Inter-American Development Bank

Korea's Pursuit for Sustainable Cities through New Town Development: Implications for LAC

Knowledge and Learning Sector

Knowledge Sharing Forum on Development Experiences: Comparative Experiences of Korea and Latin America and the Caribbean

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Heeseo Rain Kwon

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Executive Summary

Under rapid urbanization that took place from around 1960 to 1990, the Republic of Korea has been facing various urban problems such as the expansion of urban slum, traffic congestion and environmental pollution. Among the various responses to these challenges, New Town development can be regarded as one of the most successful and effective strategies, which has over 50 years of development history in five phases.

Korea's New Towns were developed with three main purposes according to the periodic needs: industry support, housing supply, and nationwide balanced development. Phase I New Towns (1962-81) responded to the country's need for industry promotion. Phase II (1967-86), Phase III (1989-95) and Phase IV (2001-present) New Towns were built in response to the severe lack of housing emerged due to over-concentration in the capital and later its metropolitan area, by providing large-scale housing inside Seoul, in the outer ring of Seoul, and in the Capital Area respectively over time. Finally, the most recent Phase V New Towns (2005-present) provided response to the issue of equitable and balanced development across the country. These development yielded outcomes such as housing market stabilization, improvement of housing condition, securement of public and green spaces, economic effect on related industries, and expansion of urban infrastructure.

The paper suggests three success factors of Korea's New Town development. First is feasible planning and concrete implementation strategies that enabled the implementing organizations to overcome conflicts and carry on with the project until completion. The second factor is institutional driving force and legal support which involved establishing a dedicated bureau, defining clear organizational structure and stakeholder roles, and providing timely Acts to support the land acquisition and construction. The third success factor is reasonable land acquisition methodologies which evolved over time from Land Readjustment to Publically Management Development. This paper also presents Sustainable New Town Design Criteria as an important implication for the LAC to consider, which includes social, economic and environmental sustainability that pursue outcomes such as social inclusion, self-sufficiency, connectivity, green space and smart resource management.

Exchanging these experience of Korea and promoting mutual cooperation would be highly valuable for the cities in LAC to minimize the trial and error and maximize the success

factors experienced by Korea as an attempt to relieve the challenges of rapid urbanization they are faced with at present. In this regard, it is anticipated that Korea can actively share its accumulated New Town experience and knowledge and act as one of the promising development partners of the countries in LAC.

1. Introduction

The period of Korea's rapid urbanization took place from the early 1960s until late 1990s, after the Korean War (1950-53) along with the seven sets of "Five-Year Plans" of economic development (1962-96). Subsequently, large migration of population to the Seoul in this period caused significant urban problems such as lack of housing and slum formation, traffic congestion and lack of public transportation, and air and water pollution. These in fact are highly comparable to the urban challenges faced by various cities in Latin America and the Caribbean (LAC) undergoing rapid urbanization at present.

Korea enforced a number of policies in order to tackle these urban issues, and among these, the New Town Development can be regarded as Korea's key answer to its urbanization challenges. These New Towns were developed since 1960s in various type, form, scale, and purpose that are suitable for the needs of each time period; and are still being developed at present in accordance with the continuing paradigm shift of urbanization.

The New Towns developed until 2000 were mainly focused on promoting sustainable urbanization by relieving the over-concentration of population and functions in Seoul. From 2000 onwards, the New Towns began to be developed as real means of "Sustainable Cities" with attention to renewable energy, sustainable transport, e-governance, sustainable resource management through ICT, etc. This study will explain the history of Korea's New Town Development by period and purpose.

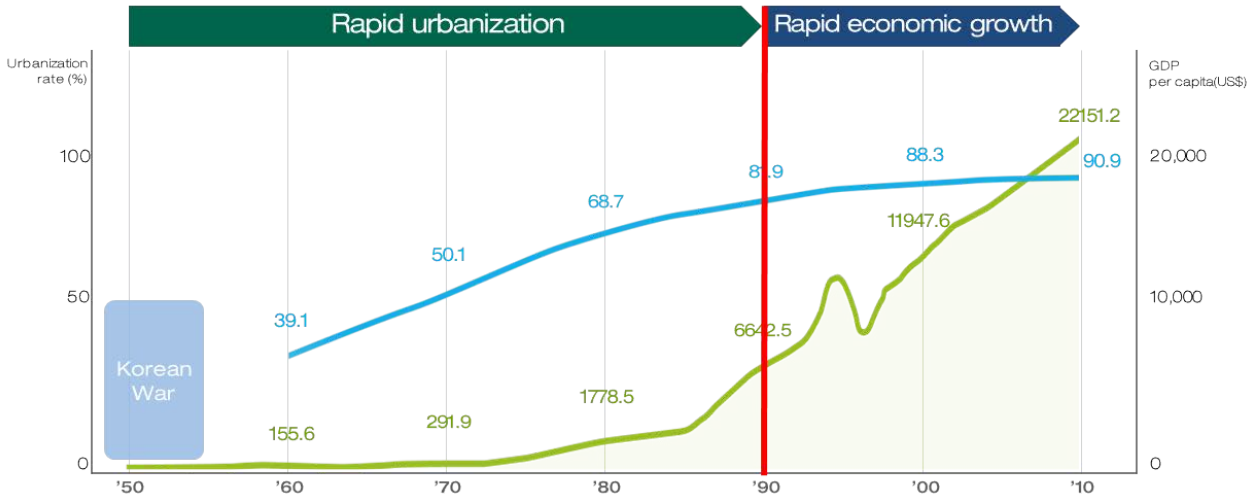
The study will take on the following knowledge sharing approach. Firstly, the report will provide understanding on Korea's urbanization background and identify the challenge that threatened the cities' sustainability. Secondly, Korea's experience on New Town development will be shared as an effective response to tackle the challenges and pursue urban sustainability. Thirdly, the paper will propose lessons learned from Korea's experience of New Town development. And finally, the study's implications will be discussed for the emerging and sustainable cities of LAC.

