

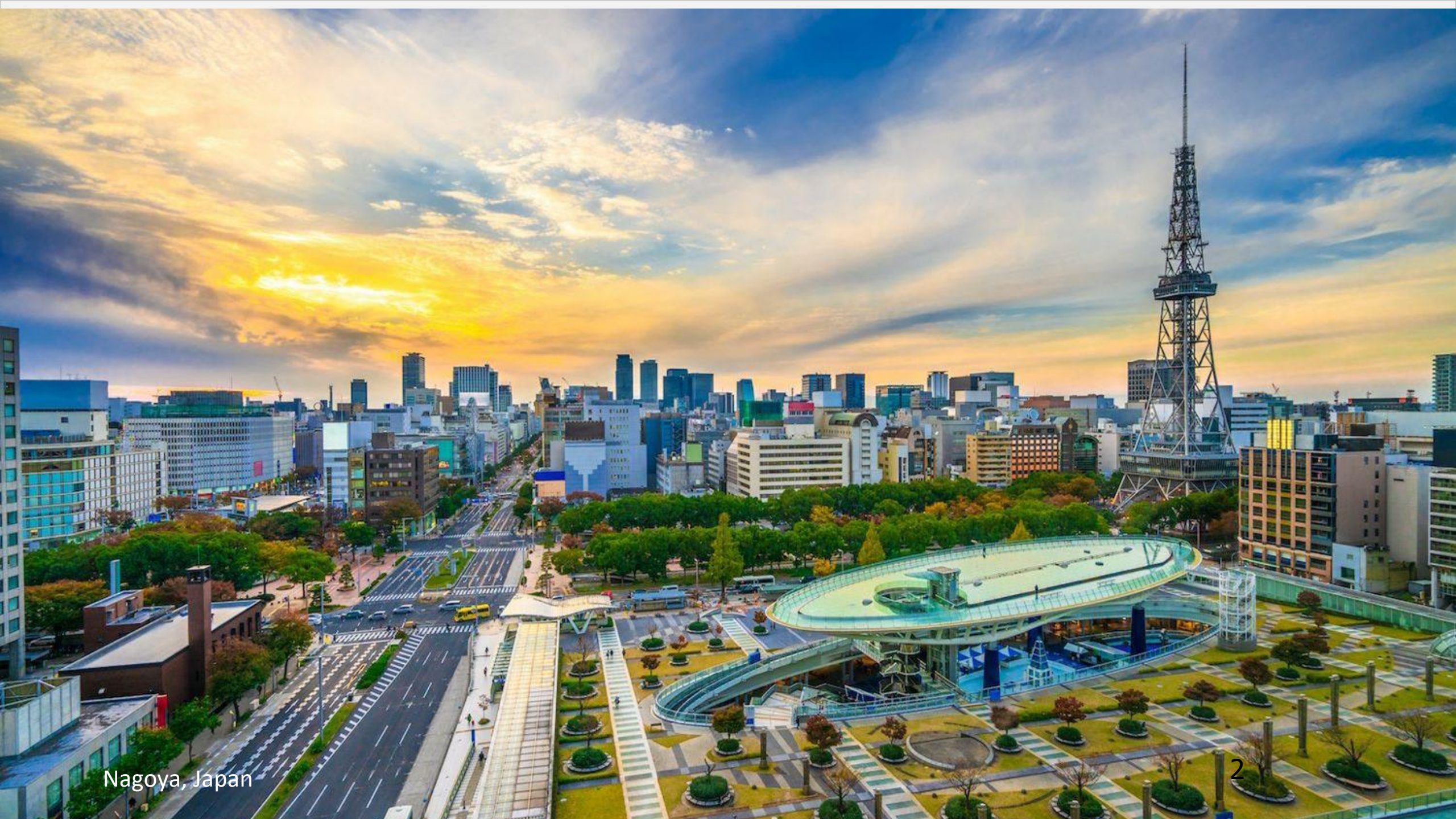
Training Workshop On Smart Cities

**For Building Inclusive, Resilient, and Sustainable Cities and
Communities**

29th August 2023

Nagoya, Japan

Dr. Kazushige Endo



Nagoya, Japan

INTRODUCTION

“Humanity is facing an existential contradiction: we are building an urban future for ourselves, yet urbanization in its current form is threatening the very future of humanity and the natural world”

- Herbert Girardet



OUTLINE

1. Smart Cities Concepts
2. Smart Cities Core Principles
3. Key Challenges and Issues

Smart Cities, a Global Movement

“Smart city is an innovative city that uses ICTs and other means to improve quality of life, efficiency of urban operation and services, and competitiveness, while ensuring that it meets the needs of present and future generations with respect to economic, social, environmental as well as cultural aspects” .

