranging from water sources to tap water
- The acquired data are analyzed in terms of water quantity, water quality and energy management with the help of intelligent water network software that enable to supply drinking water without service interruption and formulate an optimal plan to rehabilitate water supply infrastructure.
- water-Net: Diagnosis, Operation and Management System for Water Distribution Networks
  - A water network operation system with which it's possible to collect real-time information about waterworks, ensure a GIS-based water network inspection, and manage water quantity, quality and crisis and energy.



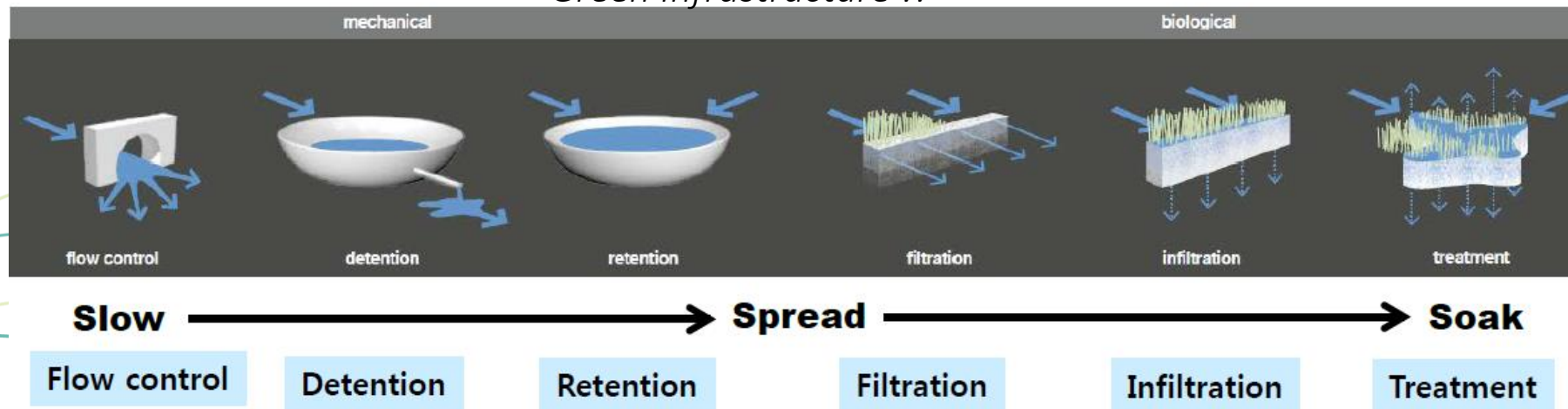
# (K item 3) Low Impact Development (LID)

- LID element technologies

- Bio retention: storm water pond, tree box filter, storm water wetland, Infiltration basin
- Green roof, rain garden
- Porous pavement, water-retentive pavement
- Infiltration trench, Infiltration channel, Infiltration chamber



*Green Infrastructure !!*



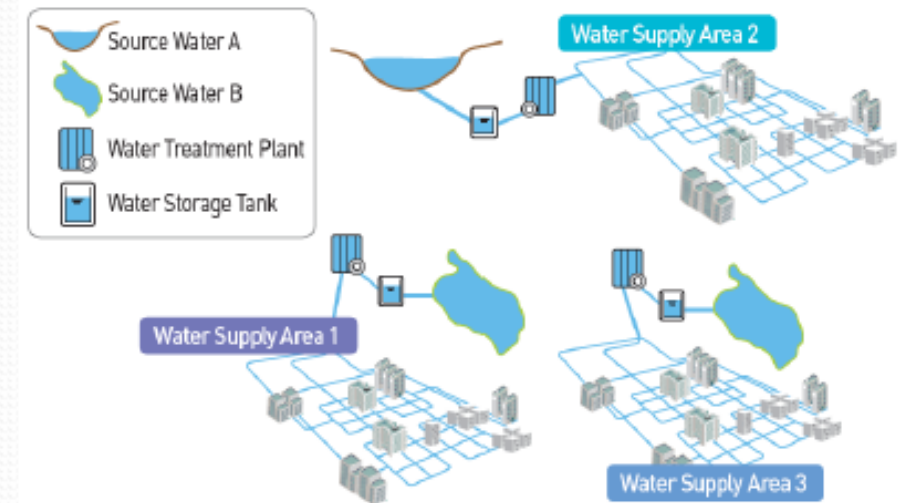


# (K item 4) Decentralized Water Supply System



## Decentralized Water Supply System

- The decentralized water supply system reduce the transport time and distance of the treated water by installing the water treatment plant at the nearest place to the consumers. The required area of water treatment plant could be minimized by applying the vertical placement of treatment processes.
- The vertical structure of WTP enables installation at the nearest place of the end user.
- The WTP installed close to the consumers can reduce the possibility of secondary pollution in supply line and ensure the quality of treated water. The network of decentralized water supply systems can enhance the stability of water supply.
- The vertical water treatment plant is consisted of directly-coupled water treatment modules, which can be variously combined according to the water quality of source water.