2. Korea's Urbanization and its Challenges

2.1 Rapid Urbanization and Industrialization

Korea went through a dramatic economic growth since the end of the Korean War in 1953. From one of the poorest countries in the world (GDP per capita of US$67 in 1953), Korea became a G20 and OECD member country with 33rd highest GDP per capita in the world (US$25,977 in 2013). This rapid economic growth of Korea accompanied rapid urbanization of its cities and now more than 90% of the population in Korea resides in urban areas.

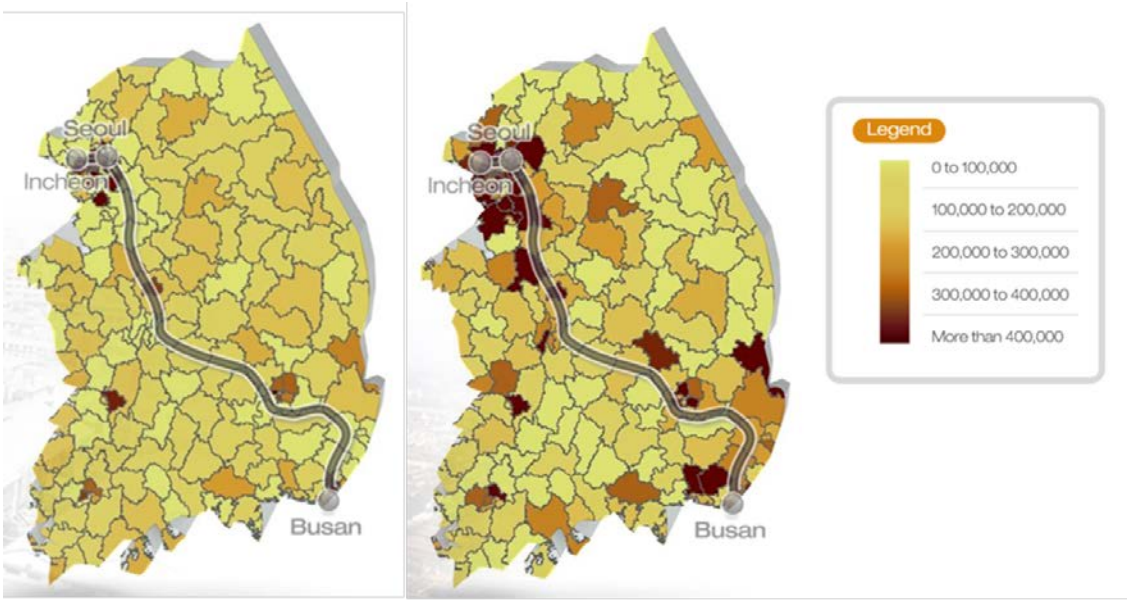
Figure 1 Urbanization Rate and GDP Per Capita (US$) of Korea (1960-2010)



Source: World Bank, 2014. United Nations, 2014. MLIT, 2013.

Urbanization in Korea, or the creation of urban areas, has a large relationship with the industrialization that took place largely between 1960s and 1980s. One of the most important single infrastructure that acted as a catalyst for Korea's economic development was the 416.04km Seoul-Busan Expressway, constructed from 1968 to 1970. Several industrial complexes were formed along this axis to exploit the ease of transportation. Export-oriented and labor intensive industrial complexes were formed in Guro and Incheon near Seoul during the 1960s-70s; heavy chemical and electronic industries were formed in Southeastern area of Korea near Busan during the 1970s-80s such as Gumi and Daegu. The heavy chemical and electronic industries especially accompanied the creation of New Towns to provide residential areas for the employees.

Figure 2 Industrialization and Creation of Urban Areas along Seoul-Busan Expressway



Source: KRIHS, 2015.