- International Telecommunication Union, United Nations



Singapore transport network and cityscape

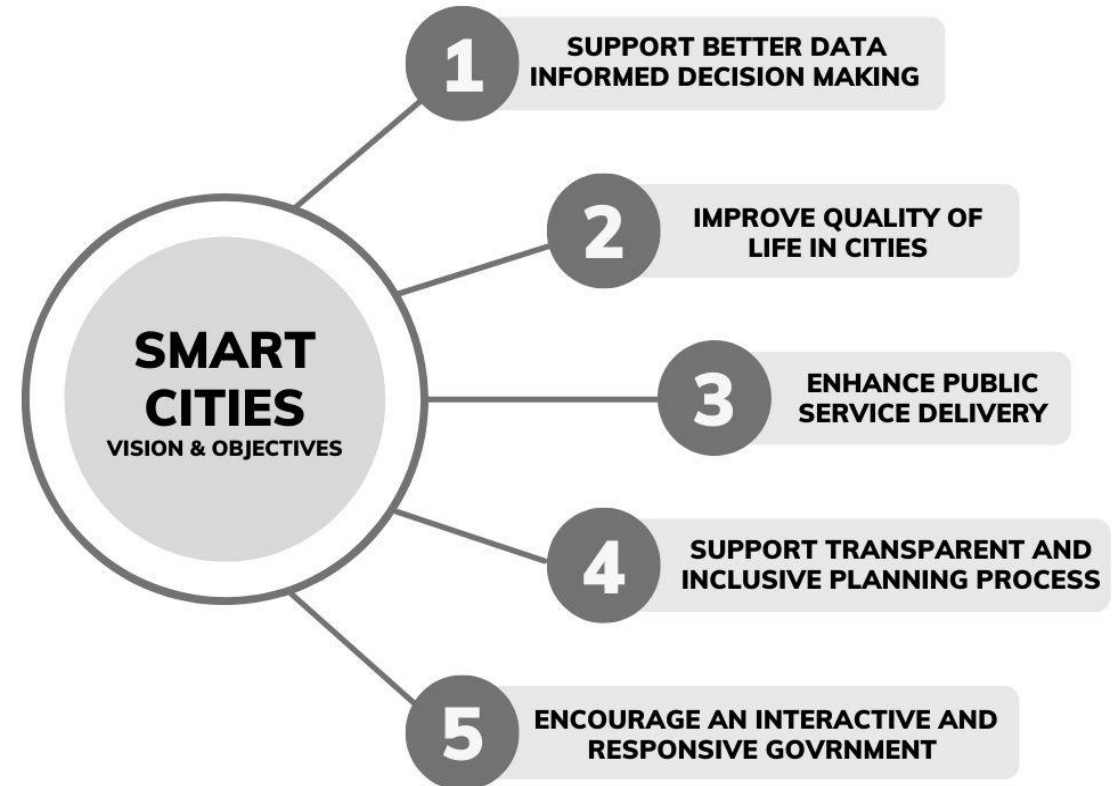
The Smart City concept

Smart cities use smart technologies and smart solutions including Internet of Things (IOT), Information and Communication Technologies (ICT), big data to increase operational efficiency, to monitor, control, and integrate various urban systems.

A major feature of smart city initiatives is to use digital solutions and innovations in technology to improve, upgrade and make urban public service delivery more efficient. However, these solutions must be correctly applied, based on a sound scientific approach and rationale.

