





UN Sustainable Development Goals (SDGs)

# GOAL 11 IMPLEMENTATION REPORT OF SUWON



Sustainable  
Development  
Goals

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## Preface

With rapid industrialization and urbanization, the concern over the sustainability of the global environment sparked the international debate on environment and development, and the results of the debate were epitomized by 'Agenda 21' at the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro in 1992. Since then, the UN-led efforts to create a sustainable global environment had resulted in the Millennium Development Goals (MDGs) in 2001 and led to the adoption of the Sustainable Development Goals (SDGs) in 2015. As part of the global efforts to achieve SDGs, the United Nations High-level Political Forum on Sustainable Development (HLPF) is annually held to check the implementation status of SDGs with a sense of responsibility. The focus of the HLPF 2018, which will be held in July 2018, will be checking the implementation status of SDG 11.

SDG 11, which aims to “make cities and human settlements inclusive, safe, resilient,” has 7 Targets covering areas of residence, public transportation, urban planning, cultural heritage, resilience, environment and waste management and public space and three Sub-targets working as the fundamental tools for the implementation: linking urban, peri-urban and rural areas; integrated policy; and government capacity. The tasks of SDG 11 are in line with the tasks that the Network of Local Governments (NLG) have pursued the recognition that the success of sustainable development is up to cities.

SDG 11, as a key agenda for the world's sustainable development, has been discussed at various conferences like the United Nations Conference on Human Settlements (HABITAT) and by many organizations including international council for local environmental initiatives(ICLEI). Especially, the “New Urban Agenda”, which was adopted at HABITAT III held in Quito in 2016, well epitomizes the essence of the agenda. The close partnership between diverse stakeholders and their participation would be the key to achieving SDGs. Especially, the cooperation between the United Nations, member states, local governments and other stakeholders would be of the utmost importance.

Recognizing the importance of the environment, Suwon City has put its priority on people-centered policy for sustainable urban development since 2010 and has been dedicated to establishing urban infrastructure for the safety of citizens. The city enacted the

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Ordinance for Sustainable Development and launched the Suwon Council for Sustainable Development, an organization with a private-public governance structure, and adopted its own 10 Sustainable Development Goals through a private-public partnership. In addition, the Suwon Research Institute (SRI) was established as a think-tank to study the specific tasks and strategies of Suwon for the implementation of Sustainable Development Goals while the newly established Suwon Sustainable City Foundation is mandated with implementing the tasks and projects related to urban sustainability. With the launch of ICLEI Korea Office, Suwon is also making efforts to spread the international community's efforts for achieving sustainable development.

Suwon City and the Suwon Research Institute, in cooperation with various entities and organizations, examined the tasks and implementation status of the Targets of SDG 11, in line with the HLPF to be held in July 2018. This paper is SDG 11 implementation Report of Suwon and has been prepared after going through such process.

This report is expected to give an opportunity for Suwon to do a self-evaluation on the efforts the city has made for sustainable development and to seek higher levels of its own goals and multidimensional measures for the global sustainable development. We hope that the efforts of Suwon, coupled with international cooperation and communication for the implementation of SDGs, would be able to sow the seeds for the global sustainable development and spread them to more local and municipal governments across the world.

June 2018

Suwon City Government

Suwon Research Institute

Suwon Council for Sustainable Development

ICLEI - Local Governments for Sustainability Korea (Office)

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## Introduction

Within two centuries of economic development fueled by rapid industrialization and urbanization, the entire world was faced with the crisis of sustainability. Since the warning of the Club of Rome in the 1970s, the international debate on environment and development has been diversified. As a result, the UN Member States reached agreement on the importance of sustainable development at the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992 and made the Rio Declaration on Environment and Development, and then the declaration led to the launch of the United Nations Commission on Sustainable Development (CSD) by the UN General Assembly as well as the organization of the Millennium Forum in 1998 in which more than 100 nations participated and discussed a wide range of topics such as poverty eradication, environment, and human rights protection. Later, all of such efforts had resulted in the adoption of United Nations Millennium Declaration at the Millennium Summit in September 2000. However, the Millennium Declaration did not include the Millennium Development Goals (MDGs) which were discussed at the summit. In 2001, the Millennium Development Goals (MDGs) with the target year of 2015 were announced, based on the International Development Goals (IDGs) by the OECD and the IMF and the Millennium Declaration.

Since then, agendas have been pursued to realize the MDGs, mainly led by the UN, but they were met by mixed responses; some evaluated highly of their considerable achievements while others viewed the agendas as a short-sighted approach focused on unbalanced topics and regions. Based on the MDGs, the UN Summit on Sustainable Development, held in September 2015, adopted “Transforming our World: The 2030 Agenda for Sustainable Development” as a new agenda to be universally applied to the UN Member States over the next 15 years. A key part of this agenda was Sustainable Development Goals (SDGs), broad goals that will lead international action and investment for sustainable development for the next 15 years by 2030. Even though those who confirmed SDGs in New York were the government of each state, cities, local governments, and local communities are more closely related to the 17 Goals and 169 Targets of SDGs.

The global phenomenon of urbanization will continue while the implementation of SDGs. Today, cities are home to more than half of the world's population, and the number of urban

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dweller is expected to increase by 60 million a year, and cities are estimated to account for 70% of the global economy. Such tendency clearly shows that cities play a pivotal role in politics, economy, and society in the 21st century. Emphasizing such importance of cities, the goal related to cities was included in SDGs. Among 17 Sustainable Development Goals, 'Sustainable Development Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable'(abbreviated as SDG 11 or Goal 11) well epitomize the issues facing cities.

The third United Nations Conference on Housing and Sustainable Urban Development (hereinafter referred to HABITAT III) was held in Quito in 2016, the following year of the introduction of SDGs. Habitat III has achieved the adoption of the "New Urban Agenda (NUA)", which would facilitate and provide guidelines for the actual implementation of SDG 11. Every year the United Nations sets areas to be monitored and check the progress of member states to encourage them to act on SDGs, and SDG 11 is the focus of monitoring this year.

With the aim of "Making cities and human settlements inclusive, safe, resilient and sustainable", SDG11 is composed of seven specific targets and three sub-targets, and the details about each target are shown in Table-1.

## **Suwon's Review on 7 Targets of SDG 11**

With the aim of "People-centered, Bigger Suwon", the city government has pursued a safe and secure city for all which is also in line with "Cities for All" of Habitat III. In this regard, Suwon's self-examination on how Suwon's policy goals, measures, and the progress are evaluated in light of SDGs, or more specifically, Targets of Goal 11, will be of great significance for Suwon to pursue its policy goals and plans for sustainable development.

Therefore, in this paper, Suwon, along with many experts and organizations, tries to interpret the 7 Targets and Indicators of SDG 11 (excepting 11.a, 11.b, and 11.c which set

**Table 1. Description of Goal 11 and its targets**

Goal 11	<b>Make Cities and human settlements inclusive, safe, resilient and sustainable</b>
11.1	By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums
11.2	By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons
11.3	By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries
11.4	Strengthen efforts to protect and safeguard the world's cultural and natural heritage
11.5	By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to the global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations
11.6	By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management
11.7	By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities
11.a	Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning
11.b	By 2030, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels
11.c	Support least developed countries, including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials

out the basis or systems for the implementation of SDG 11) in the local context of Suwon, a city with 1.26 million population. In the meantime, the city will check its status in the implementation of SDGs and obstacles, and explore future tasks to improve the quality of life for citizens and realize the goal of making a sustainable city.

Suwon has advanced itself to the levels of a considerably big city in many areas. In some aspects, Suwon may have already surpassed the universal standards set forth by the SDGs. In terms of quantitative indicators, the supply rate of housing and water and

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sewerage penetration rate are close to 100% in the city. Suwon has implemented various policies to make more progress in the city's indicators. The city hosted the EcoMobility World Festival for the first time in the world, carried out a variety of cultural projects and strengthened basic cultural infrastructure by building more cultural facilities such as libraries which help citizens learn and cultivate themselves. Suwon also has been dedicated to the creation of a comprehensive social safety net to ensure the well-being of all citizens. In addition, the city's commitment to preservation and protection of cultural heritage was well demonstrated by its restoration efforts for the Suwon Hwaseong Fortress. The city government has devoted itself to creating pleasant urban spaces such as parks. In the meantime, the city explored various types of governance systems such as 'Team of Citizen Planners' to engage more citizens in the process of pursuing such urban plans.

In addition, Suwon City enacted the Ordinance for Sustainable Development to achieve SDGs which led to the launch of the Suwon Council for Sustainable Development, an organization with the private-public governance structure, and the city adopted 10 Sustainable Development Goals of Suwon through a public-private partnership. The Suwon Research Institute was also established with the aim of conducting research on specific tasks and strategies for the implementation of SDGs. In addition, the city hosted the ICLEI Korea Office and has been holding the annual International Human City Forum to share exemplary cases of countries and Suwon's experiences in pursuing people-centered policies. In that way, Suwon is striving to contribute to the spread of the SDGs across the world.

In spite of such efforts, Suwon, as a city with high population density, has its own share of urban problems and still has a long way to go towards an inclusive, sustainable and safe city. The potential tasks of Suwon which will be identified while preparing for this report will be a good basis for the city to set up and realize higher levels of its own goals for achieving SDGs by the target year of 2030.

**Lee Jaeun**

President of Suwon Research Institute

## 01

## Ensuring access for all to adequate, safe and affordable housing and basic services and upgrading slums

Kim Doyoung

Target 11.1	By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums	Indicator 11.1.1	Proportion of urban population living in slums, informal settlements or inadequate housing
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### I. Setting targets and indicators in the local context of Suwon

Target 11.1 aims to address problems caused by inadequate housing by providing durable housing with drinking water, sanitation and adequate space (Architecture & Urban Research Institute, 2016).

According to UN HABITAT, a number of conditions must be met to be considered as “adequate housing”: ① access to basic water and ② basic sanitation, ③ guarantee for land ownership, ④ durable housing and ⑤ enough space, and housing that doesn't meet the conditions is considered as “inadequate housing.”

As there is no specific indicator of inadequate housing in Korea, the minimum housing standards<sup>1</sup> of the Quality of Life Indices of Korea can be used as an alternative.

The targets of the Sustainable Development Goals of Suwon (Suwon SDGs) include ① the guarantee of citizens' housing rights and expansion of public rental housing; and ② reducing housing expenses of citizens and promoting social housing, and

<sup>1</sup> Notification No. 2011-490 (2011) of the Ministry of Land, Transport and Maritime Affairs suggests the minimum housing standards with regard to the necessary facilities for residential buildings, structural performance, environmental standards, and the minimum residential area.

**Table 1. Conditions suggested by UN-Habitat not to be inadequate housing**

Conditions	Details
Access to basic water	Sufficient, affordable and readily available for family members to use
Access to basic sanitation	Purification treatment facility that is enough to be used by family members and a separate booth must be installed in the common toilet
Guarantee of land ownership	Document that can prove land ownership status, a degree of tenure security which guarantees substantial protection from forced evictions
Durable housing	Must be Constructed in a perpetual and appropriate structure in non-hazardous areas
Enough space	More than 2 people do not share the same room

※ Source: "Study on Goal 11: Make cities and human settlements resilient and sustainable" by Bang Seola et al.(2015), "Current Status and Measures for the Achievement of Sustainable Development Goals(SDGs)" by Kim Ji Hyun et al. (2015), "Study on the Directions of Architecture and Cities Responding to Sustainable Development Goals(SDGs)" by Architecture & Urban Research Institute

**Table 2. Indicators of Sustainable Development Goals of Suwon (Suwon SDGs)**

Target	Indicators
Guarantee of citizens' housing rights and expansion of public rental housing	Rate of public rental housing compared to total number of housing in Suwon
	Annual rate of public rental housing compared to the annual supply of total housing in Suwon
	Status of 1- and 2-person households and small-sized housing distribution rate in Suwon
Reducing housing expenses of citizens and promoting social housing	The ratio of rent to income
	The number of tenant households to the total number of households
	Budget for housing welfare (Budget for youth rental housing, youth dormitory, and rental housing for the low-income class)

※ Source: Suwon Council for Sustainable Development(2017), Suwon SDGs(3 areas, 10 goals and 57 targets)

Suwon City checks the progress made in achieving the targets.

The minimum housing standards of the Quality of Life Indices of Korea and Suwon SDGs' housing-related indicators are quantitative indicators of residential spaces and housing prices. So they can be considered as a means of evaluating "enough space" but not appropriate to evaluate the level of "access to basic water or sanitation".

Therefore, Suwon City examined the status of residential spaces in Suwon by selecting indicators that seem most relevant to the conditions for adequate/inadequate housing defined by UN-Habitat, and the details are shown in the table below.

Located in the Seoul metropolitan area, Suwon has relatively good residential environments. So, Suwon City further strengthened conditions for adequate housing than those suggested by UN-Habitat.

**Table 3. Conditions suggested by UN-Habitat not to be inadequate housing**

Number of family member(s)	Typical composition of family member(s)	Number of room(s) Kitchen/Dining area	Total residential area (m <sup>2</sup> )
1	1-person household	1 K	14
2	Couple	1 DK	26
3	Couple + one child	2 DK	36
4	Couple + two children	3 DK	43
5	Couple + three children	3 DK	46
6	Grand parents + couple + two children	4 DK	55

※ Source : Notification No. 2011-490 of the Ministry of Land, Transport and Maritime Affairs (2011)

\* K refers to only kitchen, DK refers to kitchen and dining area and the number of rooms include bedrooms and living rooms.

**Table 4. Conditions suggested by UN-Habitat not to be inadequate housing, and relevant indicators**

Conditions	Indicators	
Access to basic water	-Rate of households using shared bathroom facilities (by district and by income level)	Tier 3
	-Rate of households that do not have bathrooms with hot running water (by district and by income level)	
	-Rate of households without kitchen facilities	
	-Rate of households using shared types of kitchens	
Access to basic sanitation	-Rate of households without flush toilets	Tier 3
	-Rate of households using shared types of toilets	
Guaranteeing land ownership	-Rate of households living in free housing	Tier 3
	-Rate of households living in non-residential buildings	
Durability of housing	-Rate of households satisfied with physical conditions of the house	Tier 3
Enough living space	-Rate of households below the minimum housing standards	Tier 1

※ Source : "Study on Goal 11: Make cities and human settlements resilient and sustainable" by Bang Seola et al.(2015), "Current Status and Measures for the Achievement of Sustainable Development Goals(SDGs)" by Kim Ji Hyun et al. (2015), "Study on the Directions of Architecture and Cities Responding to Sustainable Development Goals(SDGs)" by Architecture & Urban Research Institute

**Access to basic water** As water supply facilities are connected to all households in Suwon, every citizen of the city has access to basic water. However, some households share bathrooms with others and lack hot-running water, and some houses are not equipped with kitchens or use shared types of kitchens.

**Access to basic sanitation** Even though most households in Suwon have flush toilets, we measured the percent of households using conventional toilets and the percent of households sharing toilets with other households.

**Guaranteeing land ownership** We measured the percent of people whose living environments that do not seem to be sustainable: people living in free housing or non-

residential housing.

**Durability of housing** Durability of housing was evaluated in an indirect way by measuring residents' levels of satisfaction about physical conditions of the house.

**Enough living space** As data about “enough space” doesn't exist at the municipal level, we used national statistics.

## II. Status of Suwon and evaluation

The households using shared bathrooms account for 0.5% of the total households in Suwon, and the rate is the highest in Paldal-gu, recording 1.5%, followed by Kwonseon-gu and Yeongtong-gu.

- The results show that there is a large gap between districts as the percent is the highest in Paldal-gu, a district mainly composed of old towns, while Yeongtong-gu, a district mainly composed of new towns, doesn't have any household using shared bathrooms.
- None of households with monthly income of over KRW 3 million use shared bathrooms while 1.2% households with monthly income of KRW 2-3 million, 1.0% of households with monthly income of KRW 1-2 million and 1.0% of households with monthly income below KRW 1 million use common bathrooms. The results suggest that 1% of households with monthly income below 3 million use shared types of bathrooms.

Households that do not have access to hot running water in their bathrooms account for 0.3% of the total. Gwonseon-gu recorded the highest at 0.7%, followed by Jangan-gu at 0.4%, Paldal-gu at 0.1% and Yeongtong-gu at 0.0%.

- A total of 0.7% of households in Gwonseon-gu, a district with high percentage of undeveloped areas, do not have access to hot-running water in their bathrooms.
- In case of households with monthly income less than KRW 1 million, 1.8% of them do not have access to hot-running water in their bathrooms.

The rate of households with no kitchen is 0.2% of the total. The percent was the highest in Paldal-gu, recording 0.8%, followed by 0.1% of Kwonseon-gu while all households in Jangan-gu and Yeongtong-gu have kitchen areas.

- When you look at the results by income levels, 0.5% of households with monthly income of KRW 2-3 million and 0.4% of households with monthly income between KRW 1-2 million lack kitchen areas.

The households using shared types of kitchens account for 0.3% of the total and

**Table 5. The rate and the number of households that do not have access to hot-running water in their bathrooms by district(or “gu”) by income level and by type**

Category	Number of households	Percent of households with/without hot running water			Type		
		Hot water	Only cold water	None	Not shared	Shared	
Suwon	436,304	99.7	0	0.3	99.5	0.5	
District	Jangan-gu	104,948	99.6	0	0.4	99.5	0.5
	Gwonseon-gu	130,273	99.3	0	0.7	99.8	0.2
	Paldal-gu	78,986	99.9	0	0.1	98.5	1.5
	Yeongtong-gu	122,097	100	0	0	100	0
	Under 1 million won	35,532	98.2	0	1.8	99	1
Household monthly income	100-less than 2 million won	69,121	99.4	0	0.6	99	1
	200-less than 3 million won	83,946	99.7	0	0.3	98.8	1.2
	300-less than 4 million won	86,200	99.9	0	0.1	100	0
	400 million won and above	161,198	100	0	0	100	0

※ Source: 2017 Survey and Analysis on Housing in Suwon and Statistical Report by Suwon Sustainable City Foundation (2017)

the percent is the highest in Paldal-gu, recording 1.1%, followed by Jangan-gu at 0.4% and Kwonseon-gu at 0.1%.

- A total of 0.8% of households with monthly income between KRW 1-3 million and 0.6% of households with monthly income below KRW 1 million use shared types of kitchen facilities.

The percent of households that do not have flush toilets is 0.1% and households using shared types of toilets account for 0.9% of the total.

- The situation of households with monthly income below KRW 1 million does not seem good as 0.8% of them use squat toilets and 2.5% of them share toilets with other households.

- By district, Paldal-gu has the highest percent of households using shared types of toilets, recording 1.9% while none of households in Yeongtong-gu use shared types of toilets.

The rate of households living in free housing is 2.0%, while those living in non-residential building account for 3.5%.

- UN-Habitat sees that the absence of land ownership refers to an environment in which the occupant can not be adequately protected from evictions. So, we viewed that households residing in free housing or non-residential buildings as households living in an environment that could not provide the households with adequate protection from forced evictions.

We used the results of the questionnaire about elements of housing as an indicator of durability of housing. The respondents were asked to mark their satisfaction

**Table 6. The rate and the number of households with/without kitchen by district(or “gu”)**

by income level and by type

Category	Number of households	Percent of households with/without kitchen			Type		
		Modern type	Traditional type	None	Not shared	Shared	
Suwon	436,304	99.7	0.1	0.2	99.7	0.3	
District	Jangan-gu	104,948	99.8	0.2	0	99.6	0.4
	Gwonseon-gu	130,273	99.9	0	0.1	99.9	0.1
	Paldal-gu	78,986	99.2	0	0.8	98.9	1.1
	Yeongtong-gu	122,097	100	0	0	100	0
	Under 1 million won	35,532	99.4	0.6	0	99.4	0.6
Household monthly income	100-less than 2 million won	69,121	99.6	0	0.4	99.2	0.8
	200-less than 3 million won	83,946	99.5	0	0.5	99.2	0.8
	300-less than 4 million won	86,200	100	0	0	100	0
	400 million won and above	161,198	100	0	0	100	0

※ Source : 2017 Survey and Analysis on Housing in Suwon and Statistical Report by Suwon Sustainable City Foundation

levels about housing on a scale of 1 to 5, and the respondents gave 4.18, the highest, for structural safety followed by 4.16 for natural lighting and 4.15 for water leakage prevention.

- The most unsatisfactory elements among physical conditions of housing was soundproofing, marking 3.38, followed by 3.7 for moisture/fungus prevention and disaster preparedness and 3.74 for housebreaking prevention.

Looked at the quantitative result instead of qualitative evaluation, you can see that

**Table 7. The rate and the number of households with/without toilet by district(or “gu”)**

by income level and by type

Category	Number of households	Percent of households with/without toilet			Type		
		Flush toilet	Squat toilet	None	Not shared type	Shared type	
Suwon	436,304	99.9	0.1	0	99.1	0.9	
District	Jangan-gu	104,948	100	0	0	98.9	1.1
	Gwonseon-gu	130,273	99.8	0.2	0	99.1	0.9
	Paldal-gu	78,986	99.8	0.2	0	98.1	1.9
	Yeongtong-gu	122,097	100	0	0	100	0
	Under 1 million won	35,532	99.2	0.8	0	97.6	2.4
Household monthly income	100-less than 2 million won	69,121	99.9	0.1	0	97.9	2.1
	200-less than 3 million won	83,946	99.9	0.1	0	98.3	1.7
	300-less than 4 million won	86,200	100	0	0	99.8	0.2
	400 million won and above	161,198	100	0	0	100	0

※ Source: 2017 Survey and Analysis on Housing in Suwon and Statistical Report by Suwon Sustainable City Foundation

**Table 8. Characteristics of surveyed households**

(Unit: household and %)

Category	Surveyed households		(Parent) Population		
	Number of households	Percent	Number of households	Percent	
Number of family members	1-person household	956	23.8	119,552	27.4
	2-person household	959	23.9	94,136	21.6
	3-person household	833	20.7	96,766	22.2
	4-person household	1,010	25.1	97,387	22.3
	5 or more	260	6.5	28,463	6.5
Type of occupancy	House owner	2,063	51.3	224,427	51.4
	Jeonse (Renting house after paying key money)	780	19.4	84,869	19.5
	Daily/monthly rent and monthly rent paid in advance	1,096	27.3	117,856	27
	Free housing	79	2	9,152	2.1
Type of house	Single/multi-unit houses	1,284	32	121,983	28
	Apartment	2,107	52.4	239,137	54.8
	Tenement houses/multi-household houses	485	12.1	57,121	13.1
	Non-residential housing	142	3.5	18,063	4.1
Exclusive private area	40㎡ or less	1,015	25.3	110,157	25.2
	40~60㎡ or less	1,107	27.6	123,312	28.3
	60~85㎡ or less	1,307	32.5	140,921	32.3
	more than 85㎡	589	14.7	61,914	14.2
Vulnerable households	Vulnerable households	1,080	26.9	119,605	27.4
	Korean households	899	22.4	102,541	23.5
	Foreign and multicultural families	181	4.5	17,064	3.9

※ Source: "2017 Survey and Analysis on Housing in Suwon and Statistical Report" by Suwon Sustainable City Foundation in 2017

**Table 9. Satisfaction levels about physical conditions of housing by district(or "gu")**

Unit: household and %

Category	Structural safety	Natural lighting	Sound proofing	Moisture/fungus prevention	Ventilation	Pest control	Water leakage prevention	Heating	Size	Disaster preparedness	House breaking prevention
Suwon	4.18	4.16	3.38	3.7	4.03	3.88	4.15	3.76	3.88	3.7	3.74
District	Jangan-gu	4.13	4.05	3.35	3.63	3.9	3.93	4.09	3.69	3.82	3.54
	Gwonseon-gu	4.14	4.27	3.38	3.64	4.17	3.8	4.11	3.69	3.91	3.76
	Paldal-gu	4.15	4.07	3.33	3.53	3.91	3.52	4	3.7	3.72	3.57
	Yeongtong-gu	4.27	4.2	3.42	3.93	4.07	4.14	4.33	3.94	3.99	3.88
Household monthly income	Under 1 million won	3.83	3.49	3.26	3.29	3.5	3.36	3.82	3.4	3.67	3.33
	100-less than 2 million won	4	3.88	3.28	3.41	3.77	3.53	3.96	3.52	3.72	3.44
	200-less than 3 million won	4.14	4.07	3.36	3.56	3.89	3.77	4.06	3.66	3.68	3.5
	300-less than 4 million won	4.19	4.22	3.42	3.76	4.1	3.93	4.19	3.74	3.85	3.76
	400 million won and above	4.34	4.45	3.43	3.95	4.3	4.17	4.32	4.01	4.1	3.97

※ Source : 2017 Survey and Analysis on Housing in Suwon and Statistical Report by Suwon Sustainable City Foundation

the number of households below the minimum housing standards has decreased by 10.2% over 10 years from 16.6% in 2006 to 5.5% in 2016.