2.2 Concentration on Capital Region

Seoul concentrates the highest share of Korea's population and wealth and is three times larger than Busan, the next largest city in Korea. Seoul had only 1 million inhabitants in 1942, and its population grew from 5 million in 1970 to 10 million in 2010. The percentage of population in the capital region increased rapidly during the period from 1960s to 1980s (from 20.79% to 42.81%) and this growth rate slowed down since 1990s. In 2009, Seoul hosted 22% of the country's firms (723,086) and 20.6% of total employment. In the same year, Seoul and the Capital Region accounted for 46.8% of Korea's businesses (1,541,691) and 49.5% of national employment.

Table 1 Population and Urbanization of Korea (1960-2005)

	1960	1970	1980	1990	2000	2005
National population (Thousand)	24,989	31.435	37,407	43,895	45,895	47,041
Urban population (Thousand)	9,198	15,510	26,107	35,873	43,307	45,240
Urbanization Rate	36.8%	50.2%	69.7%	82.6%	93.9%	95.7%
% of population in the capital region	20.79%	29.24%	35.50%	42.81%	46.2%	48.1%

Source: National Statistics of Korea (http://kostat.go.kr).

2.3 Expansion of Urban Slum

After the Korean War, shanty towns of refugees were built around the Cheonggye River and in downtown areas. Also, a group of shacks called “Haebangchon” (Liverticille) was formed around Namsan tunnel by refugees from the North. According to statistics in 1953, there were 2,643 dugout huts and 5,356 shacks in Seoul.

Figure 3 Slums in Seoul in the 1950s

Photo Credit: KRIHS, 2013.

2.4 Traffic Congestion and Environmental Pollution

Cities in Korea, especially the capital Seoul began to suffer from severe traffic congestion from 1980s, followed by explosive urban population growth, dramatic increase in privately owned cars, and great lack of public transportation.

Figure 4 Traffic Congestion and Environmental Pollution in Seoul (1980s)

Photo Credit: Lee, Sang Keon, 2014.

Table 2 Population and Number of Vehicles of Korea

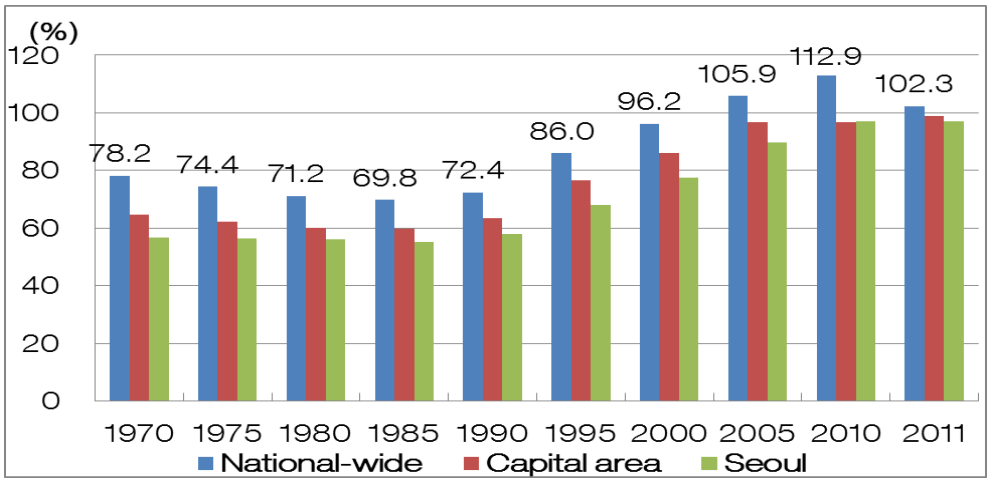
	1960	1970	1980	1990	2000	2010
Population (Thousand)	25,012	32,241	38,214	42,869	47,008	48,747
No. of vehicles (Thousand)	30.8	126.5	527.7	3,394.8	12,059.2	17,325.2

Source: National statistics (http://kostat.go.kr).

2.5 Insufficient Housing Supply

Until 1985, housing supply ratio had continuously decreased because the increasing number of housing units did not keep up with the increasing number of households; however, since 1990, there was a rapid increase in housing supply between 1990 and 1995 (13.6%) and between 1995 and 2000 (9.8%). This increase in the housing supply ration after 1990 resulted from the construction of 2.85 million housing units mentioned in the 2-Million Housing Construction Plan (1988-1992).

Figure 5 Trend of Housing Supply Ratio in Korea (1970-2011)



Source: KRIHS, 2014.

3. New Town Development Solution

3.1 Potentials of New Town Development for Addressing Urban Challenges

New Towns can provide solutions for the increasing urban problems of existing cities. Most importantly, New Towns disperse the over-concentrated population of existing cities to new residential areas and contribute to the housing supply which gets followed by the housing market

stabilization and improvement of housing condition. Inclusion of social housing in New Towns can provide adequate dwellings for the low-income population and possibly discourage the slum formation or expansion. The development gain attained during the process of land acquisition and development gets invested in the expansion of urban infrastructure such as road, railway etc., reducing traffic congestion and resultant air pollution. Also, the land readjustment process during New Town development enables the securement of public and green space, further contributing to the betterment of cities' environmental aspect.