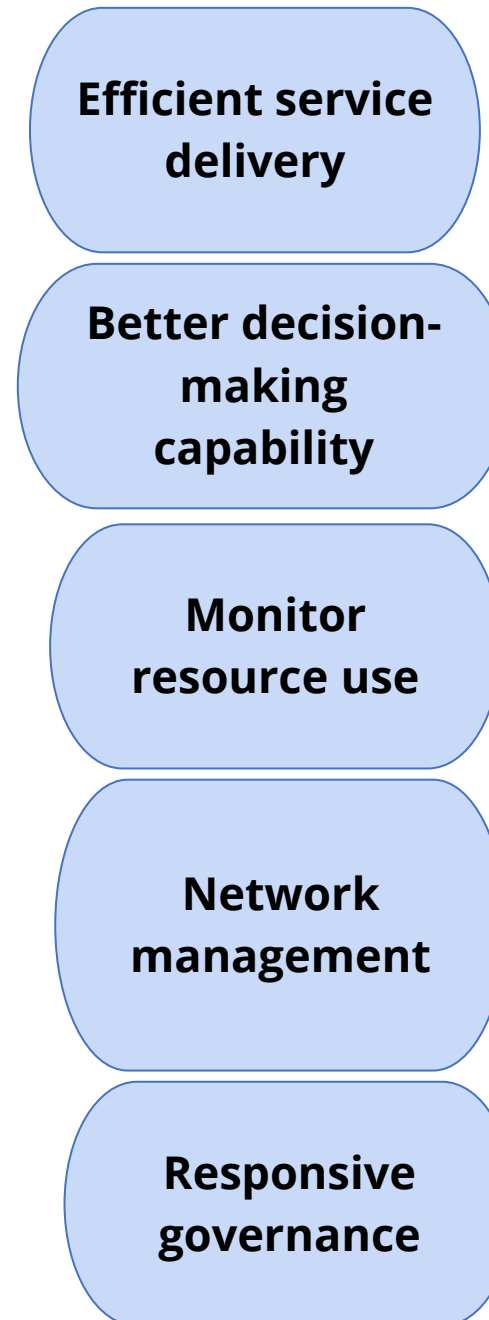
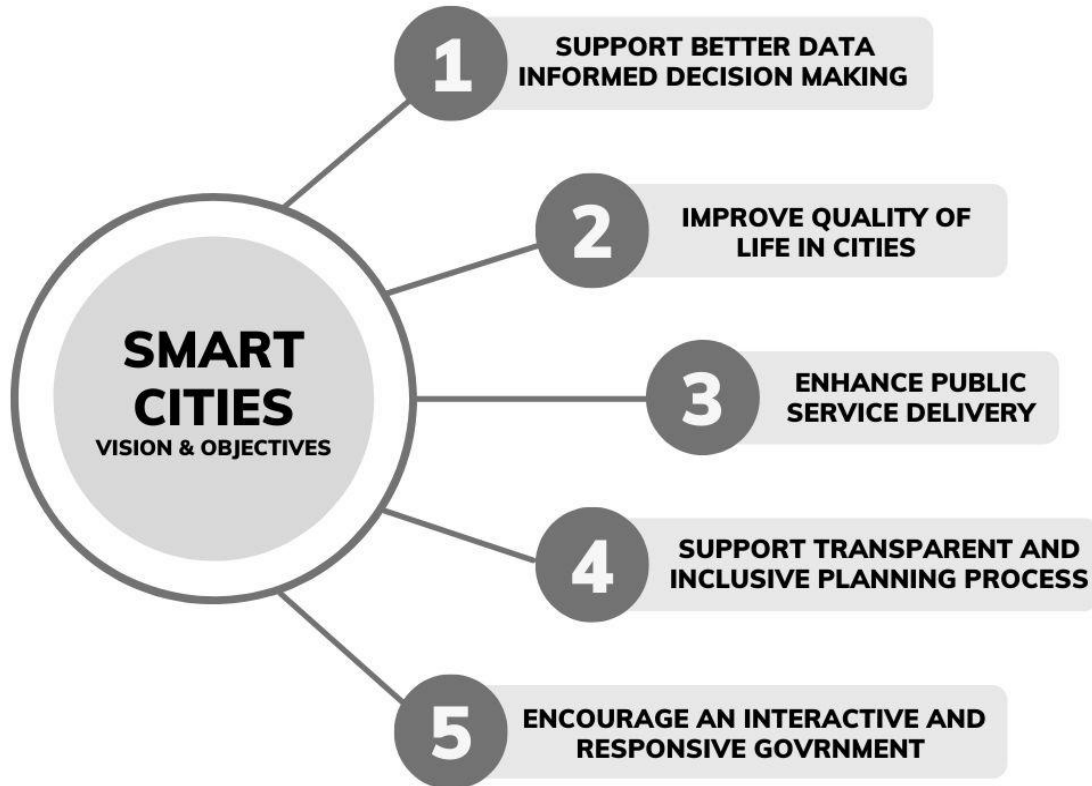
A “smart and sustainable city” approach should intrinsically promote human and social capital, as well as environmental protection.