**Table 10. Changes in the rate of households below the minimum housing standards**

Year	2006	2008	2010	2012	2014	2016
Number of households below the minimum housing standards in Suwon	2,680,000	2,120,000	1,840,000	1,277,000	992,000	1,027,000
Percent(%)	16.6	12.7	10.6	7.2	5.4	5.4

※ Source : "Survey on Housing," conducted annually by the Ministry of Land, Infrastructure and Transport and "the Quality of Life Indices of Korea" (<https://qol.kostat.go.kr/blife/main.do>)

### III. Conclusion and suggestions

#### 1. Conclusion

As a result of the review on the statistics of Suwon City regarding "ensuring access for all to adequate, safe and affordable housing and basic services and upgrading slums,"

- we found that households living below the minimum housing standards account for 5.4% but it doesn't exactly mean that 5.4% of Suwon's population live in "inadequate housing" defined by UN-Habitat.
- So, Suwon City made the indicators shown in <Table.4> based on the conditions for adequate housing suggested by UN-Habitat and also in consideration of domestic situations.

According to the indicators, the results show that Suwon citizens' access to basic water is well guaranteed as the rate of households using shared bathroom facilities is only 0.5%, and households without kitchen facilities and those using shared types of kitchen facilities account for just 0.2% and 0.3% respectively.

- The results also suggest a big gap between Paldal-gu, a district mainly composed of old towns, and Yeongtong-gu, a district mainly composed of new towns.

In terms of access to basic sanitation, households without flush toilets account for 0.1% and the rate of those using shared types of toilets is as low as 0.9%. However, such rates are 3 or 4.5 times higher than the rate of households using shared types of bathroom or kitchen facilities.

In case of land ownership guarantee, the rate of households living in free housing is 2.0% and those in non-residential building account for 3.5% of total households. Therefore, it is considered that the medium and long-term stability of housing is relatively in bad shape in light of the housing quality standards.

As for housing durability, the results of the questionnaire about elements of housing

show that the residents are highly satisfied with the durability of housing.

- However, the respondents expressed lower levels of satisfaction about structural safety, natural lighting and water leakage prevention.
- Data on residential condition of Suwon suggests that the city's housing environments are generally great but Paldal-gu and Kwonseon-gu with highly concentrated old town areas show relatively poor outcomes compared to other districts like Jangan-gu and Yeongtong-gu.
- Given that, the city government needs to reduce the gap between districts and implement more customized housing policies in consideration of those using shared types of kitchens, bathrooms and toilets.

## 2. Policy suggestions

Suwon's housing welfare policy needs to be divided into ①improvement of residential environment of those living in dilapidated housing, ②reducing the economic burden of housing expenses, and ③providing affordable and safe living spaces.

First of all, the city government is required to support the installation of modern kitchen facilities, flush toilets, and bathrooms with hot running water in order to improve residential environment of those living in dilapidated housing.

- The city government needs to consider financial support for house remodeling and incentives for urban renewal projects to help those economically stricken families who cannot afford their own kitchen or toilet.
- More specifically, financial support for the establishment of a co-operative for home remodeling and subsidies for home remodeling works would inject vigor into the remodeling market and lead to tangible improvements of residential conditions.
- Given those who cannot use hot water due to the burden of the utility bill, utility vouchers could be a realistic solution.
- In addition, as a way of addressing inconveniences caused by shared types of toilets and kitchens, the adoption of floor area ratio (FAR) incentives for urban regeneration projects is worth considering to increase the economic feasibility of related projects.

Second, the expansion of public rental housing would contribute to reducing the economic burden of housing expenses.

- The most common public rental housing model, which is based on the benefits generated from housing site development, is no longer sustainable given the diminishing population.

- So, aside from the wide-spread model, the model of purchased rental housing should be constantly promoted.
  - In addition, administrative and financial supports, such as connecting public rental housing with Social Impact Bond(SIB), would motivate the private sector in terms of supply and maintenance of public rental housing.
- Lastly, we need to take a more broader approach for safe and affordable housing.
- Public rental housing has been a surest way of providing citizens with safe and affordable housing as the physical residential space has given people a sense of stability.
  - However, not enough consideration has been made about jobs, leisure activities and residential communities.
  - In this regard, not only physical spaces but also residential programs for promotion of jobs, leisure activities and residential communities should be taken into consideration for safe and affordable housing.

## The current status and tasks for safe and convenient public transport systems for all

Kim Sukhee

Target		Indicator	
11.2	By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums	11.2.1	Proportion of urban population living in slums, informal settlements or inadequate housing

### I. Setting targets and indicators in the local context of Suwon

The New Urban Agenda mentions the importance of transport mobility to create a sustainable city, and the role of local governments in achieving SDGs has been emphasized through the Paris Agreement, the Post-2015 Urban Agenda and Habitat III.

Target 11.2 of SDG 11 emphasizes ensuring access to public transport systems for ensuring mobility of the vulnerable groups, and the progress and achievements will be measured based on the distance and travel time to access public transport services.

While Target 11.2 of SDG 11 uses “proportion of population that has convenient access to public transport”, as its indicator, this is also related to “Suwon 2030 Sustainable Development Goals” and especially its “Target 1-4: Increasing the Share of Public Transport for Ecological Transport and Improvement of Air Quality” of “Goal 1: Good Energy for All.”

In this regard, as Suwon currently does not have analyzed statistical data on the proportion of population with access to public transport services. This paper

suggested the data on the size of areas covered by bus service, which is estimated based on the locations of bus stops in the city.

This paper also introduce Suwon's current policies of securing the right of the transportation for disadvantaged and the vulnerable groups and addressing service blind spots in terms of time and space.

## II. Status of Suwon and evaluation

### 1. Removing blind spots for people without access to transport service

#### 1) Status of current policy and remaining tasks

In January , the Korean government enacted the “Act on Promotion of the Transportation Convenience of Mobility Disadvantaged Persons” to ensure safe and convenient transport services for the underprivileged. Following the legislation, the Ministry of Land, Infrastructure and Transport and local governments established the Basic Plan for the Promotion of Convenient Transportation for the Mobility Disadvantaged .

As such, projects for the transportation disadvantaged groups or individuals have been carried out at the national level with the aim of improving safety and mobility of people who do not have proper access to transport services. The government has dedicated to strengthening safety by improving the nation's transportation facilities while improving mobility through the introduction of low-floor buses and guarantee of access to urban railways.

Suwon started a pilot project of low-floor buses in 2003 to improve the convenience of the mobility disadvantaged, and low-floor buses have been running on the roads of Suwon since 2006. The Ministry of Land, Infrastructure and Transport plans to increase the average rate of low-floor buses to 42% in the nation and to 32% in Gyeonggi Province by 2021.

As of December 2017, Suwon has 128 bus routes, and 1,242 registered buses are in operation in the city. A total of 918 buses are running on 102 city bus routes and, of the 918 buses, there are 258 low-floor buses, accounting for 28% of the total.

The low-floor bus has literally “low floor” and has no steps between the ground and the floor of the bus, helping the vulnerable groups such as children, elderly people and people with disabilities easily get on and off the bus. The sloped floor installed in the vehicle makes it easy to climb up and down with a stroller or wheelchair.

In order to effectively operate these low-floor buses and help the vulnerable groups use the buses as efficiently as possible, Suwon has studied the distribution rate of the mobility disadvantaged and related facilities while analyzing elderly citizens' travel patterns. The city also came up with measures to improve the existing low-floor bus routes and set directions to increase the number of low-floor buses and to provide better services.

## 2) Status of bus service based on bus stops<sup>1</sup>

As data that quantifies the proportion of the population with convenient access to public transport has not yet been constructed, Suwon would like to suggest the size of areas covered by bus service which were analyzed based on the locations of bus stops in the city.

**Table 1. Size and ratio of area in Suwon by the land usage**

Category		Size(km <sup>2</sup> )	Ratio(%)
The built-up area	Residential area	43.13	35.60%
	Commercial area	5.73	4.70%
	Industrial area	4.12	3.40%
	Total	52.98	43.70%
Green area		68.16	56.30%
Total		121.14	100.00%

※ Source: Basic Urban Plan 2030 of Suwon City (as of 2014)

The total area of Suwon is 121.14km<sup>2</sup>, and the city is covered by 56.3% of green areas. The size of the built-up area is 52.98km<sup>2</sup>, accounting for 43.7% of Suwon and is composed of 43.13km<sup>2</sup>(35.6%) of residential area, 5.73km<sup>2</sup>(4.7%) of commercial area and 4.12km<sup>2</sup>(3.4%) of industrial area.

The “Analysis of areas covered by Bus service” was conducted for the whole area of Suwon including the densely populated built-up areas(residential, commercial, industrial areas excepting the green area), and areas reachable on foot from bus stops (within 300 meters from the bus stop) were assumed as areas covered by bus service.

The result shows that the size of areas covered by bus service, which are accessible to general bus routes in Suwon, is 74.3km<sup>2</sup>, which is equivalent to 61.4% of the total area of Suwon.

On the other hand, the size of the areas covered by Direct seated bus service is 38.4km<sup>2</sup>, which is 31.7% of the total. The coverage of this bus service is not wide since most of those routes are connecting to Seoul or to other neighbor cities.

<sup>1</sup> Research on the Direction of Transport Policy Responses to an Aging Society (especially about elderly drivers) by Kim Sukhee, Suwon Research Institute, in 2015

**Table 2. Size of area with bus stops(Regular bus route)**

Size of Suwon(km <sup>2</sup> )	Serviced area(km <sup>2</sup> )	Share(%)
121.0	City bus : 74.3	61.4
	Direct seated bus : 38.4	31.7
	Seated bus : 17.7	14.6

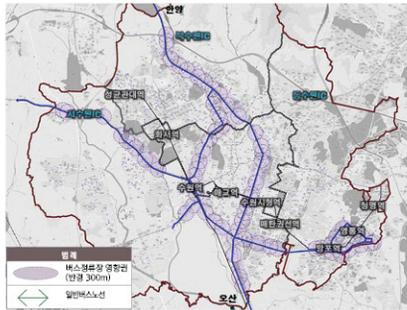


Figure 1. Size of area with bus stops(City bus route)

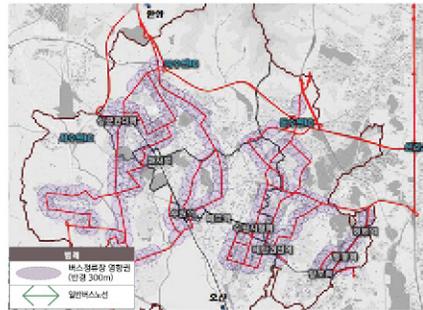


Figure 2. Size of area with bus stops(Direct seated bus route)

In the case of seated bus, most of the buses were running on routes to Ansan, and the serviced areas were partially biased to the western part of Suwon, and they were only 17.7km<sup>2</sup> or just 14.6% of the total size of Suwon.

The analyzed size of the areas covered by bus service based on the locations of bus stops is estimated to be 43.97km<sup>2</sup> in the 52.98km<sup>2</sup> built-up areas, which means the serviced areas account for 84.9% while 15.1% of the built-up areas are denied access to bus service.

The analysis shows that most areas in Suwon are accessible to bus services except

**Table 3. The size and ratio of the built-up areas with bus stops**

Size of the build-up areas(km <sup>2</sup> )	Area with bus stops		Area without bus stops	
	Size(km <sup>2</sup> )	Ratio(%)	Size(km <sup>2</sup> )	Ratio(%)
52.98	43.97	84.90%	9.01	15.10%

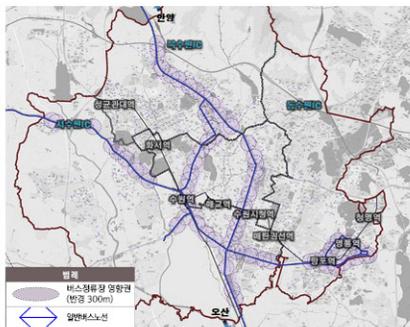


Figure 3. Serviced areas based on bus stops (Direct seated bus routes in the city)

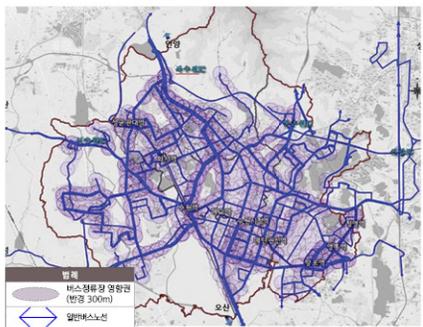


Figure 4. All type of serviced areas based on bus stops

for the underdeveloped part of the city, and that the service needs to be gradually improved for the 15.1% of areas, which are denied access to bus transportation.

### 3) Analysis of elderly citizens' travel patterns<sup>2</sup>

Suwon analyzed the travel patterns of Suwon residents based on the survey results of households' travel patterns of the Metropolitan Transportation Authority. The survey analyzed 24,798 trips of 11,800 Suwon citizens, of which 2,189 movements are associated with 1,570 elderly citizens.

According to the analysis of travel patterns of the elderly in Suwon, walking was the most preferred means at 70.9%, followed by using vehicles (passenger cars or vans) at 11.0%, riding in vehicles with others at 5.1% and using city buses at 4.1%. The analysis of the means of transportation used by the elderly in case of travels with purposes, walking still occupied the highest percentage of 62.4%, followed by city buses at 12.5%, passenger cars or vans at 8.2%, subways or trains 4.5% and riding in vehicles with others at 3.7%.

As for inter- and intra-city travels of the elderly in Suwon, 87.2% of the total number of 2,189 trips were made inside the city while inter-city travels accounted for 12.8%. When it comes to trip purposes of the studied 2,189 elderly citizens, those traveled to go back home took up the largest share of 44.7%, followed by 13.7% who commute to work, and 11.4% for leisure purposes. While returning home recorded the highest rate among all other purposes of travels, the rate of shopping and leisure were also high.

The analysis also showed that 82.9% of 2,189 travels took place during the day time.

### 4) Increasing the number of low-floor buses and measures for service improvement

Increasing the number of low-floor buses and ensuring regular operation of them are critical to provide more convenient transport services for the mobility disadvantaged. In this regard, the third "Basic Plan for the Promotion of Mobility for the Vulnerable of Suwon" set policy directions to cover a wide range of areas such as transportation, passenger facilities, roads (and pedestrian environments) and others. The details are shown in Table 4.

On the other hand, the intervals and low-floor bus schedules need some adjustments, and the inconvenience caused by irregular bus arrival times at bus

<sup>2</sup> Research on the Direction of Transport Policy Responses to an Aging Society (especially about elderly drivers) by Kim Sukhee, Suwon Research Institute, in 2015

stops need to be addressed to provide better service for the mobility disadvantaged. In addition, adequate information on bus schedules should be provided to help users make informed decisions about their travels.

**Table 4. Policy directions of strengthen transport infrastructure for the mobility disadvantaged**

Policy area		Details
Transportation means	Bus	<ul style="list-style-type: none"> <li>Finding areas to be improved such as lack of information centers, wheelchair lifts, seats and vertical handles for vulnerable individuals</li> </ul>
	Special Transport Service (STS)	<ul style="list-style-type: none"> <li>Setting up a plan suitable for Suwon with regard to the adoption of Special Transport Service(STS) and financial supports</li> <li>Providing door-to-door service, with call taxi and shuttle bus for people with disabilities, especially for the severely handicapped or elderly people who are denied access to public transport services</li> </ul>
Facilities for passengers	Urban railways and other railways	<ul style="list-style-type: none"> <li>Finding areas to be improved regarding vertical and horizontal movements, sanitation, transport information and facilities for user-friendly transport services</li> </ul>
	Bus stops	<ul style="list-style-type: none"> <li>Improving facilities/equipment for better pedestrians' access to bus stops, smooth vertical and horizontal movements and information provision and reviewing the adoption and expansion of low-floor buses.</li> </ul>
Roads and pedestrian environments	Tracing survey on inconveniences felt by those in vulnerable situations	<ul style="list-style-type: none"> <li>Tracing surveys were conducted to address issues regarding bollards, various obstacles to pedestrians, non-standard braille blocks, and not-functioning sound signals .</li> </ul>
	Survey on pedestrian environments	<ul style="list-style-type: none"> <li>Addressing improper installations/cases revealed by tracing surveys</li> </ul>
	Designating Pedestrian-first Areas	<ul style="list-style-type: none"> <li>Improving pedestrian environments by designating Pedestrian-first Areas</li> </ul>
Others	Mobility Support Center	<ul style="list-style-type: none"> <li>Suggesting measures for special transportation means</li> </ul>
	Building information systems	<ul style="list-style-type: none"> <li>Suggesting measures for the establishment of information systems for the vulnerable</li> </ul>
	Public awareness	<ul style="list-style-type: none"> <li>Suggesting measures for education and promotion of policy</li> </ul>
	Improvement of systems and environments	<ul style="list-style-type: none"> <li>Suggesting measures for post-management of facilities for the vulnerable</li> </ul>

※ Notice: Plans on urban railways and other railways are excluded from the third Basic Plan for the Promotion of Mobility for the Vulnerable of Suwon as there are other authorities responsible for the operation of railways.

※ Source: The third Basic Plan for the Promotion of Mobility for the Vulnerable of Suwon



Figure 5. Automatic folding chair

It also seems to be necessary to improve the conditions of bus stops for low-floor bus users. Low-floor buses are well equipped for wheelchair users, but, the design of most bus stops where the users get on and off the bus is not desirable for low-floor buses.

Therefore, the design change of bus stops located on low-floor bus routes should be considered first.

Suwon City set the standards on the design of bus stops in Suwon and applied the design to new Bus shelters. The city may consider introducing the automatic folding chair, which won a prize at the Proposal Review Committee in the first half of 2013, to bus stops that lack spaces and are used by many vulnerable individuals.

#### 5) Plan on increasing the number of low-floor buses<sup>3</sup>

The city set the goal of increasing the distribution rate and the number of low-floor buses to 32% and to 310 vehicles by the target year of 2021. The details are shown in <Table 5>.

**Table 5. Setting the targeted distribution rate of low-floor buses in Suwon**

Item	Nation-wide distribution rate <sup>4</sup>	Distribution rate of low-floor buses in Suwon as of 2017			Targeted distribution rate of low-floor buses in Suwon by 2021				(B-A)
		Total number of city buses	Number of low-floor buses	Distribution rate	Gyeonggi Province (A) <sup>5</sup>	Suwon City (B)	Target number	Number of low-floor buses to be added	
Low-floor bus	19.00%	918	258	28%	32%	32%	310	52	-

## 2) Spread of Special Transport Service(STS) vehicles

### 1) Overview

The purpose of Special Transport Service (STS) is to provide vulnerable groups or individuals with an access to public transportation and ensure them travel safely and conveniently, thereby promoting their participation in society as well as their well-being.

As of 2018, a total of 123 STS vehicles are in operation in Suwon and the number of wheelchair-accessible vehicles are 78 with 8 lift-type vehicles and 70 slope-type vehicles, and 45 taxis (without wheelchair accessibility) are in operation for STS service.

<sup>3</sup> The contents were reconstructed based on the third Basic Plan for the Promotion of Mobility for the Vulnerable of Suwon in Dec. 2017.

<sup>4</sup> The distribution rate refers to the distribution rate as of 2016 according to the third Basic Plan for the Promotion of Mobility for the Vulnerable of Suwon (for 2017-2021).

<sup>5</sup> The target rate of Gyeonggi Province is the goal to be reached by 2021 according to the third Basic Plan for the Promotion of Mobility for the Vulnerable of Suwon (for 2017-2021), and Gyeonggi Province is one of "9 provinces" included in the preceding plan.

**Table 6. Status of the adoption of Special Transport Service (STS) in Suwon**

Category	Wheelchair-accessible Special Transport Service (STS) vehicles		Taxis without wheelchair accessibility	Total
	Number of lift-type vehicles	Number of slope-lift-type vehicles		
Number of transportation means	8 vehicles	70 vehicles	45 taxis	123 taxis
Organization in charge	Mobility Support Center of the Suwon Urban Development Corporation		Private taxis	-

※ Source: 2018 Data from Hanareum Call Center of the Suwon Urban Development Corporation

The user of Special Transport Service(STS) in Suwon must meet the following criteria.

**Table 7. Special Transport Service(STS) in Suwon**

	Details about using Hanareum Call Taxi Service
Qualified users	<ul style="list-style-type: none"> <li>• People with disability grades 1-3, people of national merit with grade 1-3 injury and people requires 1-3 grades of long-term care</li> <li>• Recipients of national basic livelihood guarantees at age 65 or above or pregnant women</li> </ul>
Serviced areas	<ul style="list-style-type: none"> <li>• Metropolitan areas departing from Suwon</li> </ul>
Operating hours	<ul style="list-style-type: none"> <li>• Open throughout the year (operated only by the reservation system during late-night hours)</li> </ul>
How to use	<ul style="list-style-type: none"> <li>• Priority is given to the person who made the reservation.</li> </ul>
Charge	<ul style="list-style-type: none"> <li>• Inside Suwon: taxi fare is as same as bus fare paid by credit card</li> <li>• Inter-city travel: 100 won is added per 1km from the boundaries of Suwon</li> </ul>
Serviced areas by taxi types	<ul style="list-style-type: none"> <li>• Special taxi: Suwon, nearby areas, and the Seoul metropolitan area</li> <li>• General taxi: only inside Suwon</li> </ul>

2) Users of Special Transport Service(STS) and the number of registered STS vehicles

The number of people with disabilities registered in Suwon is 16,066, and 13,472 people are registered as users of the Mobility Support Center.

It is legally required to have at one STS vehicle per 200 persons with disability grades 1-2 and the number of STS vehicles held by Suwon is equivalent to 173% of the legal requirements.