3.2 Development Background of New Towns in Korea by Period and Purpose

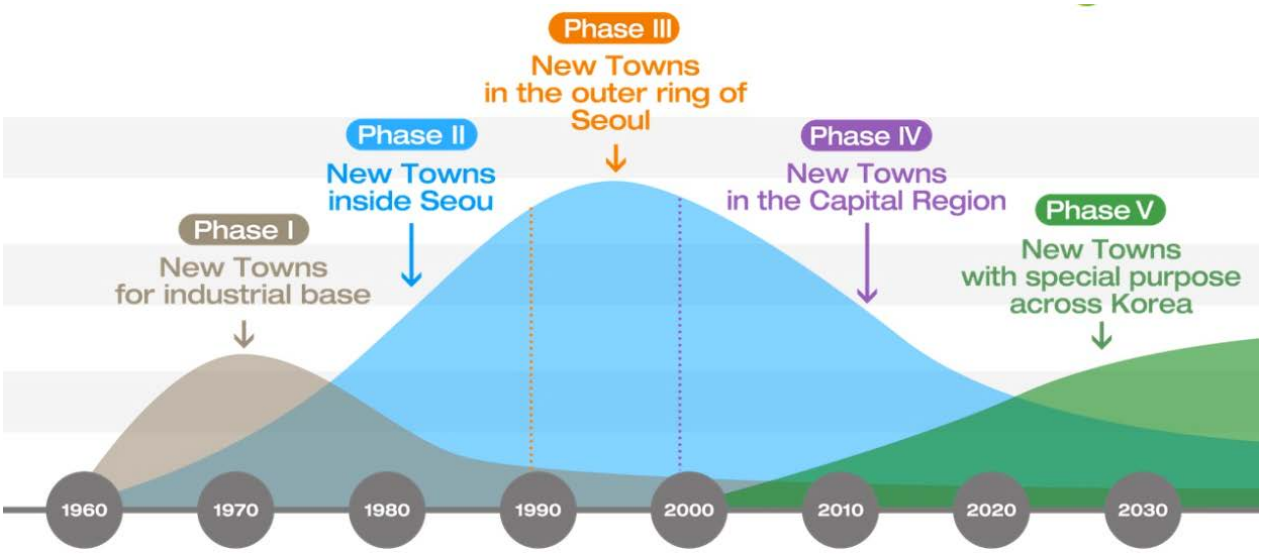
'New Town' can be defined in a broad manner as a new settlement developed in a planned manner. Korea Planners Association defines a New Town as "an urban settlement space newly built based on a comprehensive plan to achieve clear development objectives set in relation to national policy tasks including self-reliant and non-self-reliant settlement space. The New Town Development policies have been implemented in Korea since 1960, to achieve two main goals: to provide solutions to urban problems in large cities and to develop the national territory in a balanced manner. The New Towns developed since 1960s had different purposes according to the periodic needs as below.

Table 3 Korea's Responses to Urban Challenges through New Town Solution

Period	Challenge	Response
1962-81	Needs for industry promotion	Phase I New Towns for industrial base
1967-86	Lack of housing in Seoul	Phase II New Towns inside Seoul
1989-96	Over-concentration of Seoul	Phase III New Towns in the outer ring of Seoul
2001-present	Over-concentration of Seoul's periphery Lack of self-sufficiency of Phase III New Towns	Phase IV New Towns in the Capital Region
2005-present	Over-concentration of Capital Area Needs for balanced national development	Phase V New Towns with special purpose across Korea

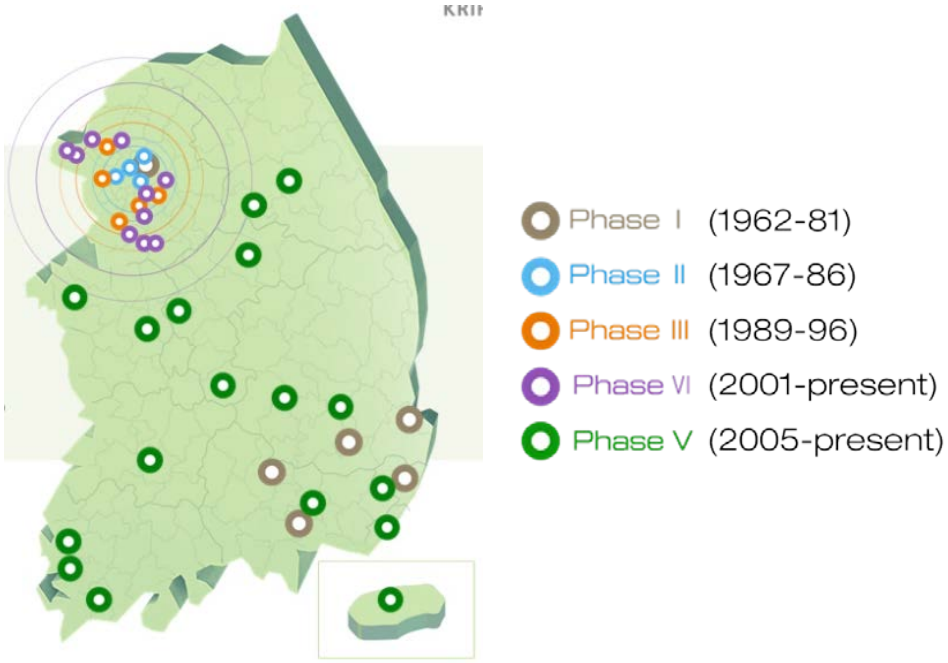
*Source:*KRIHS, 2015.