Fig 1 - Smart Cities, Vision & Objectives



Logical Steps for Smart City system

Smart Cities, Vision & Objectives



Core Principles

The smart city must keep the public trust by providing excellent safety measures and a secure environment for all individuals, organizations, and businesses.



Core principles of Smart City

Safety and Security

Equity and inclusiveness

Resourcefulness and resilience

Integration and inclusiveness

Green growth, and liveable environments

Innovation and transformation

Resource conservation

Public and private sector participation

A Smart and Humane City

A truly smart city recognizes its citizens as its greatest asset by placing citizens and people at the core.

From the initial stage to the final stage of the smart city planning cycle, citizens and communities must be given a central role.

Putting people first means developing people-friendly planning in every aspect of the city. This principle should be clearly featured and enabled in every aspect of smart city planning.



Key Challenges & Issues

- 1. Privacy and Data Security:**
The increased collection and sharing of data in smart cities raise concerns about citizens' privacy and data security. Ensuring that data is collected, stored, and used responsibly while protecting individual rights is a complex challenge.
- 2. Digital Divide:**
While smart technologies offer numerous benefits, there is a risk of creating a digital divide where only certain segments of the population have access to these technologies. Ensuring equitable access and bridging the gap between digital haves and have-nots is essential.
- 3. Interoperability:**
Smart city systems often comprise various technologies and platforms from different vendors. Ensuring seamless interoperability and communication among these systems is crucial to avoid fragmentation and inefficiencies.
- 4. Sustainability:**
The goal of smart cities is to enhance sustainability, but the rapid deployment of new technologies can lead to increased energy consumption and electronic waste. Balancing technological advancement with environmental responsibility is a challenge.
- 5. Citizen Engagement:**
Effective implementation of smart city initiatives requires citizen involvement and support. Engaging citizens in decision-making processes and addressing their concerns is essential for successful outcomes.
- 6. Infrastructure Upgrades:**
Integrating new technologies into existing urban infrastructure can be costly and complex. Upgrading infrastructure to support smart solutions, such as IoT sensors and high-speed connectivity, is a challenge that requires careful planning.

7. Regulatory and Legal Frameworks:

Current regulations and legal frameworks may not adequately address the unique challenges posed by smart city technologies. Developing new regulations that address data ownership, liability, and other legal aspects is critical.

8. Vendor Lock-In:

Cities may become dependent on a single technology provider, leading to vendor lock-in. Creating an environment that encourages competition and open standards can mitigate this risk.

9. Public Funding and Investment:

Smart city initiatives often require significant investments in technology and infrastructure. Identifying sustainable funding models and attracting private sector investment can be challenging for cities with limited resources.

10. Cybersecurity:

As cities become more connected, they become potential targets for cyberattacks. Ensuring robust cybersecurity measures to protect critical infrastructure and sensitive data is a top priority.

11. Ethics and Governance:

The ethical implications of using technologies like surveillance systems and AI in urban environments must be carefully considered. Establishing governance frameworks to address ethical concerns and ensure responsible technology use is important.

12. Cultural and Social Acceptance:

Implementing new technologies may face resistance from citizens who are accustomed to traditional ways of living. Navigating cultural and social acceptance of smart solutions requires effective communication and education.