**Table 8. The number of users of the Mobility Support Center by each vulnerable group**

(unit: person)

Category	People with physical disabilities	People with brain lesions	People with visual impairments	People with kidney failures	The elderly	Others	Total	
Registered users	Number of users	2,709	2,564	1,119	1,142	3,644	2,294	13,472
	Ratio	20.1	19	8.3	8.5	27	17	100

※ Source: Internal data of the Mobility Support Center of Suwon (as of 2017)

**Table 9. Legally required number of STS vehicles for Suwon**

Number of people with disabilities				Legal requirements		
Grade 1	Grade 2	Grade 3	Total	Number of people with disability grades 1-2	Number of legally required STS vehicles	13,472
3,444	5,555	7,067	16,066	8,999	45	100

※ Source : Data from Suwon City as of 2017

### 3) Plan on the adoption of Special Transport Service(STS)<sup>6</sup> and measures for improvement

The yearly plan on STS reflects the internal plans of the Public Transport Division of Suwon City and the detail are shown in <Table 11>.

The launch of a consortium comprised of Suwon City, Suwon Urban Development Corporation and other groups representing people with disabilities needs to be considered to promote the use of STS, and educational programs for the customer service representative and vehicle drivers are necessary.

Many problems associated with STS, such as discomfort caused by delayed bus arrival times, unkindness of drivers, the inconvenience of sharing the space with many other passengers who travel in the same direction, need to be addressed from the viewpoint of STS users.

Also, it is also important to advertise the Mobility Support Center to attract more STS users.

**Table 10. Plan on the adoption Special Transport Service(STS) in Suwon**

Year	Estimated number of people with disabilities				Number of required STS vehicles		Plan on STS vehicles	
	Grade 1	Grade 2	Grade 3	Total	Number of People with disability grades 1-2	Number of required STS vehicles	Number of vehicles to be added	The current number of STS vehicles
2018	3,444	5,554	7,066	16,064	8,998	45	10	88 (133)
2019	3,443	5,554	7,066	16,063	8,997	45	-	88 (133)
2020	3,443	5,553	7,065	16,061	8,996	45	-	88 (133)

### 3) Measures to remove blind spots in terms of operating hours

#### 1) Dealing with blind spots in late-night bus operation<sup>7</sup>

6 The third Basic Plan for the Promotion of Mobility for the Vulnerable of Suwon as of Dec. 2017

7 The 3rd Basic Plan on Public Transport in Suwon 2018

**Table 11. Current status of late-night bus operation in Suwon**

Number	Number of buses	Point of departure	Stops	Point of arrival	Late-night operation (on weekdays)	Late-night operation (on Saturday)	Late-night operation (on Sunday and public holidays)	Final arrival time at the last stop	Company in charge of bus operation
1	3000	Suwon Women's University	Uiwang-Gwacheon	Gangnam Station	7	7	1	2:00	Gyeongjin Bus Company
2	3002	Suwon Terminal	Gyeongbu Expressway	Gangnam Station	2	2	2	0:30	Yongnam Express
3	3003	Suwon Women's University	Gyeongbu Expressway	Gangnam Station	2	2	1	0:30	Yongnam Bus
4	3007	Suwon Terminal	Gyeongbu Expressway	Gangnam Station	6	6	1	2:00	Yongnam Express
5	5100	Kyung Hee University	Gyeongbu Expressway	Yangjae Station	6	6	1	1:50	Yongnam Express
6	7000	Kyung Hee University	Uiwang-Gwacheon	Sadang Station	6	7	2	2:00	Yongnam Express
7	7001	Suwon Terminal	Uiwang-Gwacheon	Sadang Station	3	3	2	0:50	Yongnam Express
8	7770	Suwon Station	Uiwang-Gwacheon	Sadang Station	14	9	6	4:30	Gyeongjin Bus Company

According to the Review on Inter-District Linkages in Suwon, Most of direct seated bus routes heading to Seoul are concentrated on the north-south corridor of Suwon while there is the absence of late-night bus operation between east and west districts such as Gwonseon-Yeongtong, Gwonseon-Gwanggyo, Yeongtong-Homaesil and Gwanggyo-Homaesil. It means that there is a need to add more late-night bus routes to strengthen connectivity.

In case of Seoul, the city operates N(Night)-buses, which pass through areas with the high densely area of floating population, based on big data about the amount of mobile phone calls.

For Suwon, the city needs to analyze the demand for late-night buses. It considers by calculating the number of passengers who get on and off from the bus from

**Table 12. Status of late-night buses connecting districts in Suwon** number of late-night bus routes

Point of Arrival Point of Departure	Jangan	Gwonseon	Paldal	Yeongtong	Gwanggyo	Homaesil
Jangan		3000, 3003	3000, 3007, 7000, 7001, 7770	7000	3007, 7000, 7001	3000, 3003
Gwonseon	3000, 3003		3000	none	none	3000, 3003
Paldal	3000, 3007, 7000, 7001, 7770	3000		7000	3002, 3007, 7000, 7001	3000
Yeongtong	7000	none	7000		7000	none
Gwanggyo	3007, 7000, 7001	none	3002, 3007, 7000, 7001	7000		none
Homaesil	3000, 3003	3000, 3003	3000	none	none	

※ Source: The third Basic Plan on Public Transport in Suwon 2018

22:00 to 24:00 based on data of transport card usage and visualizing data to create bus routes around the bus stops.

## 2) Eliminating blind spots at peak hours

Suwon City considers introducing circular inter-city buses and the bus seat reservation system, in which users could reserve bus seats in advance through their smartphone application, to alleviate the discomfort that citizens feel in an overcrowded bus at peak hours.

The “Squirrel Bus” of Seoul could be an example. Considering that in-car congestion occurs mainly at certain hours and between certain sections, Seoul introduced the Squirrel Bus which is a shuttle bus-type circular bus that runs a short distance around very busy sections of the city just like a constantly moving squirrel in a spinning wheel.

HAN-COOP, a cooperative organization and a charter smart bus carrier in South Korea, operates “E-bus”, a commuter bus with the bus booking system for the rush hours, and this commuter bus runs on the routes between Hwaseong Dongtan-Samsung Station and Bongdam-Sadang Station.

## 4. Measures to eliminate blind spots from spatial perspectives.

Spatial blind spots in Suwon are found in areas around the Suwon Industrial Complex and on the outskirts of Suwon due to the lack accessibility to bus service.

There are five bus routes that pass through the Suwon Industrial Complex and buses like 123A(Ddabok Bus which is received financial support from Gyeonggi province for the purpose of improving public character), 99-2(city bus), 6-1 and 6-3(town buses) and 1009(non-stop bus) run on the routes, and bus companies tend to avoid opening new routes due to the low demand for bus service in these areas.

To solve this problem, the city government should move away from the current system to a new one in which the city government makes a decision on the creation of new bus routes and make a public notification to select the company who will be in charge of attracting users of the new routes. In addition, allowing the new routes to be used by periodic ticket holders is also worth considering.

As the Ministry of Land, Infrastructure and Transport revised the Enforcement Decree of the Act on Passenger Transport Service to allow small and medium-sized enterprises, who cannot afford their own commuter buses, to benefit from sharing of

commuter buses, it is also worth considering the adoption of such type of commuter bus operation in Suwon as Suwon Industrial Complex I, II and III were included as permitted areas for the common use of the commuter buses.

Furthermore, for the convenience of citizens, the city government needs to move towards flexible demand-responsive public transport services in terms of routes, operating hours, and frequency of operations, especially for areas on the outskirts of the city which lack access to public transportation.

### III. Conclusion and suggestions

In this chapter, we have mainly focused on solutions to blind spots in terms of time and space for the mobility disadvantaged in order to “provide access to safe, affordable, accessible and sustainable transport systems for all” in line with Target 11.2 of SDG 11.

We assume that the suggested data based on the locations of bus stops in Suwon could replace “data on proportion of population that has convenient access to public transport”. However, producing such data on a regular basis is accompanied by many challenges. So, it can be considered to use the “Share of Public Transport” in Target 1-4 of Suwon SDGs as an indicator.

The number of STS vehicles in Suwon, which is mainly used by people with disabilities, is equivalent to 173% of the standard, far exceeding the legal requirements, and the city plans to increase it to 200%.

The number of STS vehicles and the number of adopted low-floor buses should be also selected as indicators of mobility of vulnerable groups or individuals.

To address inconveniences facing general public transport users such as limited hours or not enough coverage of public transport service, the city needs to consider expansion of late-night buses and adoption of demand-responsive public transport service at late night hours as well as the bus reservation system for overcrowded bus routes. On the other hand, opening more bus routes around the areas on the outskirts of the city and the Suwon Industrial Complex also need to be considered to increase the coverage of public transport service.

Above all, in order to “provide access to safe, affordable, accessible and sustainable transport systems for all”, Suwon needs to develop its own indicators of evaluating minimum public transport services in the local context of the city and improve the overall public transportation service.

## 03

## Enhance inclusive and sustainable urbanization

Choi Seokhwan

Target 11.3	<b>By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries</b>	Indicator 11.3.1	Ratio of land consumption rate to population growth rate
		Indicator 11.3.2	Percentage of cities with a direct participation structure of civil society in urban planning and management which operate regularly and democratically

### I. Setting targets and indicators in the local context of Suwon

Target 11.3 aims to “By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries”.

Target 11.3 has two indicators: “ratio of land consumption rate to population growth rate(Indicator 11.3.1)” and “Percentage of cities with a direct participation structure of civil society in urban planning and management which operate regularly and democratically(Indicator 11.3.2).”

The indicator of “ratio of land consumption rate to population growth rate(Indicator 11.3.1)” is to ensure sustainability of expansion of urban areas and urbanization level.

- Population growth rate is the percentage of the population increase over the target period (mainly one year) while land consumption rate is defined as the rate of the land used for the extended development area which can be directly measured; area of agriculture, forestry or other economic activities; and over-intensively used area for agriculture and forestry.
- Globally, land has been changed by human activities. Given the fact that growth

of urban area is, on average, more than three times as much as the urban population, indicators such as population growth, land consumption rate, and landform changes need to be closely monitored for effective management of land consumption.

- Such indicators are also closely related to other SDGs' indicators, covering issues like poverty, health, energy and climate change.
- As the Republic of Korea has constructed annual statistical data on land use changes since 2007(Cadastral Statistics of the Ministry of Land, Infrastructure and Transport), the data can be used to calculate the ratio of land consumption rate to population growth rate.
- However, Korea needs to develop statistical data on “over-intensive exploitation of land that is used for agriculture and forestry” required by the metadata, when its operational definition is confirmed.

“Indicator 11.3.2: Percentage of cities with a direct participation structure of civil society in urban planning and management which operate regularly and democratically” is for assessing the capacity and foundation for sustainable urban policy through citizen participation.

- It is expected that this indicator will take considerable time to be used because the construction of concept definition and metadata is not completed.
- In Korea, there has been a constant discussion on the establishment of citizen participatory governance for urban planning and management, and Suwon City has been leading and continuous effort for citizen participation in urban planning such as Team of Citizen Planners and the Village Renaissance Project.
- Still, Suwon City needs to further discuss with experts to determine details about what kind of criteria should be applied.

Suwon City set the 10 Sustainable Development Goals of Suwon (or Suwon 10 SDGs), 57 targets and 133 indicators in 3 areas.

- Among them, Suwon SDGs' “Goal 9: Sustainable City and Culture for All” and “Target 9-1: Urban Management Based on Capacity of Urban Environments and Ensuring Access to Basic Services” are closely related to “inclusive and sustainable urbanization”. Its indicators include population density of Suwon, population decline rate by dong, decline rate of businesses by dong, rate of aging buildings and park area per capita.
- The land consumption rate is also closely related to “natural area ratio,” which is used as an indicator of Suwon SDGs' “Goal 2: Healthy and harmonious biodiversity.”

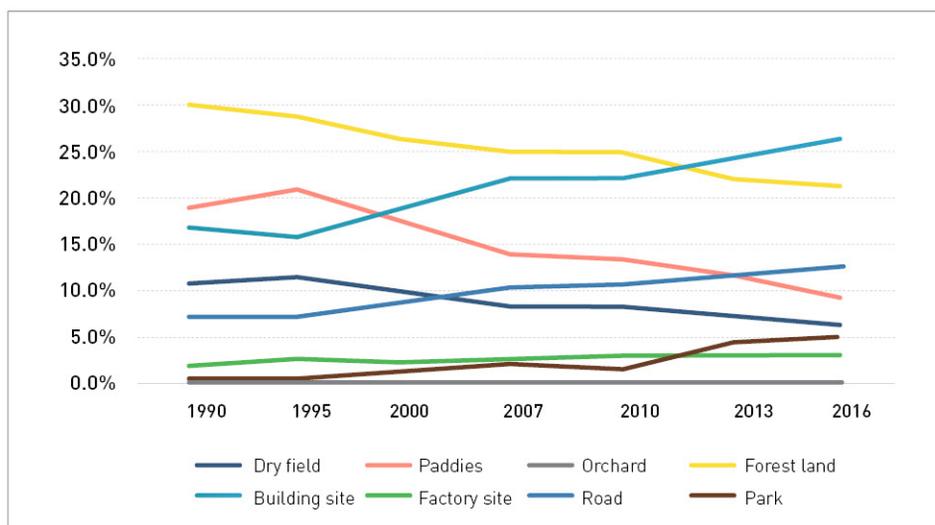
## II. Status of Suwon and evaluation

Status of Suwon regarding “Indicator 11.3.1: ratio of land consumption rate to population growth rate” and self-evaluation

- Data on land use by land category provided by Statistics Korea refers to the population growth rate and land consumption rate of Suwon.
- The population of Suwon was 644,968 in 1990 and exceeded 1million in 2007. As of 2016, Suwon has about 1.2 million population.
- The total area of Suwon city was 105km<sup>2</sup> and has not changed much after reaching 121km<sup>2</sup> in 1995.
- In 2016, the population of Suwon shows a 85.1% increase from that of 1990, and the size of building sites(a 82.5% increase compared to 1990) and roads have increased significantly(a 99.6% increase compared to 1990).
- On the contrary, the areas of dry fields and paddies have decreased by 31.3% and 45.0% respectively. Forest land areas have also decreased by 18.6%.
- Such rapid changes in land use can be seen from the time-series changes and satellite pictures of buildings in Suwon.
- In the 1940s, the area subject to Suwon City Urban Planning was 29.39km<sup>2</sup> and the population of Suwon was only 36,146. At that time the built-up areas were formed mainly around Hwaseong Fortress and Suwon Station.
- In 1967, the Gyeonggi Provincial Office moved to Suwon, making administrative functions and commercial facilities to be concentrated in areas surrounding Suwon Station. In the 1970s, Samsung Electronics started to produced products in Suwon and the Land Readjustment Project was carried out in Yeonghwa area, Gohwa area and areas near Suwon Station.
- In the 1980s, the Land Readjustment Project was expanded to Wooman-dong, Ingye-dong and Kwonseon-dong, and Suwon City Hall was relocated to Wooman-dong, making it as a new center of the city.
- In the 1990s, high-density development took place in northern and western part of Suwon and the spread of the built-up areas was intensified in eastern part of the city.
- In the 2000s, the western and eastern areas of Suwon were excluded from the list of limited development districts and Homaesil area and Gyanggyo New Town were developed, bringing big changes in land use.

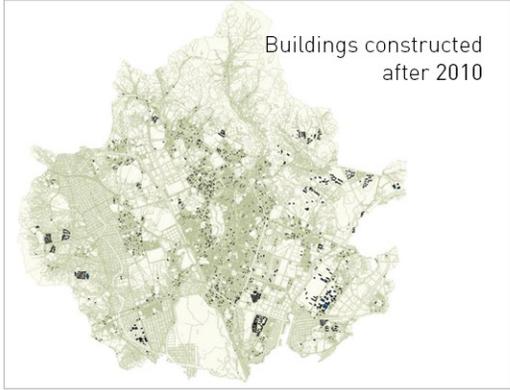
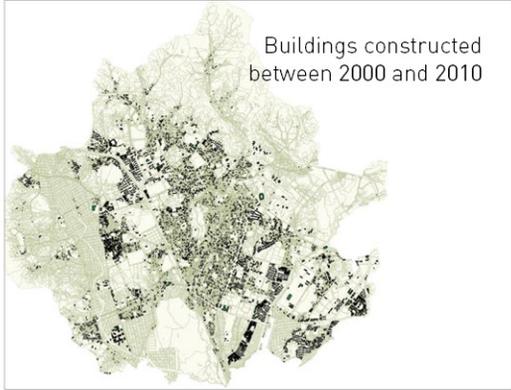
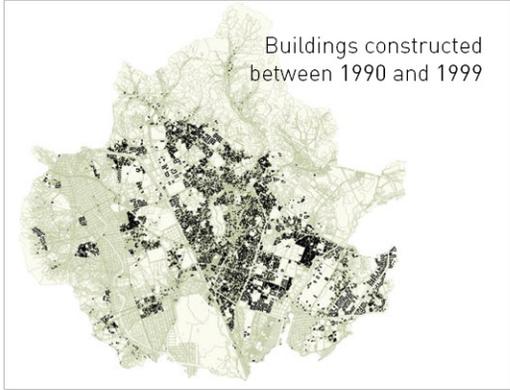
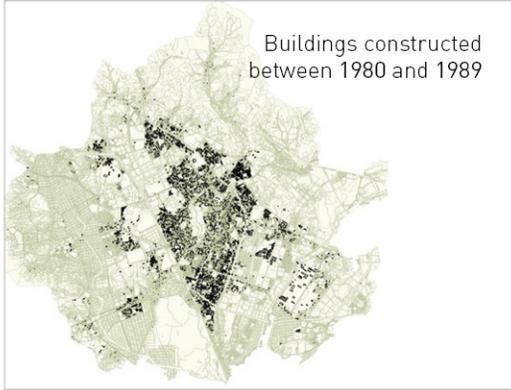
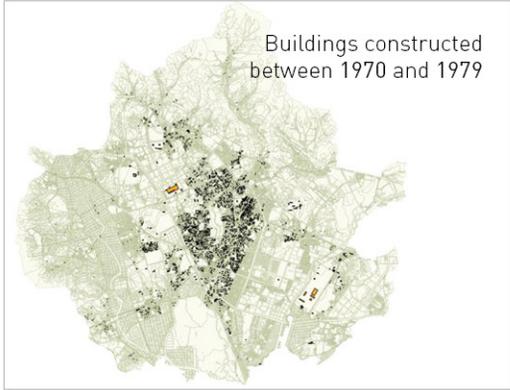
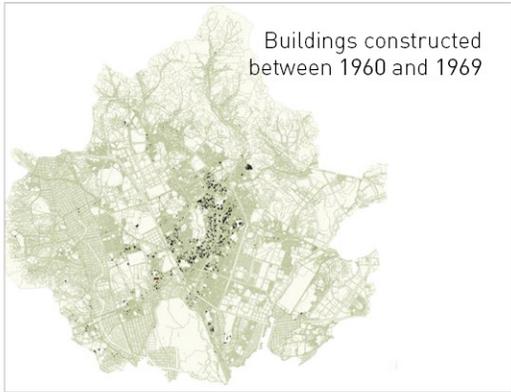
**Table 1. Changes in land use by land category**

Category		1990	1995	2000	2007	2010	2013	2016
Population of Suwon		644,968	746,610	948,065	1,067,702	1,077,535	1,148,157	1,194,041
Dry field	1,000m <sup>2</sup>	11,416	14,007	12,020	10,207	10,012	8,981	7,846
	%	10.8	11.6	9.9	8.4	8.3	7.4	6.5
Paddies	1,000m <sup>2</sup>	20,065	24,747	20,642	16,667	15,884	14,072	11,035
	%	19	20.4	17	13.8	13.1	11.6	9.1
Forest land	1,000m <sup>2</sup>	31,875	34,808	31,764	30,142	29,831	26,585	25,955
	%	30.2	28.7	26.2	24.9	24.7	22	21.4
Building site	1,000m <sup>2</sup>	17,532	19,354	23,124	26,531	26,982	29,642	31,989
	%	16.6	16	19.1	21.9	22.3	24.5	26.4
Factory site	1,000m <sup>2</sup>	1,973	2,841	2,750	3,191	3,363	3,037	3,469
	%	1.9	2.3	2.3	2.6	2.8	2.5	2.9
Road	1,000m <sup>2</sup>	7,485	8,603	10,579	12,436	12,931	14,014	14,939
	%	7.1	7.1	8.7	10.3	10.7	11.6	12.3
Park	1,000m <sup>2</sup>	557	620	1,494	2,096	2,178	4,874	5,852
	%	0.5	0.5	1.2	1.7	1.8	4	4.8
Total	1,000m <sup>2</sup>	105,562	121,221	121,128	121,065	121,008	121,048	121,054
	%	100	100	100	100	100	100	100

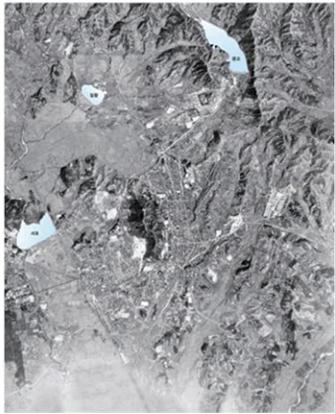


Status of Suwon seen from “Indicator 11.3.2: Percentage of cities with a direct participation structure of civil society in urban planning and management which operate regularly and democratically” and self-evaluation

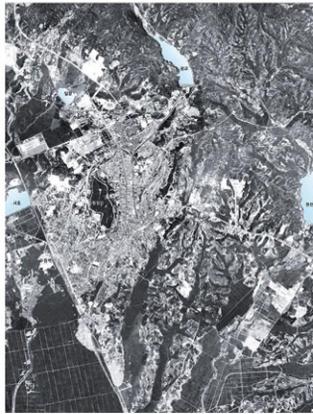
- Because of the absence of specific methodology for the indicator, maybe it is too early to evaluate Suwon in light of Indicator 11.3.2. However, one clear thing is that Suwon City has prepared a variety of channels for civil society's participation to realize a sustainable city, regarding policy proposal, budget allocation, policy planning, policy enforcement and conflict settlement.
- In terms of policy proposals, there are the Good Municipal Affairs Committee, Citizen Opinion Contest and the Round Table Discussion of 500. The Good



**Time-series changes of buildings in Suwon**



[ 1960s]



[ 1970s]



[ 1980s]



[ 1990s]



[ 2000s]

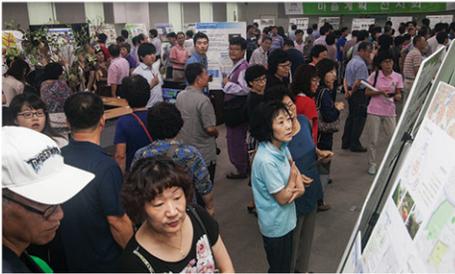
**Aerial photograph  
of Suwon**

Municipal Affairs Committee checks the implementation status of promised projects that were suggested as election pledges. Since its launch in February 2011, the committee, comprised of experts and members of civil society, has been holding regular meetings to realize the goal of citizen-led self government. Citizen Opinion Contest, which started in 2010, allows citizens suggest policy ideas or plans, and the winners are provided with financial support to directly implement the ideas. The Round Table Discussion of 500 provides an opportunity for 300-500 citizens to express their opinions about major issues of the city. Each group of 10 people sit at the table and have a candid discussion while the discussion is broadcast live. The Round Table Discussion of 500 was held in 2013 with the topic of “Speaking about Education in Suwon,” and the Round Table Discussion of 300 with the topic of “Talking about Sustainable Ecotourism” and the Round Table Discussion of 500 about “Constitutional Amendment on the Decentralization System” were held in 2016.