Figure 6 Chronological Evolution of Korean New Towns in Five Phases



Source: KRIHS, 2015.

Figure 7 Map of New Towns Developed from 1960s to Present



Source: KRIHS, 2015.

Phase I (1962-81) New Towns for Industrial Base

In the 1960s, under the leadership of President Chunghee Park and his economic staff, Ulsan

(1962) and Pohang (1968) in the southeastern region of the country were developed into industrial New Towns followed by the Korea Industrialization Master Plan and the 1st Economic Development Plan. This period accompanied the enactment of Urban Planning Act (1962), Land Acquisition Act (1966), Land Readjustment Act (1970) and Local Industry Development Act (1970) to encourage such New Town developments. The master plan for Ulsan industry complex was first initiated by Byeongcheol Lee, the former CEO of Samsung Group, and was constructed in six phases. Along with the shipping industry under the dedication of Jooyoung Jeong, the CEO of Hyundai Group, Ulsan developed into a vitalized industrial town for also petrochemical, fertilizer, and automotive industries.

In the 1970s, New Towns were constructed to respond to change in external security environments as well as economic growth. The government constructed Gumi (1973), Changwon (1977), and Yeocheon (1977) also in the southeastern region of the country to expand exports promote higher value-added industries such as mechanical and electronic industries to replace the existing light manufacturing industry.

Phase II (1967-79) New Towns inside Seoul

From 1960s onwards there was a remarkable population increase in large metropolitan areas. In 1960, the boundary of Seoul was limited to the north of Han River; however it began to be expanded to the south of river from 1966 to disperse the highly concentrated population and urban functions. Yeoido (1967) and Gangnam (1968) were developed in the south of Han River as new sub-centers of Seoul (CBD) through large-scale land readjustment projects in this period. In 1968, the government developed a large-scale residential district in the 9,900ha area of Gyeonggi province outside Seoul called Sungnam to relocate one million residents of unregistered shantytowns from Seoul.

As part of the strategy to relieve Seoul's over-concentration, several New Towns were built in the outskirts of Seoul, including Banwol (1977) to disperse the manufacturing factories, Jamsil (1971) to further disperse the CBD function, and Gwacheon (1979) to disperse the administration functions.

Phase III (1989-96) New Towns in the Outer Ring of Seoul

In 1989, in order to respond to Seoul's rapid increase in housing prices, the government built five

new towns in the periphery of Seoul from 1989 to 1996: Pyoungchon, Bundang, Ilsan, Sanbon, and Jungdong. The total development area of these five New Towns was 50.1km^2; about 292,000 residential units for 1.17 million people were accommodated to stabilize the housing market in Seoul.

Figure 8 Map of Phase III New Towns (left) and Phase IV New Towns (right)

Source: KRIHS, 2015.

However, this Phase III New Towns carried along some disputes such as excessive population concentration in the capital region and severe traffic congestion. To handle these issues, the government suggested a national territory development framework based on the "Planning first, develop later" principle and began to develop new town master plans which improved the issues of the Phase III New Towns.

Phase IV (2001-present) New Towns in the Capital Region

Ten New Towns were proposed around the capital region (Seongnam Pangyo, Hwasung Dongtan, and Gwanggyo, for example) and two cities in the countryside (Asan and Doan). The total development area of these cities is 164km^2 with about 712,000 residential units under construction.

Pangyo, Dongtan and Wirye New Towns are planned to share the burden of housing demand in Gangnam area in Seoul. Gimpo, Paju, Geomdan would provide housing and serve as a stronghold of Gangseo and Gangbuk area in Seoul. Gwanggyo New Town is planned to take

hi-tech and administrative functions for the Southern area of Capital Region while Yanju and Godeok Globalization District will share functions to supply stable land and stronghold for northern and southern region of Gyeonggi-do (province), respectively. These 10 additional new towns are planned to have transport networks connecting them with Seoul and other neighboring areas, and will provide high-quality living conditions and self-sufficiency.