Example Smart Cities

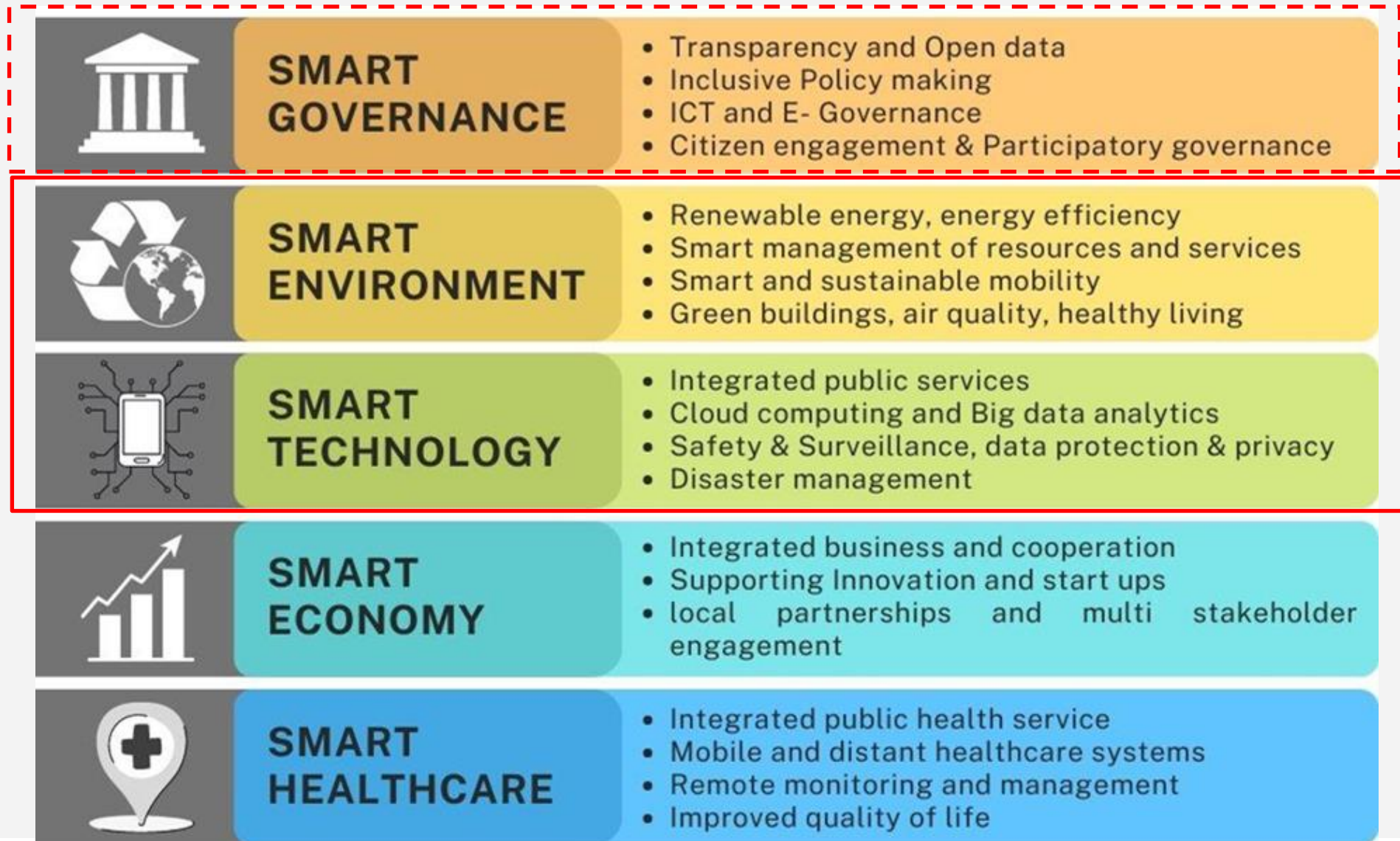
| No. | City | What they do | References |
|-----|-----------|---|---|
| 1 | Dubai | Dubai's Transportation Revolution aims for 25% driverless journeys by 2025, featuring innovative rail-hanging Sky Pods and Hyperloop for ultra-fast city travel, offering benefits like reduced congestion, efficiency, and eco-friendliness. | https://www.worldfutureenergysummit.com/en-gb/future-insights-blog/abu-dhabi-and-dubai-expand-their-smart-city-horizons-this-year.html |
| 2 | London | The " Smarter London Together " initiative focuses on responsible data sharing, smart infrastructure development, innovation through collaboration, and digital inclusion to enhance public services, efficiency, and citizen engagement in London. | https://www.london.gov.uk/sites/default/files/smarter_london_together_v1.66_-_published.pdf |
| 3 | Singapore | Singapore's Smart Nation initiatives encompass shared mobility, healthcare digitization, advanced apps, business support, tech education, and innovative technologies. Examples include sensor-enhanced elderly mobility, e-health services, the Smart Nation app, business facilitation through digital platforms, and comprehensive tech education programs. | https://www.smartnation.gov.sg/initiatives/strategic-national-projects |
| 4 | Yokohama | Yokohama and Frankfurt , partners since 2011, collaborate on climate change, economics, and creative city development. Initiatives like the "Yokohama Smart City Project" have brought together stakeholders, reducing CO2 emissions, achieving peak energy cuts, and promoting sustainable urban planning. | https://iuc.eu/japan-en/bestpractice/yokohama/ |