- In terms of budget allocation, citizens can participate in the budgeting process

through the “Citizen Participatory Budget System.” The system helps citizens directly take part in the budgeting process, and their ideas are reviewed and coordinated to secure transparency of administration and to strengthen participatory democracy. The Ordinance on the Operation of the Residents' Participation Budget System was enacted in 2009. The Committee on Citizen Participatory Budget System and the Regional Conference were organized in 2011, and Suwon became the first Korean city to launch the Youth Committee on Citizen Participatory Budget in 2012.

- At the planning stage, citizens participate in urban planning and urban policy through the Team of Citizen Planners and make up plans for their villages by taking part in the Village Planning Team. The Team of Citizen Planners started in 2013 as 130 adults and 100 teenagers participated in the establishment of the Basic Plan on Urban Planning of Suwon 2030 and they have provided a reasonable decision-making method for major policy issues of the city. The number of participants has increased to 300 adult citizens and 300 teenagers. The 'Village Planning Team' had its meetings in 2013 and 2015 in order to work out village plans in a comprehensive and systematic manner. The project was carried out by recruiting participants from neighborhoods (or “dong”), and those selected as “Excellent Village” were given added points for the Village Renaissance Contest, and participants who had been recognized for their hard work were given incentives for applying benchmark cases of advanced villages.



[ Display of plans for villages made by residents ]



[ Teenagers attending the Youth Budget School ]



[ An elementary school student expressing her opinion in front of the Team of Citizen Planners ]



[ Citizens working as part of the Team of Citizen Planners for urban planning ]

**Table 2. Status of Citizen Participatory Policy in Suwon**

Category	Conceptual characteristics	Participatory characteristics	Operational characteristics	
Policy suggestions	Good Municipal Affairs Committee	-Monitoring execution of promised projects (election pledges) -Developing new policies	-Governance mechanism based on ordinance -A channel for various participants including experts, public officials and citizens	-Regularly held -Direct operation -The plenary and five specialized committees
	Citizen Opinion Contest	-Public contest for citizens' policy proposals -Suggesting ideas and conducting policy experiments	-Open to Suwon citizens and employees of companies in Suwon and students attending schools in the city	-Regularly held once a year -Consignment operation -Public contest, experiments and evaluation
	Round Table Discussion of 500	-Intensive discussion on major municipal issues	-One-time discussion on policy	-Usually held once a year, adjustable depending on the case -Consignment operation -Roundtable discussion of all participants
Budgeting	Citizen Participatory Budget System	-Some portions of municipal budget allocated by citizens	-Organization for citizens' participation based on ordinances -Participation of teenagers	-Regularly held once a year -Direct operation -Applied to whole districts
Planning	Team of Citizen Planner	-Citizen participation in the process of establishing the Basic Plan on Urban Planning of Suwon(legal planning) -Expanded participation to urban policy issues	-Organization for citizens' participation based on ordinances -Comprised of 300 adult citizens and 300 teenagers	-Officially held once a year -Consignment operation -Round table discussion of all participants
	Village Planning Team	-Involving residents from each administrative unit or "dong" in the process of establishing village plans	-Short-term project group -Participated by about 20 people in each dong	-Temporarily held in 2013 and 2015 -Consignment operation / roundtable discussion in each "dong"
Policy enforcement	Village Renaissance	-Resident-led development of villages -A kind of citizen campaign for a stronger community and better living environments	-Governance organization based on ordinances -Residents voluntarily form a group to apply for open contests	-Participation throughout the year -Consignment operation (Suwon Sustainable City Foundation) -Education, benchmarking, public contests, consulting, etc.
Conflict management	Citizen Juries	-Non-judicial coordination system for mediation of public-private and private-private conflicts	-Recruitment and selection of juries based on ordinances -Submitting applications for mediation of conflicts -Citizens participate as applicants or juries for reasonable judgment	-Voluntary participation of citizens -Consignment operation -Determination of subjects for deliberation and operation of trial court for citizen Juries
	Gwanggyosan Council for Conflict Resolution	-A consultative body for resolution of conflicts between residents of the water source protection areas, civil society and Suwon City	-Participated by 20 people including residents, members of civil society groups, experts, city councilors and public officials	-Temporary operation -Governance system -Discussion for conflict resolution

- Suwon citizens can directly run a program to strengthen communities and improve living environments of villages through the “Village Renaissance Contest.” Since its inception in 2011, a total of 809 projects have been implemented by October 2017 through the contest. Suwon Sustainable City Foundation's Village Renaissance Center provides comprehensive support for citizen-led village development projects, customized education for residents and creation of networks of participants and supporters.
- Citizen Juries, as a citizen participatory system, make fair and objective solutions to major policy issues that are closely related to citizen' s life and solve previously unresolved or repeated conflicts through public debate and deliberation. Its first

agenda in 2012 was cancellation of designation of the redevelopment project area and cancellation of the approval of the Redevelopment Commission. Citizen Juries' decision was, "The city should reaffirm the will of the landowners and decide whether to proceed with the project, and if the project does not go ahead, the municipal government needs to quickly prepare follow-up measures such as expansion of infrastructure in the area." Citizen Juries' trials were held in 2013 for the prevention of noise between apartment floors and conflict resolution and for the decision on whether to use Gwanggyo Station as a name of the extended line of the New Bundang Line.

- Recently, Gwanggyosan Mt. Council for Conflict Resolution settled the disputes about the Gwanggyo water source protection area. A number of stakeholders including local residents, civil society, experts, and Suwon City officials discussed this issue for eight months from August 2017 before the final agreement was reached in February 2018. Gwanggyosan Council for Conflict Resolution concluded that reasonable measures for deregulation should be set to alleviate inconveniences caused by the regulation on water source protection area. And stakeholders decided to continue discussion on measures to improve water quality and preserve ecological environments of Gwanggyosan Mt.

### III. Conclusion and suggestions

The focus of policy moving from development to sustainability

- In 1970, the population of Suwon and that of Gyeonggi Province were 167,201 and 3,296,950 respectively, and the population of the country was 30,882,386. As of 2016, the population of Suwon is 1,207,032, that of Gyeonggi Province, 6,405,301, and the national population is 51,269,554.
- The population of the country and Gyeonggi Province increased by 66% and 94.3% respectively compared to 1970 levels. In the meantime, Suwon's population increased by as much as 621.9%.
- The rapid increase in the population of Suwon was possible since the city was conveniently located to use transport services and the demand for development was high as the city, at that time, was mainly made of flat areas filled with dry fields and rice paddies.
- As mentioned above, the urban area of Suwon hasn't changed much since 1990 but dry fields and paddies have decreased by 31.3% and 45.0% respectively compared to 1990. On the contrary, the building site area and roads have increased by 82.5% and 99.6%.

- Recently, as large-scale new town development projects are being carried out in areas that were previously limited development districts(Homaesil and Gyanggyo), many dry fields and paddies in the southern part of Suwon are turning into multi-unit housing.
- Such development-oriented land use is accompanied by an increase in the urban temperature, such as heat island phenomenon caused by an increase in impermeable surfaces. In addition, it is also closely related to sustainability issues, such as depletion of groundwater, floods and pollution and destruction of biological habitats as well as the issue of life quality.
- Given that, it is time to take more sophisticated approaches, moving the direction of urban policy towards regeneration of declining old towns rather than indiscriminate land development in suburbs, and eco-friendly measures, such as securing natural green spaces in the city center.

Pursuit of citizen participatory policy and the need for setting appropriate indicators

- In addition to the policies introduced above, Suwon City announced the “Suwon Declaration on Human City” in 2017 with its commitment to people-oriented urban policy. With the concept of the “Government for Suwon Citizens,” Suwon City pursues the realization of citizen-led self government and direct democracy. Activities and projects conducted by Suwon City include Citizens' Autonomous University, Citizen Participatory Online Platform, Citizen Discussion Forum, Communication Box, Apartment Democracy, Promotion of Shared Economy, Policy Debate in Agora, Youth Council, Survey on Human Rights Impacts and Dream Playground for Children with Disabilities.
- The citizen participatory policy in Suwon has been evolving with the constant support of citizens, administrative efforts and cooperation between civil society and experts for new governance systems. It would be no exaggeration to say that Suwon is a leading city in Korea in terms of citizen participatory policy.
- However, the city needs not only administrative and financial supports but also indicators for measuring and monitoring the progress made in achieving citizen participatory policy, to further promote the participation of citizens, civil society, and experts.
- As the clear methodology for “Indicator 11.2.3: Proportion of cities with a direct participation structure of civil society in urban planning and management that operate regularly and democratically” is not available, it is necessary to develop indicators for measuring the performance at the local/municipal level and also expand the participatory policy.

## 04

## Strengthening efforts to protect and safeguard the world's cultural and natural heritage

Ryu Hyunhee

<b>Target</b> 11.4	<b>Recognizing the world's cultural and natural heritage as the common heritage of humanity with universal value, "strengthen efforts to protect and safeguard the world's cultural and natural heritage"</b>	<b>Indicator</b> 11.4.1	Total expenditure per capita spent on the preservation, protection and conservation of all cultural and natural heritage
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### I. Setting targets and indicators in the local context of Suwon

Target 11.4 of SDG 11 aims to "strengthen efforts to protect and safeguard the world's cultural and natural heritage" from being damaged by urban development.

Target 11.4 has Indicator 11.4.1 which is "total expenditure (public and private) per capita spent on the preservation, protection and conservation of all cultural and natural heritage, by type of heritage (cultural, natural, mixed and World Heritage Centre designation), level of government (national, regional and local/municipal), type of expenditure (operating expenditure/investment) and type of private funding (donations in kind, private non-profit sector and sponsorship)." It is a Tier 1 indicator and the result is constructed as database at the national level.

Various interpretations are possible about total expenditure in Indicator 11.4.1 because it accepts the concept of overall budget spent on the preservation, protection and conservation of all cultural and natural heritage. Therefore, it can be applied to academic research, which is conducted to identify regional characteristics based on repair, maintenance and management of cultural heritage or cultural heritage itself, and also to the culture and tourism industries and activities for cultural enjoyment.

The indicator is closely related to “Suwon, City of History and Culture”, the key phrase that became the final choice among other candidates to capture the characteristics of the city according to the Survey on Public Awareness of Sustainable Development in Suwon. It shows how important historical and cultural elements are for sustainable development of Suwon.

Target 11.4 of SDG 11 is linked to “Goal 9: Sustainable City and Culture for All” set by Suwon Council for Sustainable Development and “Target 9-4: Guaranteeing Cultural Accessibility through Sustainable Cultural Policy” and also “Target 9-5: Promoting Cultural Enjoyment and Civic Culture” which were detailed by Suwon City.

SDG 11 is to secure the sustainable human settlements that are concentrated in cities, which could be interpreted as strengthening the elements that have been regarded as benefits of cities. However, the two concepts of sustainability of cities and the protection of cultural and natural heritage have been at odds with each other in the conflicting values between development and protection. Therefore, it seems important for Suwon to promote its own policies and indicators while striking the right balance between the two concepts.

## II. Status of Suwon and evaluation

### 1. The status of Suwon regarding Indicator 11.4.1

Suwon City has been implementing policies to create the Sustainable City and Culture for All. In relation to Indicator 11.4.1, Suwon has set policy directions such as promoting heritage protection, conducting studies on heritage on a constant basis, expanding basic infrastructure for cultural enjoyment, restoration of cultural properties, creation of the ‘Heritage Trail’ and storytelling for cultural heritage.

Suwon city is trying to secure its identity and symbol of “City of History and Culture” and is dedicated to identification, preservation and protection of the common heritage of citizens.

In the Cultural Indices of the Ministry of Culture, Sports and Tourism, Suwon demonstrated its constant efforts for cultural policies by ranking high among all Korean primary local governments in the two categories of cultural policy and cultural enjoyment in 2013.

## 2. The status of cultural property of Suwon

### 1) The rate of the budget for culture and tourism in Suwon

The budget for culture and tourism in Suwon includes all expenditures for culture, arts, tourism (both cultural and general tourism), sports and cultural assets. The national budget for culture accounted for approximately 3% of the national GDP and about 1.24% of the total government budget as of 2014. Since then, it has been on an upward trend and is expected to be more than double the current level, reaching 0.82% of the national GDP by 2030.

In case of Suwon, the budget for culture and tourism accounts for about 8% of the total budget. It is difficult to compare the national GDP or government budget with the Suwon city government's budget, but it is clear that the budget for culture in Suwon takes up a larger proportion of the total municipal budget compared to other cities. In particular, the rate of the budget for culture and tourism in Suwon is relatively high compared to Gyeonggi Province's metropolitan municipalities and other municipal governments that have a population of around 1 million people. Suwon invests a considerable amounts of its budget into culture and tourism even comparable to cities such as Gyeongju and Andong.

**Table 1. The rate of the budget for culture and tourism in Suwon**

Year	Total budget of Suwon	Budget for culture and tourism	Percent
2015	1,741,401,579,000	136,465,048,000	7.84%
2016	1,905,117,631,000	156,538,401,000	8.22%
2017	2,010,493,723,000	161,044,204,000	8.01%

※ Source: Reports on Suwon's Budget for 2015, 2016 and 2017

**Table 2. The percent of budget for culture and tourism in 2017 by city**

Name of cities	Total budget (Unit: KRW)	Culture and tourism (Unit: KRW)	Percent (%)
Suwon City	2,010,493,723,000	161,044,204,000	8.01
Seoul Special City	29,801,117,123,000	658,264,249,000	2.21
Busan Metropolitan City	10,091,139,162,000	396,272,616,000	4.22
Gwangju Metropolitan City	4,039,800,000,000	205,200,000,000	5.08
Ulsan Metropolitan City	3,247,105,325,000	138,635,832,000	4.27
Incheon Metropolitan City	8,316,641,730,000	250,755,587,000	3.98
Daejeon Metropolitan City	4,023,544,000,000	236,896,671,000	5.88
Seongnam City	2,625,067,915,000	130,731,824,000	4.98
Goyang City	1,640,019,331,000	52,625,295,000	3.21
Gyeongju City	1,146,000,000,000	168,162,254,000	14.67
Jeonju City	1,429,726,123,000	87,698,926,000	6.13
Andong City	866,000,000,000	83,019,272,000	9.58

※ Source: open data from websites of city governments

※ In case of Seoul Special City, it is the combined figure of the budget from both Culture Headquarters and Tourism and Sports Bureau of the Seoul Metropolitan Government.

**Table 3. The number of cultural heritage in Suwon as of 2017**

Total	Designated national heritage	Registered cultural heritage	Designated provincial heritage	Local relics
76	17	6	33	20

**Table 4. Status of Cultural heritage since 2008**

White Paper of Suwon City Government

Category	Year					
	2008	2009	2011	2014	2015	2017
National treasure	5	5	8	9	9	9
National historic site	3	3	3	3	3	3
Important folk material	1	1	1	1	1	1
National intangible cultural property	2	2	2	2	2	2
Tangible cultural property of Gyeonggi Province	4	4	5	5	13	13
Gyeonggi provincial monument	7	7	7	7	7	7
Cultural materials of Gyeonggi Province	1	2	7	7	8	8
Intangible cultural property of Gyeonggi Province	3	3	3	3	3	3
Registered cultural property (since 2016)						6
Local relics of Suwon	24	23	23	23	23	20
Total	50	50	59	60	70	76

## 2) Status of cultural heritage in Suwon

Cultural assets in Suwon are divided into heritage designated by the nation, heritage designated by the Province, and local relics, and there is also registered cultural heritage, which refers to non-designated cultural heritage that has the potential of becoming designated cultural heritage with its recognized cultural value. Currently, there are 76 designated cultural properties located in Suwon.

The number of designated cultural properties went up from 50 in 2008 to 76 in 2017. Such increase is related to the strengthened research capacity with the establishment of the Suwon Museum and the Suwon Hwaseong Museum. Modern architectural relics and remains created after the period of Japanese colonial rule are mainly registered as cultural properties since they are recognized as important assets in the history of Suwon.

## 3. Status of World Cultural Heritage

### 1) The World Heritage Site of Suwon Hwaseong Fortress

Suwon Hwaseong Fortress was listed as a World Heritage Site by UNESCO in 1997. As a fortress and a new city built in 1796, Hwaseong Fortress was designated

as the Historic Site No. 3 and registered as Designated National Heritage in 1963 and as a World Heritage Site (UNESCO) in December 1997. Suwon City is dedicated to the restoration and maintenance of Suwon Hwaseong Fortress through efficient management and improvement of facilities in the fortress.

The Hwahongmun Gate of Suwon Hwaseong had been repaired and restored for many times from 1848 to 1922 due to the damage by heavy rains. While having undergone repeated repair and restoration works, Suwon Hwaseong had been a constant concern for the city's residents and communities for around 100 years.

Under the circumstance, the Suwon Preservation Society was established in 1931 with the aim of preserving and protecting the historic assets of Suwon, and the repair work of Hwaryeongjeon, a shrine for King Jeongjo, was carried out in 1949 by the residents of Shinpung-dong and the members of the Korea Youth Association residing in Shinpung-dong, and then the enactment of the Cultural Heritage Protection Act laid the foundation for the preservation and protection of the nation's cultural heritage in 1962. Restoration efforts for Suwon Hwaseong, which had only undergone partial restoration and repair works, began in earnest in 1976. The Hwaseong Haenggung Palace Restoration Committee was established in 1989, and such efforts had led to the opening ceremony of the Hwaseong Fortress in 2003, marking the completion of the first restoration of Hwaseong Haenggung Palace and Suwon Hwaseong.

In the meantime, the important cultural heritage had taken its firm root as the common asset of Suwon's citizens, who had shown constant interest in and affection for the cultural heritage over the 100 years. Such citizens' support for Suwon Hwaseong is being continued even after its designation as a World Heritage Site.

## 2) Chukman Reservoir(or Seoho Lake), recognized as the first Heritage Irrigation Structure(HID) in Korea

Chukman Reservoir in Suwon was designated as the Gyeonggi Provincial Monument No. 200 in 2005 and was added to the list of Heritage Irrigation Structures (HIS) in 2016. The International Commission on Irrigation and Drainage (ICID) has been adding more than 100-year old irrigation structures that contribute to the development of irrigation and agriculture to the list of HIS to study and utilize historically, technologically and socially valuable structures since 2014.

In 1799 (23 years in the reign of King Jeongjo), King Jeongjo invested 30,000 nyang (a unit of currency) from his privy purse into the construction of the Chukman Reservoir, with the goal of improving people's livelihoods and expanding irrigation

facilities. Chukman Reservoir was designed to expand the agricultural base of the new town of Suwon and turn it into a self-sufficient city, and later modern agriculture facilities were built around this reservoir during the period of Japanese colonial rule. While Chukman Reservoir (or Seoho Lake) is an irrigation facility, it is also famous for the beautiful glow of sunset and known as one of eight places that tourists must visit in Suwon.

#### 4. The status of regulation on land use in Suwon

Suwon City set up 58 regulation items on land use to be applied to the land of 622,817,841 square meters. Twelve out of 58 items seem to be related to heritage conservation from both short-term and long-term perspectives. The 12 items are intended to preserve cultural resources and the Designated Historic and Cultural District, and protect wildlife in Designated Mountainous Districts for Public Interest. The most important part of the regulation is the Limited Development District and Designated Mountainous Districts for Public Interest as well as the regulation items on the Area within 500 Meters of Designated National Cultural Heritage and the Area with Potential Impact on Preservation of Cultural Heritage.

As of 2017, the total area of Suwon is 121.05km<sup>2</sup>(121,050,000m<sup>2</sup>). However, the designated area covered by 58 regulation items is 622,817,841m<sup>2</sup> because of duplications among designated areas for regulatory items.

Data on land use regulation is constructed to provide spatial information services to citizens, and can be used to prevent and inhibit haphazard urban development in response to growing urbanization. It can also contribute to the provision of spatial information for heritage protection.

**Table 5. Status of land use by area/district in the electronic registration system** unit : m<sup>2</sup>

	Name of area/ district	Size	Category	Name of area/ district	Size	Status
Total		63,085,776				
Limited Development District		29,472,011	Act	Designated National Cultural Heritage Site	408,286	Act
Designated Mountainous Districts for Public Interest		20,138,579	Act	Cultural Heritage Site Designated by City or Province	598,579	Act
Designated Area for Protection of Wildlife		224,372	Act	Cultural Heritage Protection Area	552,903	Act
Designated Scenic Area		33,281	Enforcement decree	Experimental Forest	552,523	Act
Designated Historic and Cultural District		390,753	Enforcement decree	Cultural Heritage Preservation District	76,042	Enforcement decree
Area within 500 Meters of Designated National Cultural Heritage		5,441,203	Enforcement regulation	Area with Potential Impact on Preservation of Cultural Heritage	5,197,244	Ordinance

## 5. Expansion of basic infrastructure for culture in Suwon.

**Table 6. Characteristics of surveyed households**

Unit: household and %

City/ County/ District	Total	Public library					Museum				Art gallery							
		National library	Education Office		Private	Total	National/Public	Private	University	Total	National/Public	Municipal	Private	University	Art Center	Local Cultural Institute	House of Culture	
			Total	Municipal														
Total	2,657	1	1,010	758	231	21	853	388	361	104	229	57	157	15	236	228	100	
Seoul(25)	365	1	147	119	22	6	128	28	73	27	39	4	30	5	20	25	5	
Busan(16)	97	0	40	24	14	2	26	9	6	11	6	1	3	2	11	14	0	
Daegu(8)	73	0	35	18	10	7	15	7	5	3	4	2	0	2	11	8	0	
Incheon(10)	96	0	47	39	8	0	27	13	13	1	4	2	2	0	9	8	1	
Jeonju(5)	57	0	22	16	6	0	10	4	2	4	9	2	6	1	7	5	4	
Daejeon(5)	57	0	24	22	2	0	16	4	5	7	5	2	3	0	4	5	3	
Ulsan(5)	40	0	17	13	4	0	9	7	1	1	0	0	0	0	5	5	4	
Sejong(1)	13	0	5	4	1	0	6	3	3	0	0	0	0	0	1	1	0	
<b>Suwon</b>	<b>35 (36)</b>	<b>0</b>	<b>24</b>	<b>21</b>	<b>2</b>	<b>1</b>	<b>7</b>	<b>4</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>2</b>	<b>1</b>	<b>0</b>

Suwon city has been committed to guaranteeing citizens' access to culture and cultural enjoyment through expansion of basic cultural infrastructure in line with "Sustainable City and Culture for All."

Suwon accounts for 1.3% of the nation's cultural infrastructure, and the city, as a relatively small municipal government, is on par with other metropolitan municipalities such as Gwangju, Daejeon and Ulsan, Suwon in terms of the number of cultural facilities.

Libraries take up the largest share among all cultural facilities in Suwon. The city, with the goal of making libraries reachable by foot within 10 minutes from anywhere of the city, has created a good reading environment and platforms of information for citizens, especially for vulnerable groups.

The Suwon IPark Museum of Art, which opened in 2015, was not initially included as cultural infrastructure in 2017 but was added afterwards. The case of a museum established by a municipal government is rarely found in cultural infrastructure surveys.

## 6. Status of cultural heritage protection in Suwon

### 1) Preservation and protection of the World Heritage Site of Suwon Hwaseong Fortress

#### **A. Restoration of unrestored facilities of Suwon Hwaseong Fortress**

Since the beginning of the restoration work of Suwon Hwaseong Fortress in 1976, Suwon has been devoted to the restoration of Suwon Hwaseong Fortress and the Hwaseong Haenggung Palace for around 40 years up until now.