# Modular Type Water Treatment Plant



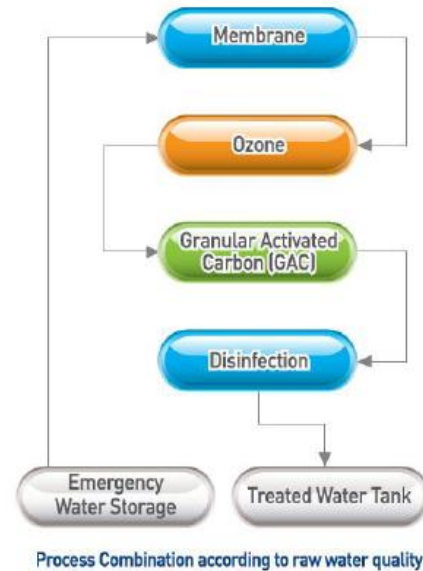
## ❖ Effects

- Ensures customer-oriented safe and stable water supply in the future
- Aims to make zero cutting-off water supply and increase a direct water supply rate from the current level of 5% to 30%
- Energy saving from clean energy

- ❖ Decentralized water supply system, combined with auxiliary water sources and emergency water supply storage using storage tanks and deep tunnels, ensures a safe and stable water supply.



## Water Treatment Process in Demonstration Plant



Membrane



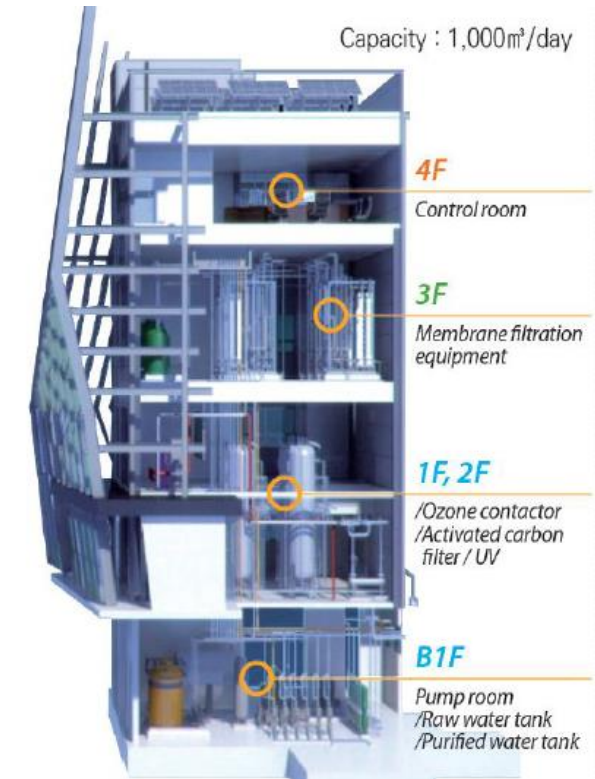
Ozone



GAC



UV Disinfection



# Key barriers and enablers for SWM implementation

## Key barriers

Factors limiting successful SWM implementation

- Lack of **initial support/investment**
- Access to **skills/capacity** to use SWM solutions
- Access to **infrastructure or resources**
- Evolving technology/**upgrades (high costs)**
- **Lack of compatibility** across SWM solutions
- Hesitation to **replace traditional infrastructure**
- **Lack of policy incentives**

## Key enablers

Factors for successful SWM implementation

- **Political commitment** at all levels
- **Policy, legislation and regulation** support
- **Combining the use of SWM tools** with other methods
- **Strong stakeholder engagement** from the beginning
- **Multidisciplinary approach**
- **Long-term investment** for ongoing R&D
- **Capacity development, training and education**

\* Source: <https://www.iwra.org/swmreport/>



# Huddles ahead and landscape of Smart Water Management in INO

## Indonesia's New Capital On Hold Due To Pandemic

Basten Gokkon  
14 May 2020



*This file photo taken on 17 December, 2019 shows Indonesia's President Joko Widodo (L) accompanied by officials visiting North Penajam Paser district near Sepaku in East Kalimantan where the government is set to build its new capital city replacing Jakarta. (AFP Photo)*

The Indonesian government's plan to relocate the country's capital from Java to Borneo has hit a wall amid the COVID-19 pandemic, with a top official saying they would "evaluate it or something" after the crisis passes.

President Joko Widodo announced last August a US\$33 billion project to build a new capital city in East Kalimantan province, citing worsening traffic, land subsidence, flooding and a host of other problems in Jakarta.

## Risk

- Political issues
- Government system
- Carrying capacity
- Staging of development
- Wholistic operation

## Opportunity

- Friendship and stewardship
- Favourable environment
- Proven competency
- Human resource

## Suggestion

- Working evidence
- Long-term prospective
- Multi-cultural working env.
- Home office / Field office

고맙습니다 !!