| 5 | Korea | Smart Waste Management in Seoul that is Improving Cleanliness and Efficiency. Seoul introduced solar-powered compacting bins using IoT tech, cutting waste collection costs by 83% and overflow. With 700% more capacity and 85% reduced collection, it's a model for cities aiming to enhance waste management efficiency. | https://tomorrow.city/a/success-story-smart-litter-bins-in-seoul |
| 6 | Barcelona | Barcelona's smart city strategy comprises 22 programs, addressing various urban aspects. They range from mobility and sustainability to citizen engagement. Noteworthy programs include Urban Lab for innovation, Sharing Cities for sustainable mobility, and Waste and Recycling for optimized waste management. Other initiatives cover areas like water management, open data, citizen science, and fostering digital education, tourism, and economic growth. | https://journals.openedition.org/factsreports/4367#:~:text=The%20purpose%20of%20Barcelona%27s%20smart,Social%20Innovation%20for%20Communities%20B%20project |
| 7 | Vienna | Vienna's Smart City goals focus on (1) Quality of Life; (2) Resource Conservation; (3) Innovation. It is a great environment friendly smart city that is achieving a 55% reduction in local per capita greenhouse gas emissions by 2030 and net zero emissions by 2040. | https://smartcity.wien.gv.at/wp-content/uploads/sites/3/2022/05/scwr_klima_2022_web-EN.pdf |