The restoration work has been carried out through thorough investigation and historical research with the material from the time of construction. Such restoration efforts paid off as Suwon Hwaseong Fortresst was designated as a UNESCO World Cultural Heritage Site in 1997.

Since the first restoration work, Suwon has continued the restoration efforts for unrestored facilities. As a result, the Namsumun (or South Floodgate of Suwon Hwaseong) was restored in 2016 and Suwon recently found the realms of the foundation of the Advisory Council (Yia/貳衛) building which was used as the second building of Hwaseong Yusubu (Hwaseong Commandery/華城留守府) where judges worked for the Magistrate of Suwon during the Joseon Dynasty.

#### **B. The second restoration project of the Hwaseong Haenggung Palace**

The restoration project of the Hwaseong Haenggung Palace was carried out in connection with the restoration of Suwon Hwaseong Fortress. After undergoing the first phase of the restoration project from 1989 to 2002, the project entered the second phase in 2003 and will be completed by 2020. The biggest challenge in the restoration process so far has been the relocation of Shinpoong Elementary School. The school was established in 1896 and has shared 100-year history with Suwon. So the city government of Suwon persuaded residents about the need for school's relocation through parent briefing sessions and a number of meetings with resident representatives, to restore the important cultural assets of Suwon.

With the conflicting interests between restoration of the traditional cultural asset and the recent 100-year history in the modern era, this case is regarded as a representative example in which restoration of cultural heritage caused conflicts with local residents. It also reminds us the need to come up with a reasonable solution to the two historic missions of preserving traditional cultural heritage and identifying and preserving future heritage. Keeping that in mind, Suwon had actively sought a solution and persuaded opposing stakeholders by holding public hearings and delivering presentations.

**Table 7. The implementation process for the preservation of Bugukwon**

Number	Major events	Date/Period
1	Designated as Local Relic No. 19 by Suwon (privately-owned)	26-Dec-06
2	Received a civil petition on the cancellation of the designation	08-Dec-14
3	The launch of the Committee on the Preservation of Local Relic of Suwon	23-Jan-15
4	Asking Cultural Heritage Administration legal advices on measures to protect and preserve the cultural property on an equal basis with designated cultural heritage (restrictions on property rights, etc.)	04-Feb-15
5	Expert advisory on the cancellation of the designation of Bugukwon	23-Feb-15
6	The Committee on the Preservation of Local Relic of Suwon held a meeting and recommended the purchase of the Bugukwon building	10-Mar-15
7	After negotiating on the ownership issue with the building owner for 12 times, he decided to sell the building	Mar-Jul-2015
8	Announcement and appraisal of the real estate price through two legal entities	03-Aug-15
9	Organized and held the Cultural Property Appraisal Committee	05-Aug-15
10	The Committee on the Preservation of Local Relic of Suwon's decision on the purchase of the old Bugukwon building	17-Aug-15
11	Application for the registration of Bugukwon as designated cultural heritage	30-Mar-16
12	Outsourcing the basic design plan for the restoration of the building	30-Mar-16
13	Decision on the investment in Bugukwon was made after being deliberated by the Gyeonggi Province (to be reflected in the mid-term financial plan)	26-May-16
14	Setting plans for restoration and utilization of the facade of the modern cultural property	28-Dec-16
15	Outsourcing removal of asbestos, dismantling of internal building material, survey of the building's prototype and safety diagnosis, etc	Feb-Nov 2017
16	Designated as Registered Cultural Heritage No. 698	23-Oct-17
17	Outsourcing the final design for the restoration work	2018-until now

**Pictures of the old building of Bugukwon, Local Relic No. 19 of Suwon**

As of March 2015, Bugukwon building located at 93-7 Gyo-dong



11 March 2015 after demolishing the building next to Bugukwon

After the relocation of Shinpoong Elementary School to Gwanggyo New Town, a full-scale excavation survey began in 2015 and Uhwagwan, a guesthouse at the Hwaseong Haenggung Palace; Byeolju, the kitchen area; and the building of 5-room Jangchungak are in the process of restoration. Suwon is striving to complete the restoration of the Hwaseong Haenggung Palace by 2020.

## 2)The restoration of Bugukwon

The old building of Bugukwon, which was designated as Suwon's Local Relic No. 19, was built in 1916 and has more than 100-year history. Although the building is old, it did not undergo any renovation or repair and the original shape of the building has been kept.

Following the designation of the building as Suwon's Local Relic in 2006, the lack of sufficient financial support from Suwon City for the preservation of the building, caused conflicts with the building's owner, who was restricted in the exercise of property right. However, it became an exemplary case of resolving the conflicts that arise from the costs incurred in the implementation process of the policy for cultural property protection.

Historical and architectural value of the Bugukwon building: Based in the agricultural center of Suwon, Bugukwon was a supplier of seeds and farm equipment and had its branches across the nation and also in Japan while the building was used as the head office of the company. Later its owner was changed to Suwon Chamber of Commerce Office in 1941, and served as an office building for the local court and the Prosecutors' Office from 1952 to 1956, and then a building for Suwon Office of Education and other public agencies in the 1970s, and it was a private hospital building in the 1980s and a printing office in 2000. The building's internal structure had been changed for several times but the exterior of the building is generally well maintained. The Bugukwon building has a significant meaning as it shows the modern landscape of old Kyodong Street and the changes of Suwon in the modern 100 years.

The implementation process for the preservation of Bugukwon: Bugukwon was a demonstration of the conflicting interests between preservation of a valuable asset of the community and the fundamental right specified in the constitution: the right of ownership. The Suwon city government actively intervened to solve the problem and smoothly settled the conflicts. Such active engagement of the city government bears significant meaning as one of cases that shows the smooth incorporation of privately-owned cultural heritage into the systematic management by the engagement of the government.

**Table 8. The Heritage Trail in Suwon**

Items	Seodun-dong District	Suwon Hwaseong District	Suwon Stream District	Gyo-dong District
Theme	-Travel into the modern agricultural history	-Travel into the Korean independence movement	-Travel into the marketplace culture	Walk the new road of the modern age
Characteristics	-Agricultural irrigation facilities in the Joseon Dynasty -Agricultural research facilities -Education facilities	-Japanese-controlled public agencies and the Korean independence movement -Religion -Traditional houses	-Modern figures -Marketplace culture	The the Japanese colonial rule and changes in the modern era
Trail length	About 4.7km	About 3.2km	About 4.2km	About 3.2km
Places along Course of the Heritage Trails	-Chukman Reservoir and Seodun -The Stone Post of Kwonup Mobeomjang (Model Farm) -The Grave of Dr. Woo Jang-choon -Rural Development Administration -Suwon High School for Agricultural Science -Hangmijeong -Monument for Park Munhoe	-Public Agencies under the Japanese Colonial Rule - the Site for Suwon County Office and Police Office - the Site for Court - the Site for Post Office -Religion - Martyrs' Site in the Suwon Hwaseong Fortress - Buksudong Cathedral - Jongro Church and Dongshin Church - Education - Samil School - Adams Memorial Hall -The Korean Independence Movement - Jahye Hospital - Banghwasyuryeong Pavilion and the site of the March 1st Movement - Birthplace of Kim Sehwan - Suwon Commercial School - Traditional Houses - The Site for Yang Seongkwan's House - The filming location for 'Mother and a Guest', a classic Korean film	-Na Hye-sok - Samil Women's School - Hwahongmun Gate (background of Na Hye-sok's poem, 'The Stream') - Suwonsa Temple (where the exhibition of Na Hye-sok's works was held) -Choi Sun-ae - the Site for the Background of the Song, 'Thinking about My Older Brother' -Marketplace culture - Palbuja Street - The Site for the Cattle Market - The Site for the Association of Kisaeng and Female Entertainers - Geobuksandang Shrine - Blacksmith's Shop - The Site for Hwaseong Station	-Invasion of Japan and changes in the modern city - Suwon Station, Water Tower - The old building of Bugukwon - The old Suwon City Office -Symbol of resistance, heroes of Sanuru-ri - Park Sone-tae and Lee Seon-gyeong -The turning points of religion, tradition and equality - Suwonhyanggyo Confucian School - Japanese temples and Suwon Shrine - Junghwa Church - Anglican Church of Suwon -Keeping the original form of cultural facilities - Suwon Theater - Suwon Civic Hall - Old Suwon Cultural Center
Research	In progress as of 2018	In progress as of 2018	In progress as of 2018	Completed in 2017

### 3) Special Tourism Zone and Creation of the Heritage Trail

Since the launch of the project of creating the Heritage Trail in 2016, Suwon has been focused on creation of the Tourism Belt by making more Heritage Trails and utilizing its cultural resources and major tourist attractions such as Suwon Hwaseong.

Such project is part of the efforts to identify and preserve modern cultural heritage that is worthy of being handed over to future generations. As the modern heritage of Suwon is mostly located in the downtown area, it is often recognized as a

physical obstacle to urban development. Furthermore, the modern heritage is in danger of disappearing with the expansion of infrastructure such as housing, roads, and public transportation for stable urban growth.

If there is scarcity of tangible and intangible heritage from the pre-modern era, the value of cultural heritage after the modern era could be found in familiarity and its appeal to the public rather than scarcity. The modern cultural heritage is also cultural heritage of future generations and, in that sense, modern cultural heritage is still in the ongoing process of evaluation. In addition, most of the Suwon 's modern cultural heritage was made during the period of the Japanese colonial rule, so there is a potential danger that the preservation and conservation of heritage can justify the colonial rule.

Suwon created the Heritage Trail along modern cultural assets in 4 districts and has been using storytelling to engage the public's interest in cultural heritage. We have been studying historical and cultural resources of Suwon based on the main characteristics of the 4 districts: Suwon Hwaseong Fortress; the area around Suwon Stream; Gyo-dong; and Seodun-dong while working on making stories with themes based on rich stories that have been accumulated over time.

The types or themes of modern historical resources include education, religion, administration, culture, medical care, and industrial facilities. We are trying to accumulate cultural heritage resources considering its type and secure heritage for future generations.

### III. Conclusion and suggestions

The primary goal of Target 11.4 is to “strengthen efforts to protect and safeguard the world’s cultural and natural heritage” from being destroyed by urban development. Suwon City is also focused on setting up plans for cultural heritage management to make a sustainable city. The ratio of its budget for culture to the total municipal budget remains among the highest, following Gyeongju and Andong, cities well known for their pride about history and traditions.

Especially, Suwon City concentrated on preservation, protection and research of the World Heritage Site of Hwaseong Fortress, which gives the identity of new town to Suwon, and such efforts led to achievements represented by the restoration of Suwon Hwaseong Fortress and the Hwaseong Haenggung Palace, and the World Heritage Site has been well-maintained in spite of the

transitional period of rapid urbanization and modernization.

With the aim of sharing the city's identity with citizens and strengthening the public consensus on it, Suwon has been dedicated to promoting cultural tourism and cultural products of the World Heritage Site of Suwon Hwaseong Fortres. In addition, the city will continue to carry out academic research and investigations to promote common cultural assets of citizens.

On the other hand, Suwon has been expanding the scope of its work to go beyond the cultural preservation of the World Heritage Site of Suwon Hwaseong Fortress towards securing cultural heritage for the future. Suwon is securing modern cultural resources by creating the Heritage Trails along modern cultural assets and, as part of efforts to share the history with citizens, Suwon has been using storytelling to engage the public's interest in cultural heritage.

Suwon has also devoted itself to expanding its infrastructure for culture. In order to increase citizens' access to cultural infrastructure, Suwon is building more museums, galleries and libraries so that no one is missing out on access to the platform of information.

The protection of the World Cultural Heritage is an important element in securing sustainability of the city. Its cultural heritage should be recognized as the common asset that represents the lives of people in Suwon. When such recognition is widely accepted and cultural heritage is identified with every member of the society, the sustainability of the city will be secured for all citizens of Suwon.

The preservation, protection and management of cultural heritage have mainly led by the municipal government or the state. So, we need to come up with measures to engage citizens in the identification and protection of cultural heritage under the recognition that the preservation and protection of cultural heritage can be a way for citizens to understand and respect their own lives.

Although Suwon's culture budget ratio is relatively higher than those of other cities and counties, it still needs to check whether the budget is appropriately allocated and used efficiently.

On the contrary to the pre-modern era where the ruler-centered historical records and cultural heritage were dominant, it is time for us to encourage citizens to take part in protection of cultural heritage with pride as members of the society and also producers of our common assets. Especially, the city needs to strengthen the support for more cultural heritage commentators and visiting teachers, encourage voluntary research groups and cultural organizations and explore various measures to help Suwon citizens make records of their own

history.

However, most importantly, Suwon needs to have a deep understanding in urban spaces to keep the value of its cultural heritage in the midst of rapid urban development and expansion and to develop the rationale to address the contradictions between development and preservation.

Citizens of Suwon, as members of communities, play an important role as producers, consumers, and distributors of cultural heritage, culture and history. As cultural heritage reflects people's past, present, and the future, cultural heritage can be identified with people themselves. Protecting cultural heritage therefore serves as a way for people to respect their own history. In addition, cultural heritage protection is key to making Suwon, the city where they live, a more sustainable one.

## 05

## Enhancing resilience for the sustainable city

Kim Eunyoung

Target 11.5	By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations	Indicator 11.5.1	Number of deaths, missing persons and affected persons attributed to disasters per 100,000 population
		Indicator 11.5.2	Direct economic loss in relation to global GDP, including disaster damage to critical infrastructure and disruption of basic services, attributed to disaster

### I. Setting targets and indicators in the local context of Suwon

Target 11.5 of SDG 11 is to “significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations” by 2030.

Two indicators were proposed regarding resilience. The first indicator is “number of deaths, missing persons and affected persons attributed to disasters per 100,000 population.” The second indicator is about the “direct economic loss in relation to global GDP, such as damage to critical infrastructure and disruption of basic services, attributed to disasters.” Both indicators are Tier 1 indicators which are used to construct data at the national level, and are appropriate to understand the level of damage and to make comparisons among countries.

Suwon is located in the inland area of the country and the level of damage from disasters like tsunamis is relatively low. Therefore, Suwon Sustainable Development Goals (Suwon SDGs) do not include contents related to Target 11.5. However,

Suwon also makes official announcements of the death toll, the number of people affected, the size of the affected area and the amount of damage by disasters such as heavy rains.

While it is important to make use of indicators that show the degree of damage caused by disasters at the national level, promoting preventive measures and building capacities for disaster response are essential elements in increasing resilience from disasters.

There is a limit for applying indicators of national-level disasters to cities. Therefore, cities need to come up with their own measures and indicators to increase resilience and evaluate the damage by disasters.

## II. Status of Suwon and evaluation

### 1. The status of damage by disasters in Suwon

In case of disaster damage in Suwon, heavy rains are the primary cause of disaster damage compared to others i.e. heavy snow, storm, strong winds, earthquakes and typhoons. The overflowing river and inundation caused by heavy rains account for the largest proportion in total property damage in Suwon. On the contrary typhoons cost the biggest damage at the national level.

The number of people affected by heavy rains in Suwon stood at 496 households with 1,162 people in 2012 and has shown a steady decline. The indicator of the number of affected people per 100,000 population has been also on a downward

**Table 1. The status of damage by disasters in Suwon**

Year	2012	2013	2014	2015	2016
Total number of affected households /persons	496 / 1162	11 / 29	20 / 41	15 / 32	0 / 0
Number of persons	Death	0	0	0	0
	Missing	0	0	0	0
	Injury	0	0	0	0
	Total	0	0	0	0
Total number of affected persons per 100,000 population	101.22	2.46	3.39	2.62	0
Total amount of damage (unit: 1,000 won)	1,586,704	6,600	12,000	9,000	215,676

\* Source: annual disasters reports of 2012, 2013, 2014, 2015 and 2016

trend. The total amount of damage fell sharply after recording over KRW 1.5 billion in 2012 and recorded KRW 200 million in 2016 due to the overflowing river and inundated buildings.

The decrease in the number of people affected by disaster and the total amount of damage was made possible by improving the sewage treatment system to have a more flow-dividing structure and installing more street inlets and other appurtenances to prevent reflux.

## 2. The status of vulnerable groups in Suwon

In case of South Korea, famine, which means absolute poverty, is extremely rare and efforts are being made to resolve relative poverty. Korea has various criteria for identifying relative poverty and vulnerable groups. In consideration of disasters in urban areas, vulnerable groups are divided into three types: the biologically vulnerable, the socioeconomically vulnerable, and the residentially and geographically vulnerable.

In case of the biologically vulnerable group, the population aged 5 and below and those aged 65 and over are defined as the biologically vulnerable. The socioeconomically vulnerable group is mostly comprised of elderly people living alone, low-income classes and recipients of national basic livelihood guarantees. The

Figure 1.  
Number of people aged 65 and over

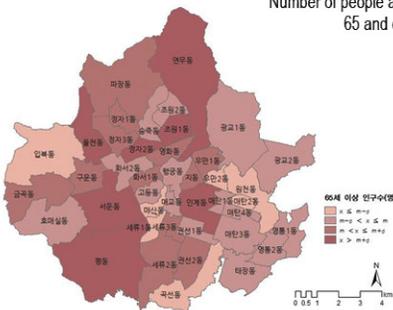


Figure 2.  
Number of children aged 5 and under

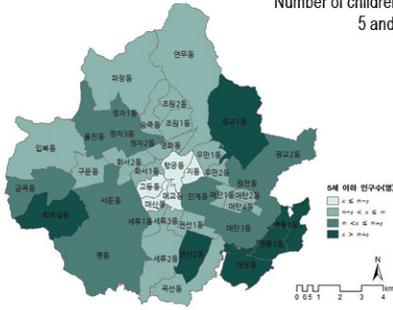


Figure 3.  
Number of elderly citizens living alone

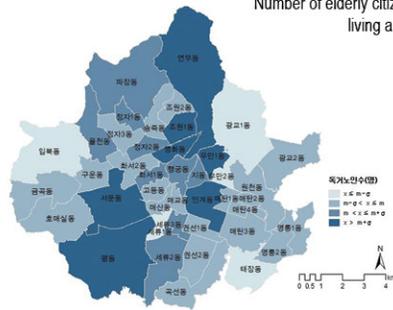
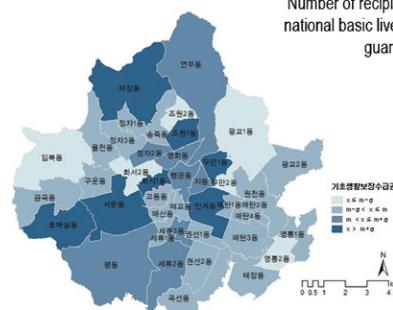
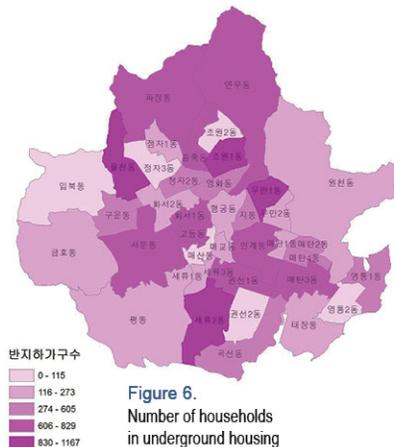
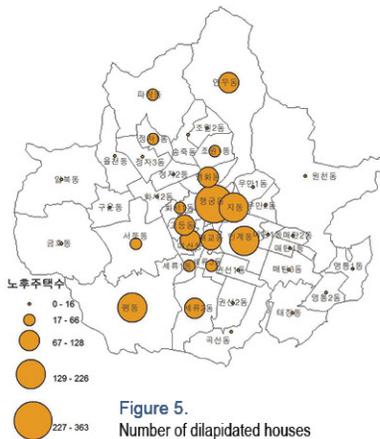


Figure 4.  
Number of recipients of national basic livelihood guarantees





residentially and geographically vulnerable group includes residents living in dilapidated housing, lowland areas and underground houses.

As of 2015, the number of elderly people aged 65 and over, who are considered to be vulnerable to disasters, was 122,631 or 10.47% of the total population while the number of children aged 5 and under was 71,798, accounting for 6.13%.

With the increasing number of people aged 65 and over, the number of elderly citizens living alone in Suwon has been also on an upward trend, totaling 24,962, and 18,080 people from 12,855 households are recipients of national basic livelihood guarantees.

Suwon was home to 374,008 households as of 2010. As for the types of housing, the most common type was apartment accounting for 49.49% followed by detached housing recording 36.94 %. The number of households in underground housing was 18,345, and many of them were distributed across districts like Jangan-gu, Paldal-gu and Gwonseon-gu.

Suwon City recommends citizens take out storm and flood insurance to facilitate the compensation and recovery process in the wake of natural disasters. In addition, the city is also working on the prevention of disaster damage through various policies such as supportive housing programs.

### 3. The status of disaster management in Suwon: policy for enhancing resilience

Suwon City's policy priorities in the disaster management include addressing inundated houses and buildings in lowland; restoring drainage systems that are damaged or running out of capacity; and lowering the possibility of vulnerable

groups to be exposed to natural disasters and potential risks. Other major issues include traffic control, road damage and destruction by inundation, and increase in the maintenance cost of infrastructure.

The existence of a master plan on disaster response is used as an important indicator to reduce the number of affected people and economic losses by disasters. Nevertheless, practical action plans and procedures are still more important than a master plan to strengthen capabilities for disaster response and to protect citizens from disasters. Therefore, it is important for the municipal government to secure relevant systems, manpower and budget.

#### 1) The status of protecting the vulnerable and disaster prevention

Suwon has implemented various policies to protect vulnerable groups from disasters. In order to cope with disasters in a proactive manner, the city has built a disaster management system comprised of the overall review on the impact of disasters, storm and flood insurance, disaster preventive projects, the Autonomous Disaster Prevention Team and the comprehensive situation control system.

The city offers supports for healthcare and social participation of vulnerable groups on a regular basis, not just in times of disaster. Especially, the city is trying to provide residents, especially those in vulnerable groups, with quality residential spaces.

#### 2) The status of infrastructure construction

The discharge capacity of all Suwon's major streams has been improved since 2013. However, repair works are not completed in some areas. The Suwon Stream has the highest completion rate followed by the Woncheon Stream and the Seoho Stream. The Hwangguji Stream has the largest proportion of areas that require embankment reinforcement. In case of the Woncheon Stream, its embankment is deteriorated and severely damaged by the introduction of resident amenities (Suwon City, 2013).

Suwon has the Suwon Sewage Treatment Plant, the West Lake Ecological Water Resource Center and the Treatment Plant for Sanitation. The daily capacity of the Suwon Sewage Treatment Plant is 520,000m<sup>3</sup> per day and that of West Lake Ecological Resource Center is 47,000m<sup>3</sup> per day.

The distribution rate of sewerage pipes recorded 91.3% with the length of constructed pipes reaching 1,873,483m out of the planned length of 2,050,387m. In case of the old downtown areas such as Paldal-gu, unclassified pipes take up the

largest proportion of the total pipes in the district.

Suwon is responding to floods and heavy rain with disaster relief facilities including seven drainage pumping stations and five retention basins.