Phase V (2005-present) New Towns with Special Purpose across Korea

From 2005, Korean New Towns began to be developed for special purposes, as opposed to the previous focus on residential housing supply. These special purpose New Towns include the new administrative city 'Sejong City', 'enterprise cities' and 'innovation cities'. The development plan of Sejong City was set in 2005 as the government's attempt to disperse the over-concentrated functions of Seoul and achieve balanced national development by moving 36 government ministries and agencies to the newly developed administrative city in the center of Korea. The city was opened in 2012 and most of the government ministries and agencies are expected to be relocated by 2015. Plans for 'enterprise cities' were established also in 2000s, with an objective of attracting private investment for local economic development. Seven enterprise cities were selected across the nation, two for industrial trade, one for knowledge industry and four for tourism and leisure. Ten 'innovative cities' were also chosen in 2005 to disperse public corporations from the Seoul Metropolitan Area to across the nation, including the 'Korea Expressway Corporation' which moved to Gimcheon City in the middle of Korea, and the Korea Electronic Power Corporation to Naju City in the Southwest of Korea.

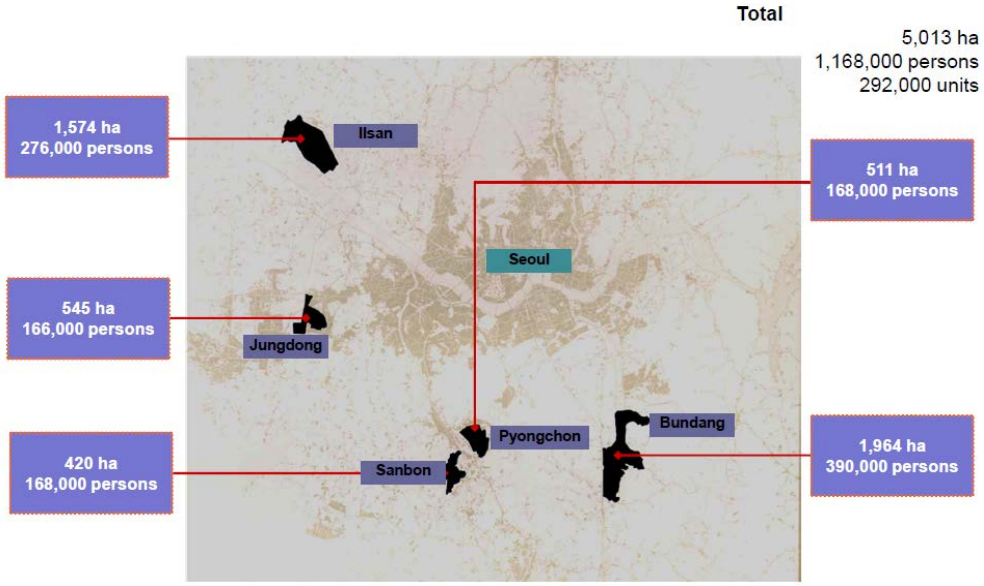
3.3 Paradigm Shift between Phase III and IV New Towns

Details of Phase III (1989-96) New Towns in the Outer Ring of Seoul

The implementation plan for the '2 Million Housing Unit Construction Plan' emerged under the following three contexts of Seoul in the late 1980s. First was the excess in housing demand and slow process in housing supply. At this time period, Seoul's housing supply ratio was only 50.6% with 2.45 million households on the housing waiting list with subscription deposit accounts. Second was the high growth rate of Korean economy and high inflation rate which provided attractive room for development gain. The economic growth ratio was 12% from 1986 to 1988 and the aggregated liquidity (money supply) increased at 17-19% annually. Third was

the steep rise in housing prices and speculation in real estate. There was a large inflow of surplus capital into real estate market while the price of large condominiums in Seoul increased by 57.4%. In the implementation plan, 900,000 of the 2 million housing units were assigned to the capital region. Due to the shortage of available land within Seoul, 400,000 houses were planned to be provided in the areas 20-30km away from Seoul as five New Towns (Figure 9).

Figure 9 Map of Five Phase III New Towns (1990s)



Source: KRIHS, 2014.

Of this '2 Million Housing Unit Construction Plan', 42.5% was designated for public housing under 85m^2, 24% for rental housing, and 33.5% for private housing. The housing supply schedule was as below in Table 4.

Table 4 Housing Supply Schedule of the '2 Million Housing Unit Construction Plan' (1988)

Year		1988	1989	1990	1991	1992
Total housing units (thousands)	2,000 (100%)	340	360	400	430	470
Public housing (under 85m^2)	850 (42.5%)	130	150	170	190	210
Rental housing	480 (24.0%)	85	90	95	100	110
Private housing	370 (33.5%)	125	120	135	140	150

Source: KRIHS, 2014.