The Key for Success is Cooperation, Involvement, and Management

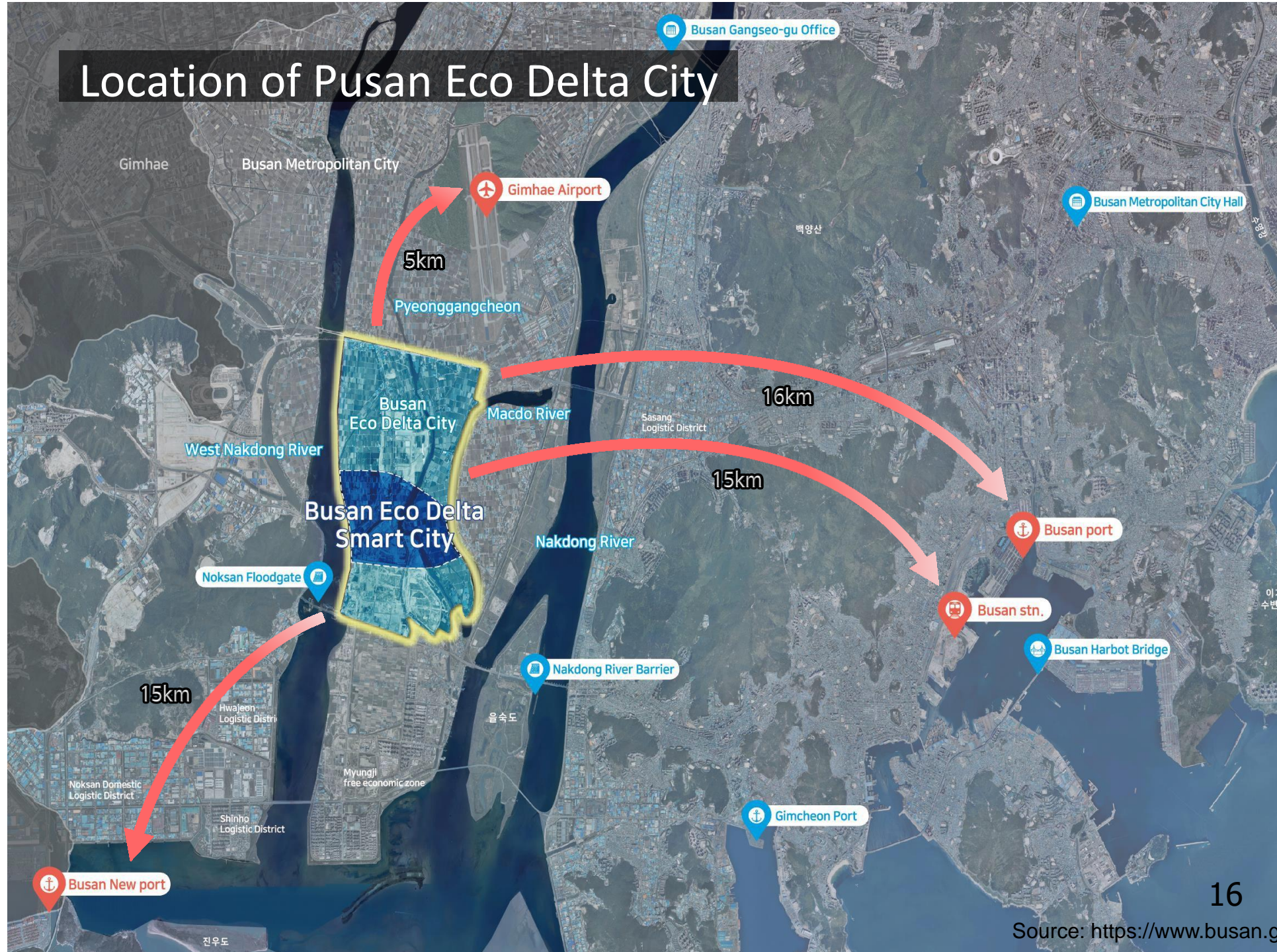
- Considering models of existing, cooperation, **Public-Private Partnerships (PPPs)** could be a vital mechanism to increase efficiency, know-how and financing in smart city projects
- In tandem with technology, further crucial components include **nature-based solutions, pro- social and community values**, the leveraging of **local and indigenous knowledge**, and fostering **innovation and research**, and promoting **young talent**.
- In the spirit of innovation, **experimentation can be the way forward. This may involve launching a pilot project**, where users and the general public are able to try out and experience new infrastructure, services, and situations in real life situations.

The main pillars of the smart city are all about meaningful impact and positive change.

UNCRD's
focus areas



Location of Pusan Eco Delta City



Overview & Locational Advantages of Busan Eco Delta Smart City



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

Overview & Locational Advantages of Busan Eco Delta Smart City



< Airport 

Busan Metropolitan City

Maekdo Riv.

Peyonggang Stream

Nakdong Riv.

The mouth of Nakdong Riv.>

 New Port >

West Nakdong Riv.

Gyeongnam (Gimhae, Changwon)