**Table 2. The Status of streams in Suwon**

Year	No. of streams	Total length	Cases of improvement needed			
			Total	Already improved	Yet to be improved	Improvement rate
2013	7	56.57	104.98	96.93	8.05	92.23
2014	7	57.7	103.89	103.89	0	100
2015	7	57.7	103.89	103.89	0	100
2016	7	57.7	103.89	103.89	0	100

※ Source: Statistics Suwon (<http://stat.suwon.go.kr>)

**Table 3. The Status of sewerage pipe in Suwon**

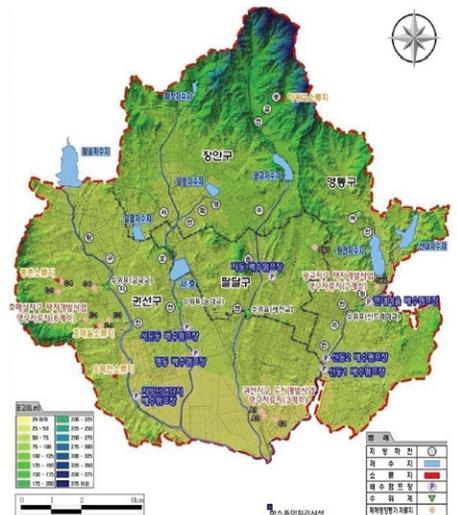
Category	Planned length (m)	Constructed length (m)	Distribution area (%)	Unclassified pipe		Classified pipe			
				Planned length (m)	Constructed length (m)	Sanitary sewer(m)		Storm sewer(m)	
						Planned length	Constructed length	Planned length	Constructed length
Suwon	2,052,060	1,873,483	91.3	945,417	945,417	583,214	583,214	523,429	522,813

※ Source: Statistics Suwon (<http://stat.suwon.go.kr>)

**Table 4. The Status of disaster relief facilities in Suwon**

	Jangan-gu	Gwonseon-gu	Paldal-gu	Yeongtong-gu
streams Maintenance Act	9 streams	8 streams	-	7 streams
7 local rivers				
River Act	-	2 water level observation towers	1 water level observation tower	1 water level observation tower
	-	3 drain pump stations	1 drain pump station	3 drain pump stations
National Land Planning and Utilization Act	-	Assessment on the Gwonseon District Development Project and Impact on Disaster 3 permanent detention ponds	Assessment on the Gwanggyo Residential Area Development Project and Impact on Disaster 1 permanent detention pond	Assessment on the Gwanggyo Residential Area Development Project and Impact on Disaster 1 permanent detention pond
Sewerage Act	Sewer pipe (349km)	Sewer pipe (457km)	Sewer pipe (345m)	Sewer pipe (297km)
Suwon Sewage Treatment Plant				

※ Source: 2012 Report on Damage by Flood by Korea Land and Geospatial Information Corporation



### 3) Status of green infrastructure construction

Suwon has seen an increase in impermeable surfaces due to the rising number of development projects accompanied by urbanization and industrialization. In addition, the likelihood of regional inundation and flooding increased with the changing patterns of rainfall caused by climate change. Especially, water circulation occurs in less areas with decreasing evapotranspiration rate due to shrinking farmland and green areas. In this regard, effective rainwater management is essential through rainwater harvesting, utilization, storage and infiltration.

**Table 5. The Status of impermeable area in Suwon**

Category	Size of administrative district (km <sup>2</sup> )	Size of impermeable area (km <sup>2</sup> )	Rate of impermeable area (%)
Jangan-gu	33.14	11.94	36.04
Gwonseon-gu	47.13	16.68	35.73
Paldal-gu	12.89	10.04	77.09
Youngtong-gu	27.85	12.48	44.82

※ Source: Ministry of Environment (2013)

**Table 6. The Status of usage of rainwater utilization equipment/facilities**

Total		Public sector		Private sector		Rainwater container	
Number	Capacity	Number	Capacity	Number	Capacity	Number	Capacity
267	88,441m <sup>3</sup>	40	51,334m <sup>3</sup>	142	36,942m <sup>3</sup>	85	165m <sup>3</sup>

※ Source: Data from Suwon City (2017)

Most urban floods are closely related to the design capacity of sewer pipes. Climate change has increased the frequency of 50-year or 100-year rain events. However, the design capacity of most installed sewer pipes in Suwon was set in consideration of 30-year rain events. Given budgetary problems, increasing the capacity of all sewer pipes cannot be an option. More preferable choice would be widening the size of permeable surfaces to minimize the impact of floods.

Suwon is trying to make the most use of equipment or facilities for rainwater utilization to reduce the occurrence of disasters and build a water circulation

system. Especially, in the old downtown areas, the percentage of impermeable areas is as high as over 77%.

Equipment or facilities for rainwater utilization have spread from public buildings to citizens through the spread of rainwater containers to general households. Besides, in addition to sewer pipes, permeable blocks and pavements have been installed to make rainwater penetrate into the soil.

Suwon is creating parks in the city to minimize damage caused by heavy rainfall. In that way, it is making efforts to create natural surfaces where rainwater can infiltrate into the soil. The Rain Garden with Low Impact Development (LID) techniques was created to enable rainwater to be stored in green areas. In addition, Suwon plans to carry out the Urban Forest Project and the Street Garden Project to maximize the rainwater storage function of the city and minimize the impact of disasters such as floods.

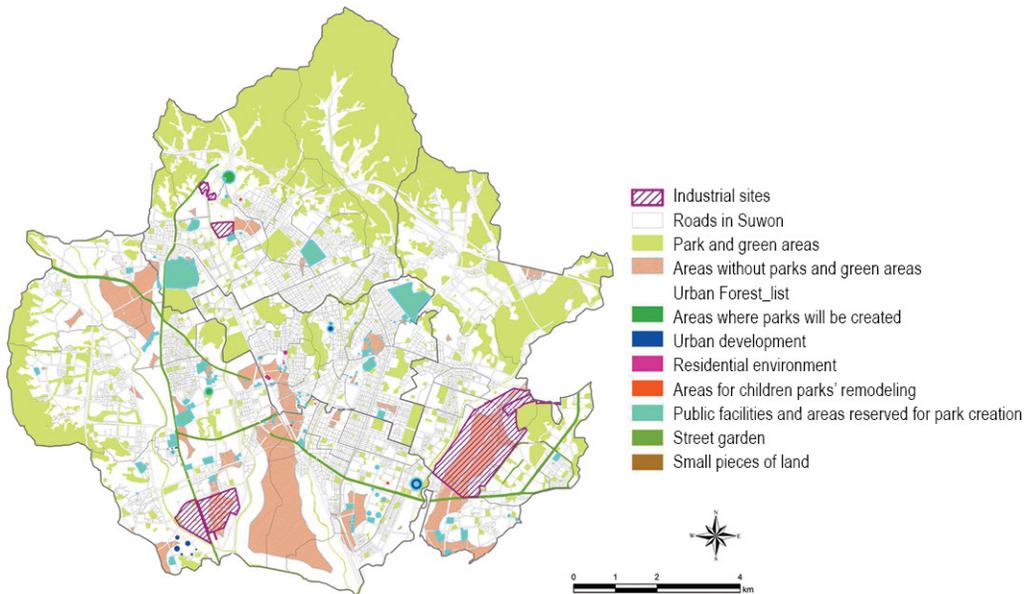


Figure 8. Urban Forest Project of Suwon (Suwon City, 2015)

Suwon City plans to build a GIS-based integrated management system which will provide various information related to Rain City Project of Suwon as well as real-time monitoring and integrated management of rainwater utilization facilities.

The GIS-based Integrated Management System of Smart Rain City, as a measure to prevent urban flooding, can be linked with the LID (Low Impact Development) monitoring system and rainwater storage and infiltration systems.



Figure 9. Media report on Suwon's GIS-based integrated water circulation management system

### III. Conclusion and suggestions

Located in the central inland area of the country, Suwon is a relatively safe city from the impact of disasters such as earthquakes and tsunamis. However, the city is not free of the potential risks of floods and typhoons and is required to prepare for urban flooding given the four streams straddling the south and the north of the city. Heavy rainfalls and typhoons account for the most of the damage caused by disasters in Suwon. Although the death toll is almost zero, such disasters still affect people and cause economic losses.

Indicators of Target 11.5 of SDG 11 requires local/municipal governments to suggest data on the current disaster damage status. However, there is a limit to setting policy directions based on such indicators. So, local/municipal governments are required to set their own indicators to evaluate both the current disaster damage status and policy responses to disasters.

The Indicators will show the level of responses to disasters and be used to suggest relevant policies and secure budget and manpower. However, clear methodology for selection and calculation for indicators has not been prepared and requires additional research. Nevertheless, there is a need to make public debate on the Indicators to enhance resilience from disasters.

Suwon is said to be a relatively safe city from disasters, but it should not be an excuse for complacency. Although the frequency of typhoons and heavy rainfall cannot be curtailed by urban policy, Suwon should lay the solid foundation for

disaster resilience through fundamental solutions such as expanding permeable pavements and building green infrastructure.

Last but not least, heat waves are excluded from the current category of disasters. However, given the rapidly growing excess mortality and damage across the world, heat waves should be included. In addition, it is necessary to discuss how to set the criteria for cases of excessive mortality and other types of mortality and for calculating the amount of damage.

## Environment and waste management for a pleasant and sustainable

### Kang Eunha

Target 11.6	By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management	Indicator 11.6.1	Proportion of urban solid waste regularly collected and with adequate final discharge out of total urban solid waste generated, by cities
		Indicator 11.6.2	Annual mean levels of fine particulate matter (i.e. PM <sub>2.5</sub> and PM <sub>10</sub> ) in cities (population weighted)

### I. Setting targets and indicators in the local context of Suwon

Target 11.6 is about reducing the negative impact of urbanization on the environment through urban waste management and air quality control, thereby improving urban dwellers' living standards. It aims to reduce the adverse per capita environmental impact of cities by addressing the overall urban environmental pollution. Two Indicators that show the proportion of properly managed urban waste and levels of fine particulate matter in cities were chosen to evaluate the level of progress in achieving Target 11.6.

If waste is not properly collected and doesn't go through adequate final treatment, the streets and residential areas will be filled with waste, leading to contamination of drinking water and water for living especially in rainy weather, causing emergence of diseases. Given that, the indicator that shows whether people's living spaces are hygienically managed is very important. In case of South Korea, urban solid waste is treated after being divided into waste for recycling, waste for incineration and for disposal in landfills. Households buy plastic garbage bags to discharge waste (according to the Volume-rate Garbage Disposal System introduced in 1995), and

the government collects all of them for treatment. Recyclable garbage is discharged after being sorted by type and is collected by specialized companies in treatment and recycling. Under the circumstance, it is not appropriate for South Korea to apply Indicator 11.6.1. as the rate of properly treated urban solid waste has been 100% since 1990. Therefore, it was proposed to use the “amount of generated waste” as an alternative indicator and this report reviewed it. The amount of waste can be a useful indicator for reducing the total amount of waste generated in cities as long as the city maintains acceptable levels of population. Although, the recycling rate of waste can be also be used as an indicator, the process of collecting and treating waste for recycling also consumes energy and environmental resources. Given that, reducing waste generation itself seems to be more important.

The data on annual averages of urban particulate matter(PM) has been accumulated based on PM<sub>10</sub> since the 1990s. On the other hand, the official measurement based on PM<sub>2.5</sub> has been officially conducted for the statistical purpose since as recently as 2015. Seoul and the Gyeonggi Province, which includes Suwon, account for 5% of the entire territory of the Republic of Korea while they are home to 44% of the nation's total population. Suwon is a very densely populated city with its population density reaching 10,000 people per km<sup>2</sup>. That explains why Seoul and the Gyeonggi Province were designated as the Seoul Metropolitan Area for Special Management of Air Quality. As such, populated areas have been policy priorities and the weighted influence based on the number of population is well recognized.

In order to protect people from the health hazard of fine particulate matter, the Ministry of Environment (MOE) and the Korea Meteorological Administration (KMA) forecast the PM<sub>2.5</sub> and PM<sub>10</sub> concentration levels of Asian Dust from China and Mongolia and the levels of pollutants generated inside the country and provide real-time information on the PM<sub>2.5</sub> and PM<sub>10</sub> concentration levels to the public. In addition, when the levels are too high, fine dust alerts are issued to provide guidelines to citizens. In 2018, the government changed the average annual standard for PM<sub>2.5</sub> pollutants in the atmospheric environment from the previous 25 µg/m<sup>3</sup> to 15 µg/m<sup>3</sup>.

**Table 1. Changes in the atmospheric environment standard**  
(Source from Air Quality Division, MOE)

Category	Before (2017)	After (2018)
Standard for Particulate Matter(PM <sub>2.5</sub> )	annual average: below 25µg/m <sup>3</sup>	annual average: below 15µg/m <sup>3</sup>
	24-hour average: below 50µg/m <sup>3</sup>	24 hour average: below 35µg/m <sup>3</sup>

The accumulated data on 10-year annual averages of PM<sub>10</sub> in cities serves as a useful indicator for comparison between the past air quality levels and the current status and for evaluation of the progress made for improvement. South Korea and its cities need to pay keen attention to the indicator of PM<sub>2.5</sub> as it is more harmful than PM<sub>10</sub> when inhaled by human and used as a major indicator in many of advanced global cities. Given that, we studied the tendency of nitrogen oxides(NO<sub>x</sub>) and ozone(O<sub>3</sub>) that are closely related to PM<sub>10</sub>, PM<sub>2.5</sub> and the concentration levels of particulate matter.

It is difficult to talk about environmental pollution issues that affect both people and Mother Nature without mentioning drinking water quality and environmental water quality such as water quality of streams. However, it is understandable that environmental water quality is excluded from SDG 11 as tackling the issue requires not only the efforts of cities but the entire world. However, in this paper, we will look into the progress made in improving the water quality of Suwon's major streams as the four streams, which flow through the entire city and are adjacent to residential and living spaces, play such an important role in improving the living standards of citizens' lives.

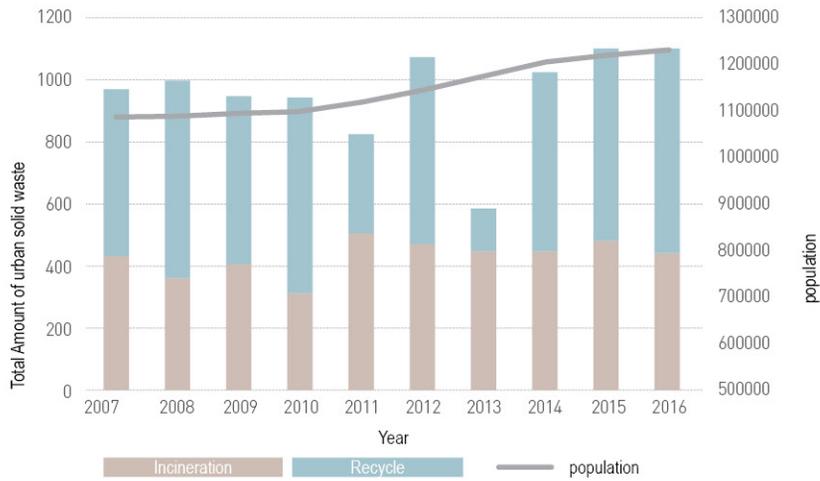
The data regarding the abovementioned indicators has been accumulated as official statistical data at the level of Suwon City as well as the national level and various efforts have been made on the policy front. For example, 'Suwon 2030 Sustainable Development Goals' were set by collecting various opinions from civil society by Suwon Council for Sustainable Development, and set the Targets in line with UN indicators such as energy conservation, improvement of air quality, reduction of carbon emissions, reducing consumption, and waste reduction,

## II. Status of Suwon and evaluation

### 1. Waste

The daily amount of Suwon's urban solid waste is around 1,000 tons per day. Although the city's population has steadily increased by 13% over the past decade, reaching 1.23 million in 2016, the urban waste has not gone up. Such achievement is attributable to the nation-wide adoption of the Volume-rate Barbage Disposal System (in which the cost of garbage disposal is charged in advance, ranging from 300 won to 600 won per 20 liters) and the Suwon's policy on separate garbage system for recycling. All of non-recyclable garbage is treated at an incinerator located in the city and they account for 48% (10-year average) of the total amount

**Table 2. Suwon's population growth vs. waste** (for incineration and recycling) (Source: Suwon Statistics)



of urban solid waste. In both scenarios where the city's population reaches 1.3 million or stays at the status quo, Suwon City needs to focus on cutting the total amount of urban solid waste and air pollutants emitted from incinerators rather than enlarging their capacity. To this end, Suwon City needs to pursue policies such as regulations on the use of incinerated disposable items (vinyl, styrofoam, etc.), packaging materials and methods, and plans for reuse of separated wastes. In addition, hygiene concerns may arise due to daily waste around living spaces, and especially food waste could cause problems in summer. In case of Korea, food waste is separated from waste to be incinerated, and citizens purchase plastic bags to discharge food waste to designated places on the roadside. Residents of apartment buildings discharge food waste in a common food waste bin located in the apartment complex. Food waste is collected every day by designated vehicles and then processed into compost or feed at disposal sites. Due to the nature of Korean food with high water content, the food waste collected from detached



Picture 3. (on the left) CCTV and sensors used to issue warnings about fly-tipping in Suwon and (on the right) status of waste collection points that are hygienically operated through periodic cleaning (Source: Diagnostic study for efficient operation of roadside cleaning in Suwon by Suwon City in 2014)



Picture 4. Leaflets in foreign languages explaining how to discharge waste

housing in summer can be malodorous. To solve this problem, local governments regularly clean the food waste bins while collecting it. In addition, sites for food waste collection are designated considering the characteristics of areas and the sites are cleaned regularly with water.

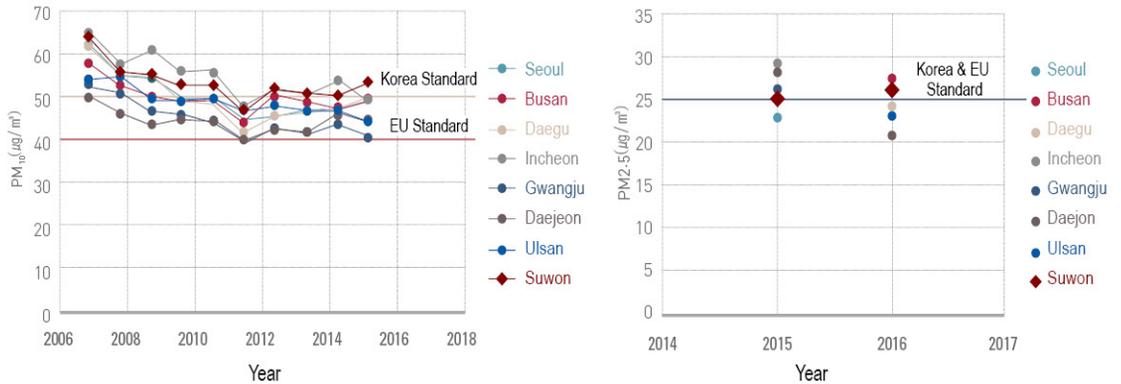
As such, waste is separated into different types from the point of discharge: waste for recycling; waste to incinerated; or food waste. If the waste is not properly separated by type or the designated waste bag is not used, the waste collection would be delayed leading to deteriorated hygiene on the roadside. Therefore, Suwon uses CCTVs and sensors, sends warning messages or make notices about violation cases to prevent fly-tipping. Suwon also provide foreigners who may not be familiar with the city's waste disposal policy with leaflets written in major foreign languages. The city government also provides free waste bags to low-income households to ease the economic burden on them.

## 2. Particulate Matter: PM<sub>2.5</sub> and PM<sub>10</sub>

Seven Air Quality Monitoring Stations in Suwon measure air pollutants (such as PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>x</sub>, CO, and O<sub>3</sub>) in the air and also on the roadside of Suwon to produce statistical data and the hourly air quality outcome is provided to the public.

The concentration levels of PM<sub>10</sub> in seven Korean metropolitan cities and Suwon had decreased between 2007 and 2011, and have been maintained ever since 2012. The PM<sub>10</sub> concentration level in Suwon is similar to those of other metropolitan cities, but its absolute value is relatively high. This cannot be seen as a result of increased pollutants or policies as the patterns that Suwon has shown over

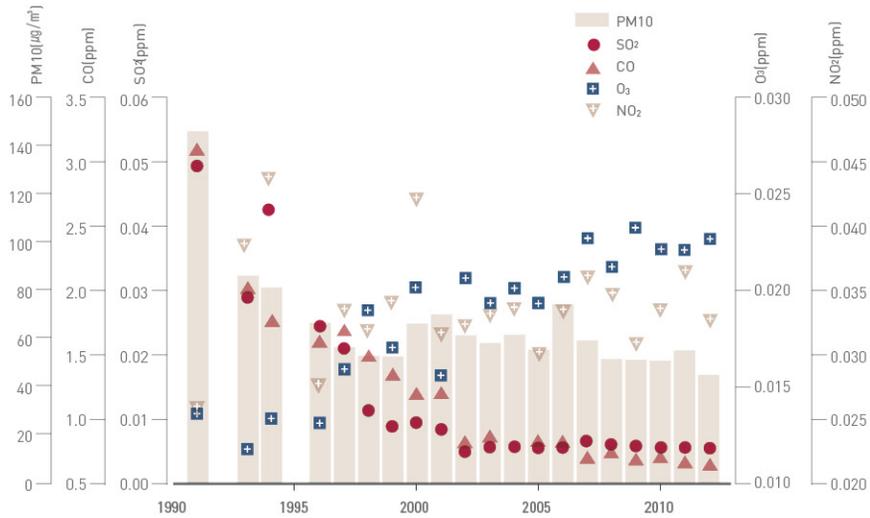
time are not much different from other cities. Rather, the reason can be found in its geographical characteristics. As Suwon has a basin-shaped terrain located in the western part of the Korean Peninsula, pollutants accumulate easily and the dilution effect by diffusion is low. As the statistics on PM<sub>2.5</sub> have been built since 2015, with only two years of data, it is too early to understand the whole patterns. Suwon is focused on continuous management of PM<sub>2.5</sub> as the annual average of Suwon exceeded the national environmental standards for PM<sub>2.5</sub> in 2016, and Suwon's PM<sub>2.5</sub> level is higher than the standards recommended by WHO (which is 1/2 of EU standards) and US standards.



Picture 5. Annual average concentration levels of PM<sub>10</sub> (left) and PM<sub>2.5</sub> (right) in Suwon and 7 metropolitan cities

The concentration levels of air pollutants like PM<sub>10</sub>, SO<sub>2</sub> and CO have been decreasing in Suwon since the 1990s but there are concerns about increasing PM<sub>2.5</sub> as the levels of O<sub>3</sub> and nitrogen oxide continue to increase. It seems that the air pollution in Suwon is turning from the type of developing countries, where air pollution is mainly caused by high levels of SO<sub>2</sub> and CO, to that of advanced countries, where air pollution is caused by high levels of nitrogen oxides due to growing number of automobiles and urbanization.