Table 5 Overview of the Five Phase III New Towns (1989-1996)

Category	Bundang	Ilsan	Pyeongchon	Sanbon	Jungdong
Development purpose and characteristics	Formed in a greatly undeveloped area in the periphery of Seoul as city on its own		Formed in the undeveloped area next to existing city in the periphery of Seoul, as the existing city' new central business area		
Location	30km southeast of Seoul	25km northwest of Seoul	20km south of Seoul, next to the existing Anyang City	30km south of Seoul next to the existing Gunpo City	20km west of Seoul within the existing Bucheon City
Area	19.6km2	15.7km2	5.1km2	4.2km2	5.5km2
Population (no. of households)	390,320 people (90,758 households)	276,000 people (69,000 households)	168,188 people (42,047 households)	165,588 people (41,397 households)	170,000 people (42,500 households)
Project implementer	Korea Land Corporation	Korea Land Corporation	Korea Land Corporation	Korea Housing Corporation	Korea Land Corporation Korea Housing Corporation Bucheon City
Project period (Y/M)	1989.8-1996.12	1990.3-1995.12	1989.8-1995.12	1989.8-1994.12	1990.2-1994.12

Source: Lee, 2011.

These five New Towns can be divided into two groups: i) the ones that were developed as city on its own in a wide undeveloped area of 15-20km^2 (Bundang and Ilsan); and ii) the ones that were developed in an undeveloped area next to and in link with an existing city as the new central business area (Pyeongchon, Sanbon and Jungdong). Jungdong New Town was a little different in that it was developed in the middle of the existing Bucheon City, hence involved more complex organization of project implementers, composed of all Korea Land Corporation, Korea Housing Corporation and Bucheon City Government (Table 5).

Figure 10 Bundang New Town (1989-1996)

Source: KRIHS, 2014.

Figure 11 Bundang's Land-use Plan and its Focus on Public Area and Areen Area

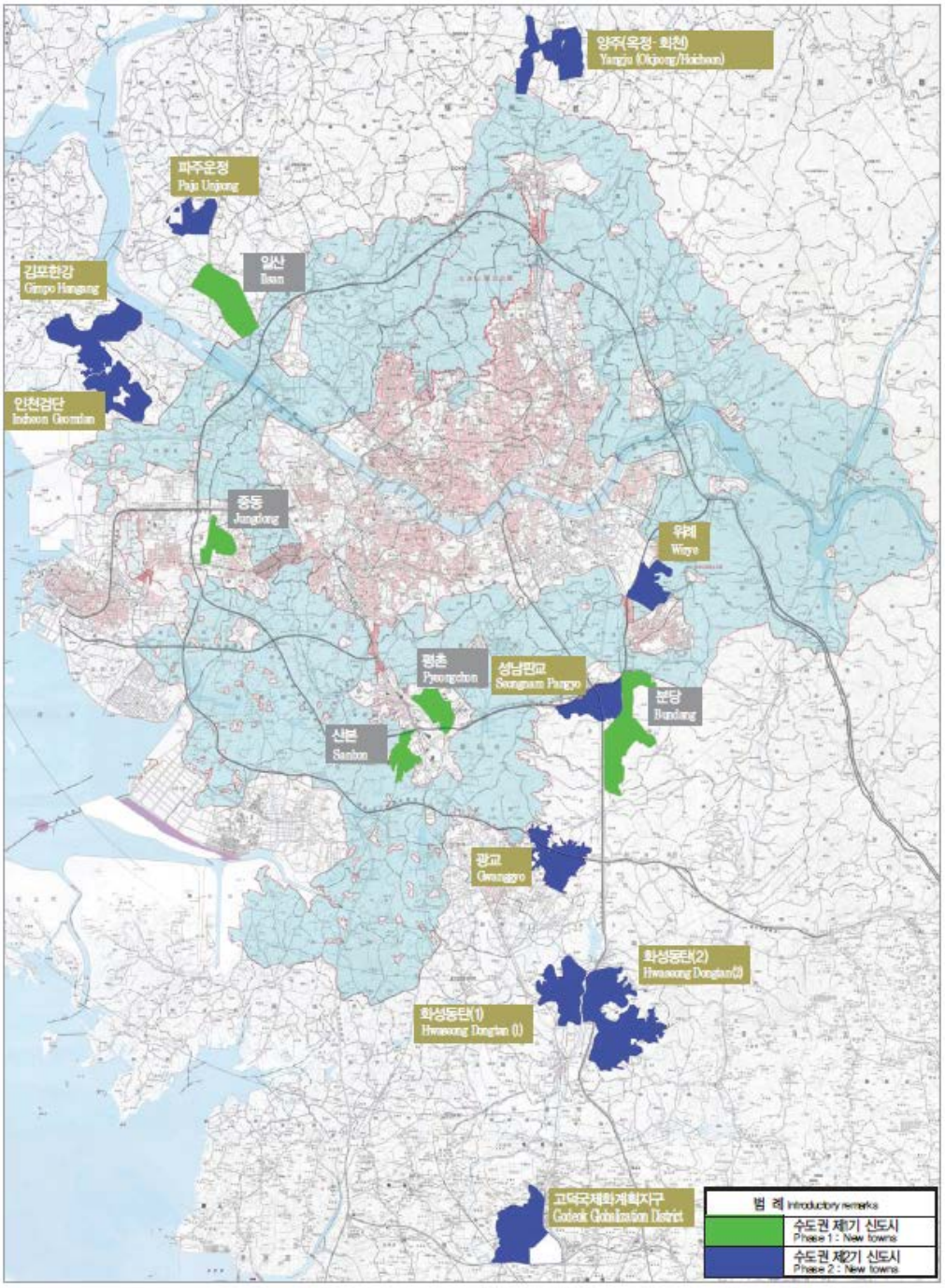
Source: KRIHS, 2014.