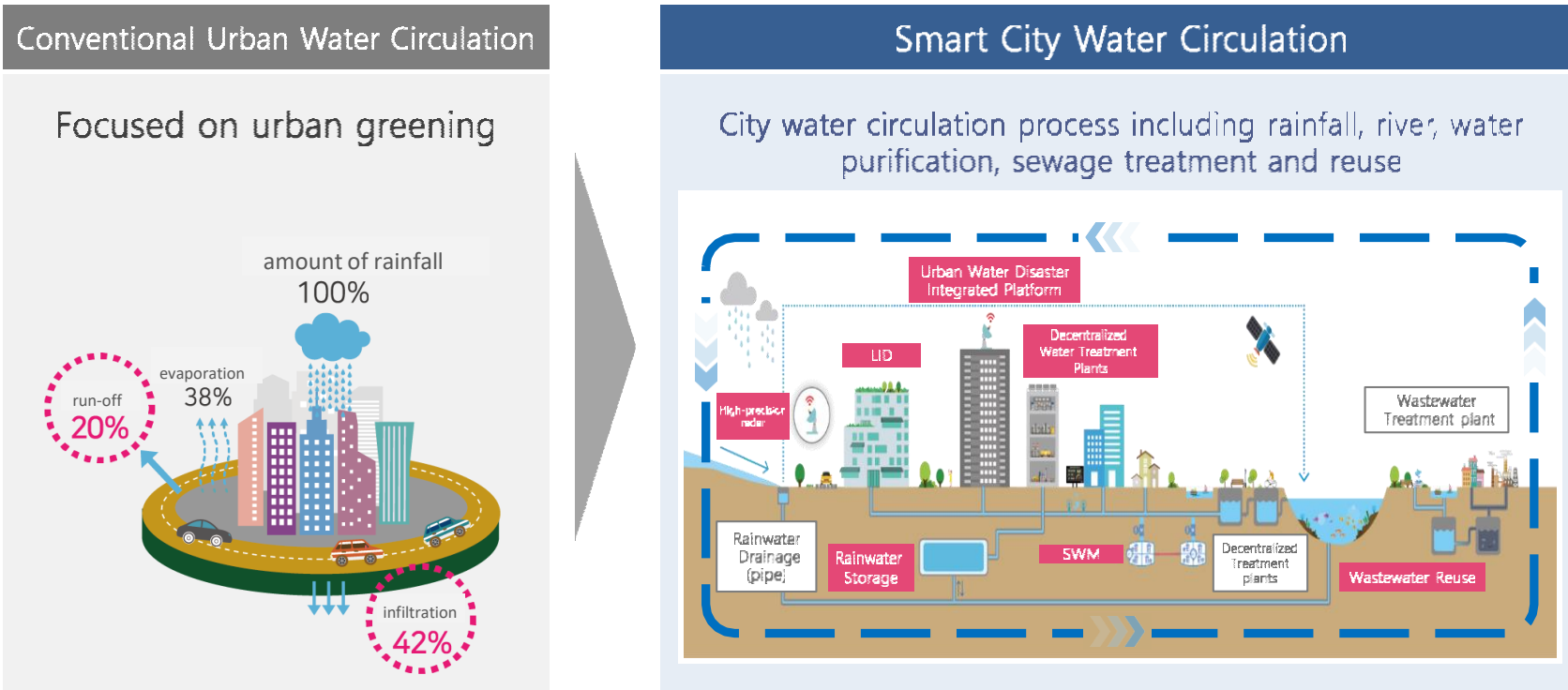


Smart City National Pilot Project

- | Area | 2.8km²
- | Population | 8,500 people(3,380 households)
- | Functions | The city where the major technologies of the 4th Industrial Revolution and the ecological settlements are harmonized with three streams as the center

Paradigm shift from focusing on urban greening to the water circulation of the entire city

Restore the unconnected water circulation and create a city specialized in water which people can rely on



Using K-Water's 50 years of water management know-how Adoption of smart water management technology

Introduce smart waterworks in new city for the first time in Korea
→ Provides services such as quality and quantity of water, as well as drought and flood information

High-precision small-scale precipitation radar

Improve the quality of river water and raw water through environmentally friendly water treatment based on natural or artificial recharge technology from developed countries.



② Urban Disaster Integrated Management System

Develop an Integrated Urban Water Disaster management system through constant monitoring water levels, gates, and drainage facilities



③ Low Impact Development(LID)

Construction of customized green infrastructure to restore urban water circulation to buildings such as roads, parks, green areas, rivers, and public buildings



④ Improving Water Quality in city rivers (Eco-filtering)

Improve the quality of river water and raw water through environmentally friendly water treatment based on natural or artificial recharge technology from developed countries.

<에코필터링 시스템>



⑤ Decentralized Smart Water Treatment Plants (Pilot project)

Prevent secondary contamination/water outage and diversify water sources by installing compact water treatment facilities near consumers.



⑥ Smart Water Management (SWM)

Providing consumer-oriented services such as applying SWM technology to manage water quality and quantity in real time for the whole water supply process and providing real-time water quality information to the public



⑦ Water Recycling

Process rainwater, sewage, and wastewater according to the purpose. e.g., use them for housing, industry, agriculture, landscaping, and river maintenance, among others.



⑧ Hydrothermal Energy System

Reduce the use of energy through the temperature differences of river water and raw water for heating and cooling.



Thank You

Dr. Kazushige Endo
ENDOK@uncrd.or.jp

**United Nations Centre for
Regional Development
(UNCRD)**