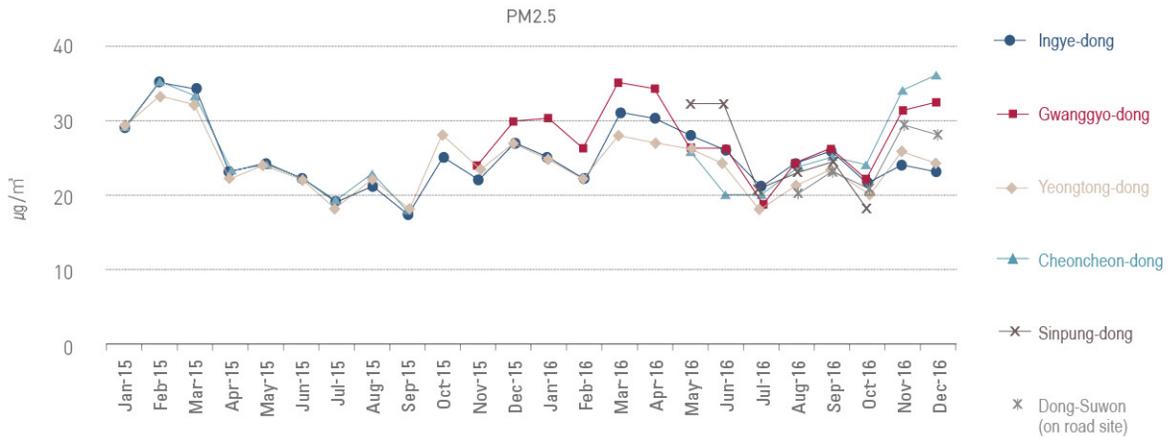
The PM<sub>2.5</sub> concentration levels in Suwon are higher in winter and early spring than in summer. Such phenomenon is attributable to increased use of fossil fuel, low temperature, frequent atmospheric congestion, and influx of air pollutants from China with northwesterly wind. According to the Gyeonggi Province Air Pollution Assessment Report 2016, daily average concentration levels of PM<sub>10</sub> and PM<sub>2.5</sub> (based on the 99th percentile) in Suwon failed to meet the standards by recording 122 µg/m<sup>3</sup> and 59 µg/m<sup>3</sup> respectively. However, not only Suwon but also many of 31 cities and counties in Gyeonggi Province also did not reach the standards. The rates of cities and countries that achieved the daily averages were 0% for PM<sub>10</sub> and



Picture 6. Overall air pollution trend in Suwon (Source: Kang Eunha et al., Suwon Research Institute, 2013)

21% for PM<sub>2.5</sub> (but only 19 cities had data on PM<sub>2.5</sub>). Therefore, this can be said to be a common phenomenon that appears in the Seoul metropolitan area.

Suwon has no large-scale industrial complexes nor power generation facilities other than district heating facilities using fossil fuels. Therefore, the use of fossil fuels for automobiles and heating, small-scale commercial and business sites, and scattered dust from construction sites are the main sources of the city's air pollutants. Accordingly, Suwon's policy is focused on traffic management and energy demand management and reducing the negative effects of particulate matter on human health. In particular, since major policies to reduce air pollution, such as shifts in industrial structures and regulations on air pollutant emissions, are carried out nationwide at the central government level rather than at the local government level,



Picture 7. Monthly averages of PM 2.5 concentration levels measured by 6 Air Quality Monitoring Stations in Suwon

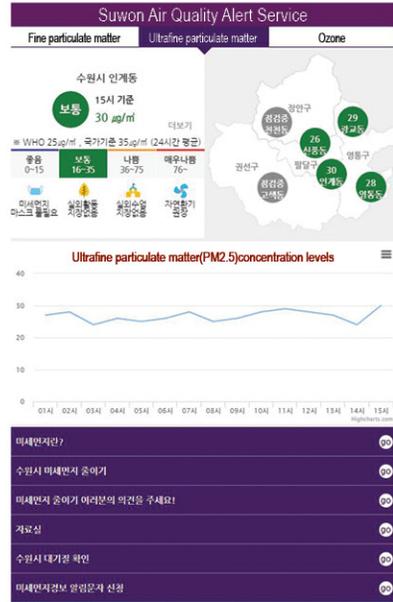
local governments such as Suwon are encouraging voluntary participation of citizens, providing support to reduce the damage of vulnerable groups, and offering citizens with the right information. Under the circumstance, Suwon has formed the Task Force for Special Measures for Particulate Matter which is participated by 11 divisions of local administration to protect citizens' health from urban air pollution. Major policies are as follows.

Suwon City makes it mandatory for public agencies to implement the Alternate-Day-No-Driving System when a fine dust warning is issued while encouraging citizens' voluntary participation.

In addition, the city opened an online homepage and a mobile application where residents can acquire information about the concentration levels of air pollutants in their residing areas and check guidelines on how to behave according to the levels of concentration.

Suwon City has allocated the budget for replacing the city's buses with CNG (Clean Natural Gas)-fueled buses, and 83% of buses were replaced in 2016. In addition, the city provides financial supports for the installation of emission gas reduction devices in diesel cars and subsidy to set up charging stations to promote the use of electric vehicles. In addition, as part of efforts to attract more public transit users, the city government created the Transit Transfer Center near the Suwon Station to enable smooth transfer of passengers between buses and subways and also improved bus stop facilities. As recently as January 2018, Suwon City began to impose more aggressive regulations on automobile emissions by cracking down on the operation of old diesel vehicles (that failed to comply with the comprehensive inspection standards for emissions). Furthermore, sprinkler trucks and road sweeping vehicles are running more frequently to remove re-scattered dust coming from roads. The city also introduced regulations such as mandatory installation of dust scattering prevention fences at construction sites to reduce dust coming from construction sites, and made it mandatory to clean vehicles that go to or come from the sites with water.

The city government is also in charge of managing the level of air pollutants



Picture 8. Suwon Air Quality Alert Service (on mobile application)

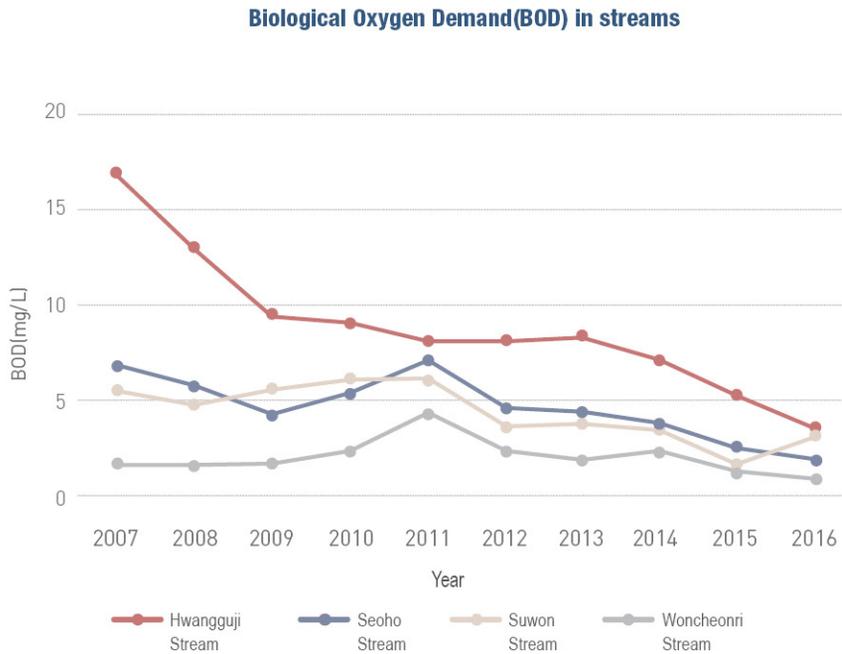
generated from small and medium-sized facilities (4.5-level facilities with the annual amount of emitted pollutants not exceeding 10 tons of dust, sulfur oxides or nitrogen oxides) In case of large facilities at 3-level or above are managed directly by the central government.

Suwon also measured indoor air quality levels in day care centers, kindergartens and senior citizen community centers and provided free consultation on air quality management from 2015 to 2016 to protect the health of vulnerable groups (infants, preschoolers and the elderly). In addition, the city government provided masks to children under 6, elderly citizens and road cleaners to reduce the harmful impact of high concentration levels of fine particulate matter on them. Electricity generation of the country is largely dependent on high thermal power plants that emit high levels of air pollutants (as of 2016, 62% of power was produced by coal, oil, and LNG-powered thermal power plants). Against this backdrop, Suwon has been committed to electricity generation from photovoltaic, solar and geothermal power (installation and operation of 22.5MW power plant by 2016) and aims to raise its energy self-sufficiency through clean local energy generation.

However, small cities located in the Seoul metropolitan area, like Suwon with the total area as small as 121km<sup>2</sup>, are more affected by air pollutants moving from neighboring cities(especially from the thermal power plant complex or the industrial complex on the west coast of the Korean peninsula) or mainland China, rather than by emissions generated inside the city (Suwon accounted for 0.77% of Korea's total emissions as of 2014). Under the circumstance, policies for reducing air pollutant emissions in those cities are mainly designed at the national level or the Gyeonggi Province level, and policies on traffic demand need to be implemented in line with the metropolitan transportation policy in line with policies of neighboring cities, Gyeonggi Province, and Seoul, rather than be pursued by the Suwon city government alone. Therefore, Suwon needs to be more focused on the policy to reduce the negative impact of particulate matter as its population is concentrated in a basin-shaped terrain where air pollutants are easily confined.

### **3. Water quality control of streams in living environments**

The four major streams in Suwon are flowing all over the city. Except for only one of them, the remaining three streams flow all around the downtown area or around apartment buildings, and trails, parks and sidewalks have been formed along the streams. In case of the reservoirs of Suwon, all of them are located along the park or in the park, providing leisure spaces to citizens. Therefore, the management



Picture 9. Water quality of main streams in Suwon (Source: open data (on the Seoho Stream and the Suwon Stream and the Woncheonri Stream) from Environmental Policy of Suwon City and statistical DB (on the Hwangguji Stream))

water quality and water environment of the streams is very important as it is not only about water resource management or sanitation but also about clean and comfortable leisure spaces for citizens.

Among the major streams in Suwon, the Hwangguji Stream is a local stream that is managed by the State so the water quality of the stream is monitored by the nation and the results are constructed in the national statistics database. The remaining three streams' water quality is measured monthly by the city, and the results are posted on the website of the Suwon city government . In 2008, the BOD levels of the Hwangguji Stream was 17 mg/L or grade-6 water quality (very poor) which means it was not appropriate to be used for daily water or agricultural irrigation. However, in 2016, the level was improved to a 3-grade (normal), ie, if it undergoes a high-level water treatment, it can also be used as a water source. The water quality of other three rivers were also improved to 2-and 3-grade levels. Such achievement is a result of Suwon City's policy efforts: managing the pollutant discharge load; installing the pre-treatment facility to reduce the non-point pollution source; and restoring and constructing the ecological stream; and encouraging citizen networks' activities of improving the conditions of river basins.

### III. Conclusion and suggestions

Suwon is a city that does not have industrial complexes or thermal power plants that cause high levels of environmental pollution but is comprised of urbanized areas with densely populated residential complexes. Suwon City has well-designed waste management policy in line with the national policy. The examples include waste collection from designated points, clearing the points of discharge and flytipping prevention. Suwon's achievement rate regarding Indicator 11.6.2 has been 100% since the 1990s, and when the total amount of generated urban solid waste is applied as an alternative indicator, Suwon is showing a good performance as the amount hasn't increased over for the past 10 years in spite of the population growth of the city. Suwon has high population density and many apartment buildings so the urban solid waste usually comes out in large quantities in certain places. Given such characteristics, the city has been focused on hygienical waste treatment and frequent collection of waste (daily collection of food waste and waste to be incinerated and once a week for recyclable waste). However, classifying urban solid waste by type at the time of discharge could be somewhat challenging, especially for foreign residents who are not familiar with the city's waste disposal policy, so there is a need to continuously enhance the publicity of waste collection methods of Suwon and the country. In addition, the government should continue to implement policies such as periodic cleaning to reduce the odors that may occur when food waste is collected in summer, and promote the use of major collection points.

Suwon was included in the Seoul Metropolitan Area for Special Management of Air Quality which is comprised of Seoul and Gyeonggi Province. Under the initiative, the air quality of Suwon has been subject to intensive management since 2005. Such policy on air quality improvement significantly reduced the concentration levels of PM<sub>10</sub> in the air and we started to officially measure PM<sub>2.5</sub> in 2015 and strengthened atmospheric environment standards for PM<sub>2.5</sub> in 2018. However, the ozone concentration levels are increasing in connection with the absolute increase of traffic volume and energy consumption caused by urbanization, and Suwon failed to meet national air quality standards for PM<sub>2.5</sub> in 2016.

PM<sub>10</sub> and PM<sub>2.5</sub> concentration levels in Suwon are somewhat higher compared to major metropolitan cities in Korea. Despite relatively low levels of emissions generated inside the city, the major reason behind the high concentration levels can be found in the accumulation of particulate matters due to the frequent air congestion caused by the densely located urban buildings in the basin-type terrain and lack of large mountains or deep rivers. While major polices to tackle

air pollution should be implemented at the national level as it requires changes in the industrial structure and energy source, reorganization of transportation systems and control of business sites that emit large amount of air pollutants, the Suwon city government has been committed to reducing particulate matter and launched its own Task Force to combat particulate matter while exploring various policies such as transportation demand policy, management of dust scattered from the roadside, creation of urban forests, policies to reduce the negative impact of particulate matters on the vulnerable, and providing information on particulate matter through the mobile application. Especially, Suwon is pursuing the policy of creating urban forests by increasing the proportion of tree-covered areas in parks, planting trees on the roadside and greening small idle spaces. Such policy should be continuously promoted as it creates more spaces for wind flow and facilitates smooth air circulation. However, for these policies to take effect, it requires years of commitment and need to be connected with neighboring cities and metropolitan areas, and the sustainable policies on national and international cooperation will also be critical.

## Providing universal access to safe, inclusive and accessible, green and public spaces

Chung Soojin

Target 11.7	<b>By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities</b>	Indicator 11.7.1	Average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities
		Indicator 11.7.2	Proportion of persons victim of physical or sexual harassment, by sex, age, disability status and place of occurrence, in the previous 12 months

### I. Setting targets and indicators in the local context of Suwon

The Indicators of Target 11.7 are designed to understand the size of public space that can be readily accessed by citizens. In case of Indicator 11.7.1, it provides a means of evaluating the accessibility to public space, especially for children, minors, women and persons with disabilities. On the other hand Indicator 11.7.2 provides a means of evaluating how safe people are from various crimes.

As for Target 11.7, no precise indicator can be found in existing research due to the lack of clear definition about public spaces and its broad scope. Instead, it can be replaced by using indicators such as “park area per capita,” “allocated park area per capita,” “urban parks, green spaces and recreation areas,” “per capita urban forest,” and “crime rate.”<sup>1</sup>

Indicator 11.7.1 requires to provide the share of open space in urban areas. In this regard, we can suggest indicators like “park area per capita,” “allocated park area per capita” and other data on the size of urban parks and green belts can be suggested,

<sup>1</sup> Page 58 in "Study on the Directions of Architecture and Cities Responding to Sustainable Development Goals(SDGs)" written by Son Dong-pil and Oh Seong-hoon in 2016

as well as various policy cases of promoting universal values in urban spaces.

Other indicators about various public spaces, cultural facilities and open spaces, in addition to indicators such as the share of urban parks and green belts, can be suggested. However it is difficult for local and municipal governments to constantly produce and manage such data. The adoption of Universal Design Guidelines can also be considered as an indicator of evaluating universal access to spaces. In “Sustainable Development Indicators(SDI) of Suwon,” “Indicator 2-3-2: per capita urban area in Suwon” and “Indicator 9-1-5: per capita park area in Suwon” are included.

Indicator 11.7.2 is about evaluating how safe urban spaces are, and requires to collect and suggest data on crime, reflecting demographic, sociological and spatial characteristics of crime by type. Given that indicators regarding crime rate seem to be closely related to Indicator 11.7.2.

Local governments' strategies to safely prevent spaces from crimes can be summarized by crime preventive design project and application of such designs to urban environments. The most relevant indicators in Sustainable Development Indicators(SDI) of Suwon are are “Indicator 10-5-1: number of violent crime cases in Suwon” and “Indicator 10-5-2: number of crime-related deaths per 100,000 persons.”

## II. Status of Suwon and evaluation

### 1. The current status of Suwon related to Indicator 11.7.1

The priority of Suwon's urban policy has been creating a sustainable eco-city. With regard to Target 11.7, the city has been making constant efforts to allow every citizens to access public spaces and to promote the public use and quality of the spaces.

Size of public space<sup>2</sup> in Suwon

Suwon's public spaces can be classified into parks, sports grounds, recreation areas, and historic sites. The size of Suwon's parks and recreation areas show a significant change between 2011 and 2012 as Woncheon Recreation Area and nearby recreation areas were changed into Suwon Gwanggyo Lake Park with the construction of Gwanggyo New Town in 2011

There is a gap between the size of allocated land for parks in cities and actual park area because some parts of the allocated land are still remained as farmland and forest. The total size of sites for public facilities has more than doubled from

<sup>2</sup> According to Article 3 of National Land Planning and Utilization Act, open facilities include squares, parks, and green areas while public, cultural, and sports facilities include schools, playgrounds, public office buildings, cultural facilities, and sports facilities deemed necessary for public use. This chapter will be focused on parks among all open facilities while covering all indicators related to it.

**Table 1. The size of sites for public facilities in Suwon**Unit : m<sup>2</sup>

Year	Park <sup>3</sup>	Gymnasium site <sup>4</sup>	Recreation area <sup>5</sup>	Historic site <sup>6</sup>	Size
2011	2,183,495	540,333	76,051	32,802	2,832,681
2012	4,341,578	524,386	9,527	32,802	4,908,293
2013	4,874,997	524,386	9,527	32,802	5,441,712
2014	5,660,706	208,335	9,527	32,802	5,911,370
2015	5,832,776	504,809	9,527	32,802	6,379,914
2016	5,852,359	503,146	9,527	32,802	6,397,834

※ Basic Statistics of Suwon 2017 and statistical data on land registration from the Ministry of Land, Infrastructure and Transport

2,832,681m<sup>2</sup> in 2011 to 6,397,834m<sup>2</sup> in 2016. Such increase is the result of Suwon's continuous efforts to provide citizens with better access to parks, athletic fields and other types of public spaces.

The allocated size of land for creation of parks in Suwon According to the Basic Plan on Urban Planning of Suwon, the land of 16,321,5320.5m<sup>2</sup> or 13.5% of Suwon's total area, was allocated for the creation of parks. The allocated park area per capita is 13.50m<sup>2</sup><sup>7</sup>, excluding Mountain Gyanggyo and Jijidae Park. Although the allocated size is bigger than the national standard suggested by the Ministry of Land, Infrastructure and Transport, the size is still below the national average of 21.0m<sup>2</sup><sup>8</sup>. The actual park areas across the nation account for only 46.4% of the land allocated for parks, far lagging behind those of other global cities<sup>9</sup>) There is no specific global standard related to this while the World Food and Agriculture Organization (FAO) recommended 9.0m<sup>2</sup>. As of 2012, the park area per capita in major global cities<sup>9</sup>, and the allocated land for parks takes up 5.35% of urban areas in the country, which

- 3 Land equipped with facilities used for the general public's living for health, relaxation and sentiment, determined and publicly notified as a park or green tract of land by the National Land Planning and Utilization Act, shall be classified as park.
- 4 Land for physical training facilities, such as the sports complex, gymnasium, baseball ground, golf course, ski field, riding course, cycle race track which are equipped with facilities and form to be adequate for physical activities for promoting national health, and the site for appertainment facilities connected thereto, shall be classified as "gymnasium site". Provided, That land for the tennis court, golf practice range, indoor swimming pool, physical training hall, yacht course, canoe course making use of flowing water, and camping ground, etc. in the forests, all of which fall short of the permanence and independency as physical training facilities, shall be excluded.
- 5 Land for the swimming pool, pleasure boat resort, fishing spot, playground for children, zoological garden, botanical garden, folk village, race course, etc., which are comprehensively equipped with the facilities to be adequate for amusement, relaxation, etc., of general public, and the site for attached facilities connected thereto, shall be classified as "recreation area". Provided, that a site for board and lodging facilities and a pleasure resort recognized to be independent in view of distance, etc. from the said facilities, and what is classified into the river, ditch or marsh (limited to what is publicly owned), shall be excluded.
- 6 Land partitioned in order to preserve the historic relics, historical spot, monument, etc. which are designated as cultural properties, shall be classified as "historic site". Provided, that the land partitioned in order to preserve the relics, historical spot, monument, etc. located within the land of different land category, such as school site, park, religion site, etc., shall be excluded.
- 7 The allocated park area in Suwon doesn't include Mt. Gyanggyo and Jijidae Park. That explains why the allocated park area per capita in Suwon is below the national average. However it still outnumbers the national standard of 12.5m<sup>2</sup>.
- 8 Data on the allocated park area per capita from Statistics Korea ([www.index.go.kr](http://www.index.go.kr))
- 9 There is no specific global standard related to this while the World Food and Agriculture Organization (FAO) recommended 9.0m<sup>2</sup>. As of 2012, the park area per capita in major global cities is as follows.

Cities	Berlin	London	New York	Paris	Tokyo	Seoul
Park area per capita (m <sup>2</sup> )	24.5	24.01	22.89	17.88	5.01	4.53

**Table 2. Rate of parks compared to total urban areas of cities in South Korea as of 2016**

Unit : m<sup>2</sup>, %

Name of Cities	Size of urban areas(m <sup>2</sup> )	Size of allocated land for parks in cities(m <sup>2</sup> )	Actual size of land for parks in cities(m <sup>2</sup> ) <sup>a</sup>	Rate of the allocated size of land for parks compared to that of urban areas	Rate of actual size of land for parks compared to urban areas
Total	17,609,522,529	942,241,684	437,306,053	5.35%	2.48%
Seoul Special City	606,114,295	137,036,724	79,660,710	22.61%	13.14%
Busan Metropolitan City	940,825,056	62,410,285	19,971,840	6.63%	2.12%
Daegu Metropolitan City	797,969,025	24,831,432	12,139,061	3.11%	1.52%
Incheon Metropolitan City	580,154,144	44,156,886	32,479,708	7.61%	5.60%
Gwangju Metropolitan City	481,554,450	20,684,839	9,081,777	4.30%	1.89%
Daejeon Metropolitan City	495,546,287	25,200,640	12,943,300	5.09%	2.61%
Ulsan Metropolitan City	755,545,355	36,656,219	10,619,861	4.85%	1.41%
Sejong Special Self-Governing City	140,971,433	22,099,076	21,287,705	15.68%	15.10%
Gyeonggi Province	3,367,486,105	182,480,189	107,884,421	5.42%	3.20%
Gangwon Province	1,027,198,470	38,227,113	10,600,134	3.72%	1.03%
North Chungcheongbuk Province	729,047,038	32,204,498	12,048,026	4.42%	1.65%
South Chungcheong Province	905,131,392	38,940,873	15,657,006	4.30%	1.73%
North Jeolla Province	885,721,699	49,183,240	18,295,770	5.55%	2.07%
South Jeolla Province	1,697,909,454	61,570,889	21,553,299	3.63%	1.27%
North Gyeongsang Province	1,855,416,781	72,423,666	20,215,218	3.90%	1.09%
South Gyeongsang Province	1,889,759,767	85,832,074	31,081,433	4.54%	1.64%
Jeju Special Self-Governing Province	453,171,778	8,303,041	1,786,784	1.83%	0.39%
Suwon	121,138,690	16,321,535.50	8,501,000	13.50%	7.02%

※ 2017 basic statistics of Suwon by Suwon City Government / statistics on urban planning by Ministry of Land, Infrastructure Transportation

**Table 3. Planned size of land by type of park in Suwon**

Unit : m<sup>2</sup>

Children's park	Small park	Neighborhood park	Historical park	Cultural park	Waterside park	Athletic park	Total
552,936.90	121,811.40	13,493,122.20	135,603.80	74,362.00	1,782,134.00	161,562.20	16,321,532.50

※ Source : Basic Plan on Urban Planning of Suwon 2030 (2014)

suggests that Suwon has relatively high percent of allocated land for parks. Cities ahead of Suwon are only Seoul Special City(22.61%) and the planned city of Sejong Special Self-Governing City(15.68%). Such results indicate that Suwon, as a relatively small city has tried hard to increase the rate of public spaces.

**Actual size of land for parks in Suwon** Suwon has been steadily creating more children's parks, small parks and neighborhood parks for citizens. In spite of such efforts, The park area per capita in Suwon is below the nation's average of 8.6m<sup>2</sup><sup>10</sup> as of 2014 according to Statistics Korea ([www.index.go.kr](http://www.index.go.kr)) and this is because that

10 Data on park area per capita from Statistics Korea ([www.index.go.kr](http://www.index.go.kr))

**Table 4. Status of park in Suwon**Unit : m<sup>2</sup>

Year	Children's park	Small park	Neighborhood park	Historical park	Cultural park	Waterside park	Athletic park	Total
2011	498,000	19,000	4,886,000	132,000	68,000	375,000	124,000	6,102,000
2012	496,000	33,000	6,953,000	133,000	67,000	374,000	124,000	8,180,000
2013	494,000	35,000	7,121,000	133,000	189,000	374,000	135,000	8,481,000
2014	493,000	37,000	7,174,000	133,000	85,000	357,000	132,000	8,411,000
2015	494,000	37,000	7,209,000	133,000	85,000	357,000	130,000	8,445,000
2016	501,000	44,000	7,239,000	137,000	93,000	357,000	130,000	8,501,000

※ Basic Statistics of Suwon 2017 / The measurement unit changed from 1000m<sup>2</sup> in the original data to m<sup>2</sup>

**Table 5. Per capita park area in Suwon**Unit : m<sup>2</sup>, total park area / population

Year	2011	2012	2013	2014	2015	2016	Remarks
Per capita park area	5.45	7.12	7.19	6.95	6.91	6.9	

※ Data created by research (numbers truncated to two decimal places)

the natural green areas of Mountain Gyanggyo and Jijidae Park (not included due to the development restriction zone inside the park) were not considered as park areas, and that the population growth in Suwon has been relatively high compared to other cities while its high population density also affected the result. The rate of actual size of land for parks compared to that of urban areas is 7.02%, which is three times higher than the national average of 2.48%, indicating that a significant percentage of urban areas in Suwon is made up of parks.

**Size of greenbelts in Suwon** Greenbelts(or green areas) are regarded as basic infrastructure of cities<sup>11</sup> and are designated spaces to improve the landscape of cities by preventing air pollution and disasters. Green belts are divided into three types: Buffer greenbelts: Greenbelts created to prevent air pollution, noise, vibration, foul odors, and other pollution equivalent thereto, various accidents, natural disasters, and other disasters corresponding thereto, etc.; Scenic greenbelts: Greenbelts created to preserve and improve the natural environment of cities and to upgrade the urban scenery by improving and restoring damaged natural areas; Connecting greenbelts: Linear greenbelts created to organically connect any park, river, mountain area, etc. in urban areas and furnish urban citizens with space in which they can relax, entertain, walk, etc. The size of green belts in Suwon is 1,701,843m<sup>2</sup> as of 2016, and that of Connecting greenbelts is 46,182m<sup>2</sup>. The per capita green belt is about 1.5m<sup>2</sup>.

11 6.(b) of Article 2 of National Land Planning and Utilization Act

**Table 6. Status of green belts in Suwon**Unit : m<sup>2</sup>

Category	Buffer greenbelts	Scenic greenbelts	Connecting greenbelts	Total
2011	1,549,610	353,519	39,675	1,942,804
2012	1,550,620	353,519	39,675	1,943,814
2013	912,458	328,806	7,210	1,248,474
2014	1,365,376	404,209	16,907	1,786,492
2015	1,455,685	407,327	46,182	1,909,194
2016	1,337,969	407,692	46,182	1,791,843

※ Basic Statistics of Suwon 2017

**Table 7. Per capita greenbelts in Suwon**Unit : m<sup>2</sup>, Greenbelt area/population

Year	2011	2012	2013	2014	2015	2016	Remarks
Per capita green belts	1.73	1.69	1.05	1.47	1.56	1.45	

※ Data created by research (numbers were truncated to two decimal places)

### Universal Design Guidelines of Suwon and its application to public buildings

The application of Universal Design Guidelines is important from a policy point of view as it promotes mobility of everyone regardless of age, sex and physical disability. Started by the fifth elected mayor in 2013, Suwon has been working together with public agencies, providing consultation for the application of “Universal Design Guidelines of Gyeonggi Province” and checking the status of the application to basic design plans of public buildings. As part of such efforts, Barrier Free Certification System was adopted to all public buildings in 2017. Currently Suwon is working on changing signs and is applying the Signs of Universal Design to

**Table 8. Progress made in the adoption of the Universal Design Guideline**

Year	Number of buildings	Public buildings where the review on Universal Design application is completed	Details
2015	4 buildings	<ul style="list-style-type: none"> <li>- Culture Center of Yeongtong 2-dong</li> <li>- Happiness Center of Songjuk-dong in Jangan-gu</li> <li>- Welfare Center for the Elderly of Pallandu-gu</li> <li>- Youth Culture Center of Homaesil</li> </ul>	
2016	3 buildings	<ul style="list-style-type: none"> <li>- Public Library of Matan-dong</li> <li>- Gwanggyo Green Forest Library</li> <li>- Community Service Center of Uman 1-dong</li> </ul>	
2017	5 buildings	<ul style="list-style-type: none"> <li>- Administrative Welfare Center of Uman 1-dong</li> <li>- Center of Sports and Culture of Seodun-dong</li> <li>- Administrative Welfare Center of Pyeong-dong</li> <li>- Administrative Welfare Center of Seodun-dong</li> <li>- Administration Welfare Center of Kwonseon1-dong</li> </ul>	Application of the Universal Design Signs to the inside and outside of public buildings
2018	3 buildings	<ul style="list-style-type: none"> <li>- Administration Welfare Center of Yeongtong 2-dong</li> <li>- Welfare Center for the Elderly of Pallandu-gu</li> <li>- Gwanggyo Green Forest Library (in progress)</li> </ul>	

※ Source: Data from Urban Design Division of Suwon City Government

public buildings in consideration of visitors. As of 2018, Suwon is developing its own Universal Design Guidelines of Suwon.

**Car-free Street Project in Suwon** Suwon selected test-bed areas for 'Car-free Day' to create a pedestrian-oriented street culture. With the aim of reducing the



Event held on Car-free Street in Yeongtong1-dong

Car-free Street around Dongsin Elementary School

**Table 9. Car Free Day Project**

No.	Project locations	Organization in charge of project	Number of events held	Estimated number of participants	Remarks
1	Dongsin Elementary School, Manseok Street, Jeongja 3-dong	Resident Representative Meeting of Hyundai Kolon Apartment	6 times	8,000	
2	Jangan-gu Turtle Market in Yeonghwa-dong and Janghwa-dong	Janganmoon Gate Turtle market Inc.	7 times	22,000	
3	Bambam Culture Street in Yulcheon-dong	Bambat Street Promotion Committee	4 times	2,000	
4	Areas around Gosaek Middle School in Pyeong-dong	Gosaek Development Committee	4 times	2,000	
5	Gwonseon-gu Areas along the Omok Lake Park Street in Pyeong-dong	Omokcheon Stream Development Committee	4 times	2,000	
6	Norim Street in Homaesil-dong	Chilbotmul Market Promotion Committee	5 times	2,500	
7	Gongbang Street in Haenggung-dong	Haenggung-dong Village Development Council	5 times	10,000	
8	Paldal-gu From Sinpung Street in Haenggung-dong to Hwaseomoon Street	Association of Haenggung-dong Residents	4 times	10,000	
9	Yeokjoen Maesan Market in Maesan-dong	Association of Store Owners of Yeokjoen Maesan Market	5 times	2,000	
10	Yeongtong-gu Areas around Maetan3-dong Community Center	Maetan3-dong Village Development Council	4 times	5,000	
11	Hwanggok Elementary School, Yeongtong Street in Yeongtong1-dong	Carless Street Promotion Committee	7 times	3,500	

※ Source: Suwon City Government Report 2017

number of cars on the road and spreading eco-friendly transportation means such as walking and bicycles, the project allowed citizens to select the test-bed areas by themselves. Such project has been made possible as the public consensus has been created on the necessity and the positive effects of car-free streets and not-motorized transportation means ever since Suwon's EcoMobility World Festival 2013.

In this Car-free Day Project, citizens suggest various programs and cultural events on car-free streets, and street performances, traditional plays and flea markets have been held by citizens. The Car-free Day Project has been implemented in 11 areas by 2017 and will expand to 13 areas by 2018.

**Dream Playground Project of Suwon** With the 6th elected mayor's promise of carrying out the Dream Playground Project, the city is building creative theme parks, which will help children develop imagination and sensitivity, and is suggesting a

**Table 10. Current status of the Dream Playground Project of Suwon**

	Name of Parks	Location	Size	Details	Remarks
1	Songjuk Children's Park	Songjuk-dong, Jangan-dong	3,592.4 m <sup>2</sup>	Children's participation	
2	Seonil Children's Park	Kwonseon-dong, Gwonseon-gu	2,856 m <sup>2</sup>	Children's participation	
3	Janggogae Children's Park	Uman-dong, Pandal-gu	595 m <sup>2</sup>		
4	Beolmal Children's Park	Pyeong-dong, Gwonseon-gu	1,684 m <sup>2</sup>		
5	Hwangsaeal Neighborhood Park	Hwaseo-dong, Paldal-gu	1,746.3 m <sup>2</sup>		
6	Neighborhood Park No. 44	Pyeong-dong, Gwonseon-gu	9,402.0 m <sup>2</sup>		
7	Owls Park for Children	Mangpo-dong, Yeongtong-gu	1,990.7 m <sup>2</sup>	Newly built (Mangpo District)	
8	Children's Park No. 209	Omokcheon-dong, Gwonseon-gu	1,763.8 m <sup>2</sup>	Newly built (Gotjital District)	
9	Children's Park No. 210	Omokcheon-dong, Gwonseon-gu	1,780.9 m <sup>2</sup>	Newly built (Mangpo District)	
10	Children's Park No. 105	Omokcheon-dong, Gwonseon-gu	10,277.0 m <sup>2</sup>	Newly built (Gotjital District)	
11	Gwonseon 2-dong Square	Kwonseon-dong, Gwonseon-gu	5,533 m <sup>2</sup>		
12	Playground in Woods of Sukji Park	Hwaseo-dong, Paldal-gu	1,000 m <sup>2</sup>	Children's participation	
13	Children's Park No. 152	Seryu-dong, Gwonseon-gu	1,533.0 m <sup>2</sup>	Children's participation	
14	Seryu Culture Park	Seryu-dong, Gwonseon-gu	700 m <sup>2</sup>	Children's participation	
15	Ilwol Neighborhood Park	Yuljeon-dong, Gwonseon-gu	1,500.0 m <sup>2</sup>	Children's participation	
16	Seonangjae Children's Park	Top-dong, Gwonseon-gu	1,900.0 m <sup>2</sup>	Children's participation	
17	Yangjimal Children's Park	Hwaseo-dong, Paldal-gu	3,000.4 m <sup>2</sup>	Children's participation	
18	Hanui Children's Park	Guun-dong, Gwonseon-gu	2,143.0 m <sup>2</sup>		
19	Hanui Children's Park	Maetan-dong, Yeongtong-gu	1,939.1 m <sup>2</sup>	Children's participation	
20	Water Playground of Sukji Park	Hwaseo-dong, Paldal-gu	32,585 m <sup>2</sup>		
	Total		103,238.3 m <sup>2</sup>		20

※ Data from Suwon City, re-edited by a researcher



Seonil Children's Park



Songjuk Children's Park

new model of park creation that involves citizens and children in every phase from planning to construction, going beyond the existing framework of the children's playgrounds. A total of 20 Dream Playgrounds will be created on 103,238.3m<sup>2</sup> of land. In the meantime, designs suggested by children will be reflected as much as possible. To that end, the city government actually made teaching materials to educate children on how to design spaces and Suwon's such efforts were recognized by receiving the Top Prize at the Public Design Award of the Republic of Korea.

## 2. Safety of public space with regard to Indicator 11.7.2

**Crime rate at public space**<sup>12</sup> Information on crime spots is not disclosed by municipalities. In case of the number of crime cases, Suwon had 3,289.1 cases

**Table 11. Number of crime cases in Suwon**

Category	Violent crime	Larceny	Violence	White-collar crime	Corruption of public morals	Other crimes	Special crime	Total
2011	716	6,379	7,673	5,593	283	1,768	14,367	36,779
2012	688	6,878	7,395	5,925	223	2,079	15,044	38,232
2013	712	6,661	7,068	6,613	240	2,320	157,62	39,376
2014	630	6,795	7,357	6,344	253	2,334	17,119	40,832
2015	724	6,520	8,055	7,458	261	2,614	20,023	45,655
2016	652	5,634	7,870	7,155	223	2,599	26,580	50,713

※ Basic Statistics of Suwon 2017/ Gyeonggi Provincial Police Agency

**Table 12. Crime rate in Suwon vs. nation-wide crime rate**

Category	2011	2012	2013	2014	2015	2016	remarks
Crime rate in Suwon	3,289.1	3,330.4	3,341.2	3,376.9	3,736.2	4,118.9	
Nation-wide crime rate	3,750.4	3,796.8	3,903.7	3,767.6	3,921.5	3,884.8	

※ Data is based on research and the nation-wide crime rate refers to data from the National Police Agency.

<sup>12</sup> The crime rate is the number of criminal offenses per 100,000 persons

**Table 13. Comparison between Suwon's crime rate and national crime rate**

Unit: cases (number of criminal offenses ÷ population) × 100,000

Year	Rape	Quasi-rape	Indecent act by force	Other types of rape	Total cases	Crime rate in Suwon	Nation-wide crime rate
2011			547		547	48.9	44.1
2012			548		548	47.7	42.5
2013	144	2	432	31	609	51.6	53.4
2014	131	11	395	12	549	45.4	58.8
2015	157	21	425	23	626	51.2	60.9
2016	124	24	408	14	570	46.2	57.3

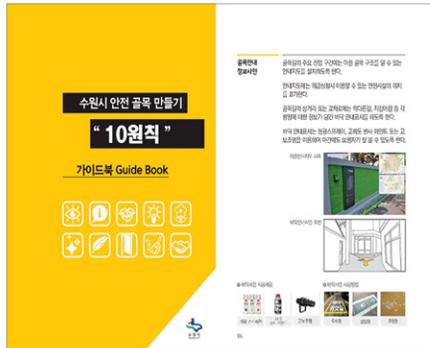
※ Basic Statistics of Suwon 2017/ Open Data Portal

in 2011 and 3,330.4 cases in 2012 and showed lower crime rate compared to the national average, which indicates that Suwon is a relatively safe city. However, Suwon's crime rate was higher than the national average in 2016, which is attributable to the large number of crimes related to the Special Act on Elections were revealed during the general election period in 2016.

**The number of sex crime cases at public space** The rate of crime in Suwon was higher than that of the nation(44.1) in 2011, however, the number has been below the national crime rate ever since 2013, and the crime rate in Suwon and the national crime rate was different by more than 10 in 2016. Such visible difference is attributable to the city's continuous efforts to create safer public spaces.

**10 Principles for Safe Alleys in Suwon** Suwon enacted the “Ordinance on Environmental Design for the Prevention of Crime in Suwon” and set up guidelines on basic principles of design after analyzing risk factors of alleys, the poor environment, etc. The city government published booklets with easy-to-understand design guidelines such as “make it look good,” “provide information,” and “clean the streets,” and these guidelines received the Grand Prize in the category of the Public Design Academic Achievements at the Public Design Award of the Republic of Korea.

**Safe Village Projects in Suwon** Suwon strengthened its effort to create safer public spaces by applying Crime Prevention Through Environmental Design(CPTED) to villages' public spaces that are vulnerable to crime. The projects that the city has conducted for the safety of villages' public spaces include “Happy and Safe Village of Songjuk (Ministry of the Interior and Safety),” “Safe Village Project around Pajang Elementary School(Ministry of Land, Infrastructure and Transport),” “Jidong DDabok Safe Village(Ministry of Justice, Gyeonggi Province),” and “Safe Village of Doran in Maegyo-dong(Ministry of Justice).”



10 Principles for Safe Alleys in Suwon



Safe Village of Doran in Maegyo-dong Project

### III. Conclusion and suggestions

With regard to Target 11.7 of Goal 11, the allocated park area per capita and the actual size of land for park per capita in Suwon are  $13.50\text{m}^2$  and  $6.90\text{m}^2$  respectively. The latter is below the national average as it excludes natural green areas like Mountain Gwanggyo and Jijidae Park, and Suwon's high population density ( $10,248$  persons per  $\text{km}^2$ ), which is much higher than the average of the Seoul metropolitan area ( $2,141$  persons per  $\text{km}^2$ ) and is similar to that of Seoul ( $16,279$  persons per  $\text{km}^2$ ) also affected the result. Under the circumstance, Suwon has been making efforts to secure more land for public parks and green areas and to reduce the gap between the planned size and actual size of parks.

When the per capita park area increases, the proportion of parks and green areas in urbanized areas will increase accordingly, resulting in an increase in the oxygen production rate of the city and bringing various positive effects such as rich vegetation, prevention of heat and alleviated particle pollution. So, the per capita park area can be a very important indicator of sustainable development.

In this regard, the Suwon City Government has put great effort to provide citizens with more public parks and green areas given its relatively small park and green area per person. In addition, ever since EcoMobility 2013, Suwon has introduced "Car-free Day" and Universal Design Guidelines to promote eco-friendly means of transportation and provide citizens with access to public space regardless of sex, age and physical disability. In addition, the city has been building Children's parks by listening to children's ideas about the parks' design.

As Suwon reviewed its general crime rate and sex crime rate to check the level of public space's safety, the results show that both rates are above the national average, indicating that Suwon is a relatively safe city. Suwon has been making

and distributing easy and efficient design guidelines such as 10 Principles for Safe Alleys in Suwon and, with its Safe Village Projects, the city is committed to making public spaces safer for citizens.

As such, Suwon City is exploring various policies that can be implemented at the city government level. Although the city is relatively small, Suwon is committed to providing universal access to public spaces and achieving Sustainable Development Goals(SDGs).

Given that, it seems more important to improve access to neighborhood spaces that are more familiar to citizens than to form large parks and green spaces. In terms of securing safety of spaces, diverse programs are needed to encourage more people's participation. In addition to the current the Haenggung Square, Suwon City needs to diversify the use of more public spaces such as Ssamji Park and other squares and make various programs to attract more people. For citizens, they need to keep themselves interested in and involved in operation of public spaces and programs.

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## Epilogue

### **Diagnosis of Suwon city in the light of global indicators**

The reason for diagnosing cities based on goals and indicators adopted by the international community can be found in the close relationship between cities' sustainability and the global sustainability. UN SDGs Goal 11 specified the targets and indicators for "Sustainable Cities and Human Settlements" is one of the main agendas to be reviewed at the United Nations High-level Political Forum (HLPF) on Sustainable Development in 2018.

Especially, the Global Taskforce of Local and Regional Governments (GTF), which was launched by the global network of local governments in the process of adopting the UN SDGs, committed itself to the adoption of the city-related goal and underscored the important role that local governments should play in promoting sustainable cities. Given the fact that Goal 11 is the result of such efforts, local governments should fully acknowledge their important mission of leading the success of "Goal 11," and the duty of diagnosing the sustainability of cities in the light of global indicators should be fulfilled at the state and local levels.

### **Suwon Implementation Report on SDG11, the first-ever city's report in Korea**

This report was formulated by organizations that play a major role in promoting sustainable development of Suwon. Researchers of Suwon Research Institute (SRI) analyzed the current status and tasks of Suwon based on the indicators of Goal 11. Suwon Council for Sustainable Development which adopted the 10 Sustainable Development Goals of Suwon (10 SDGs of Suwon) in 2017, worked as a supervisor and an advisor to link 10 SDGs of Suwon to the analysis results based on the global indicators and to come up with follow-up measures. With this first report on SDG 11 in Korea, ICLEI Korea Office helped Suwon City connect local government policies with international efforts and to share the identified tasks for the UN SDGs with the international community. Such efforts have

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laid the solid foundation for participation and cooperation of a wider range of stakeholders and for mainstreaming of “sustainability” policy in Suwon.

### **Crucial time for visioning policy goals and directions with specified time-frame by 2030**

This report shows that Suwon City has been promoting tasks and policies in pursuit of all targets of Goal 11 with its commitment to the values upheld by SDGs. In particular, Suwon City has been implementing a variety of policies regarding targets of SDGs and has been leading the efforts to realize SDGs by adopting policies that are not common in Korea.

However, it is hard to find detailed objectives of Suwon's policies in terms of target years. Given the fact that the United Nations SDGs propose 2030 as the target year, this “SDG 11 implementation Report of Suwon” will be used as a tool to re-tune the strategies and approaches of the city's policies with the aim of shaping the vision of a sustainable city of Suwon by the target year of 2030.

### **Data sets: Challenges for analysis based on SDGs indicators**

The universally adopted United Nations Sustainable Development Goal 11 is comprised of 10 specific targets and 15 indicators. This report looked into 7 targets (excluding 3 targets on implementation measures) and 11 indicators and used them to analyze the current status of Suwon.

For the purpose of analysis, the city underwent the process of “setting targets and indicators in the local context of Suwon”, and devoted itself to finding the most appropriate indicators for each target. By doing so, the city analyzed its current status and suggested tasks for the future. Despite the fact that 7 out of 11 indicators are Tier 1 indicators, which means they have a well-established methodology and available statistical data, it was still difficult for Suwon to select data for the analysis. Even for indicators that were easy to find relevant statistical data, they were still not enough to be used as practical indicators to

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evaluate the city in the light of SDG 11 targets.

Even though we reviewed various statistics and related data to overcome limitations of the proposed indicators, finding appropriate data was still accompanied by a number of challenges, and it was only a process to reaffirm the reality that the society's statistical basis is still very weak. It suggests the need for improving the national statistical system and for strengthening the statistical infrastructure at the municipal level of Suwon.

## **Beyond indicators: exploring synergy by linking global goal and local context**

International agreements that were recently adopted by the international community emphasize the necessity of 'sustainable cities' and call on local governments to play a leading role in promoting sustainable cities. The city hopes that this report would be humble beginnings in response to these international requests.

Now Suwon needs more concrete research and policy decisions on how "its future tasks and process of achieving a sustainable city of Suwon" should look like. To begin with, the city needs to remind itself the basic premise: "City is for everyone" and reach an agreement on priority tasks that can drive real changes in the light of its vision, and the process should reflect the needs and demands of various stakeholders while everyone shares roles/responsibilities in an efficient way. In that way, Suwon will be able to grasp the whole picture of a sustainable city of Suwon, and such efforts would create much more policy synergies when they are backed by inter-municipal/inter-local cooperation.

Hopefully, Suwon's such efforts would encourage the participation of many other cities seeking sustainability.

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