Details of Phase IV (2001-present) New Towns in the Capital Region

After the successful construction of the five 1st generation new towns, the government launched a project to build ten more new towns to resolve housing shortages and unplanned, irregular

development that continued in the Capital Region.

Figure 12 First Generation New Towns (green) and Second Generation New Towns (blue)



Source: MLTM, 2012.

Table 6 Overview of the Ten Phase IV New Towns (2001-present)

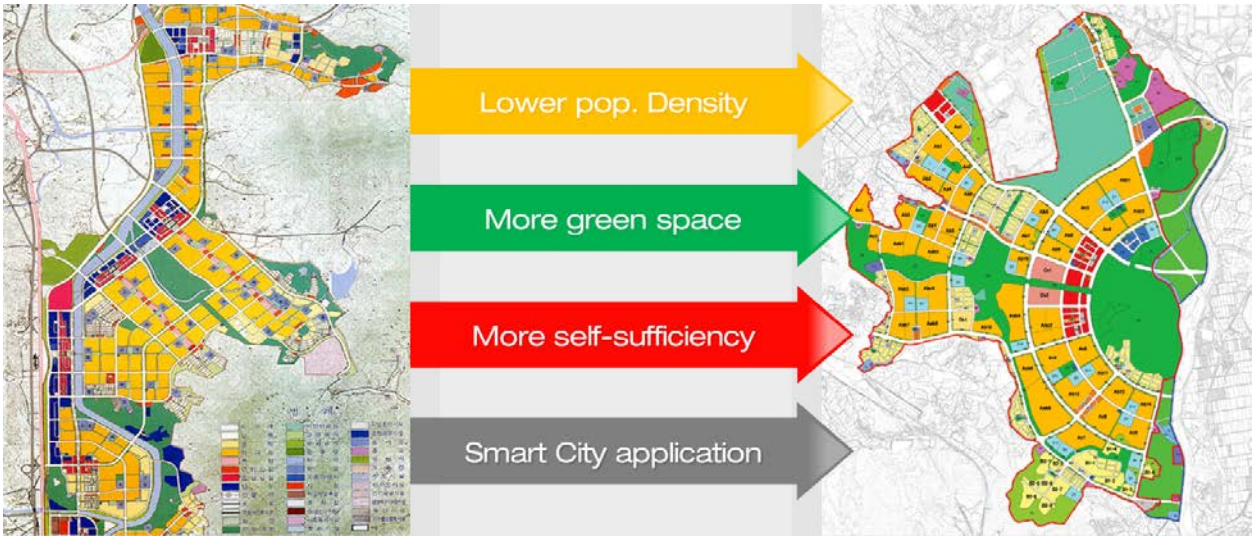
Category	Sungnam Pangyo	Hwaseong Dongtan (1)	Hwaseong Dongtan (2)	Gimpo Hangang	Paju Unjeong
Location	20km south of Seoul	45km south of Seoul	45km south of Seoul	30km northwest of Seoul	30km northwest of Seoul
Area	8.9km2	9.0km2	24.0km2	11.7km2	16.5km2
Population (no. of households)	88,000 people (29,000 households)	124,000 people (41,000 households)	286,000 people (115,000 households)	166,000 people (60,000 households)	212,000 people (86,000 households)
Project implementer	Gyeonggi-do Seongnam-si LH	LH	LH GICO	LH	Paju-si LH
Project period (Y/M)	'03-'12	'01-'12	'08-'15	'06-'12	'03-'17
Category	**Gwanggyo**	**Yangju**	**Wirye**	**Godeok**	**Geomdan**
Location	30km south of Seoul	30km north of Seoul	5km southeast of Seoul	60km south of Seoul	25km northwest of Seoul
Area	11.3km2	11.4km2	6.8km2	13.4km2	18.1km2
Population (no. of households)	78,000 people (31,000 households)	60,000 people (60,000 households)	43,000 people (43,000 households)	58,000 people (58,000 households)	92,000 people (92,000 households)
Project implementer	Gyeonggi-do Suwon-si Yonggin-si GICO	LH	LH SH	Gyenggi-do LH GICO PUC	Incheon-si LH IUDC
Project period (Y/M)	'05-'12	'07-'13	'08-'17	'08-'20	'09-'16

Source: MLTM, 2012.

Comparative Analysis between Phase III and IV New Towns

Some key evolvements were made from Phase III to IV New Towns, overcoming some limitations. First, many of the Phase IV New Towns were built further away from Seoul (average 40km away) than the Phase III New Towns (average 22km away). Being further away from Seoul where the land price is lower helped the Phase IV New Towns to offer lower population density and more green space, improving the quality of life for residents. It also meant that the Phase IV New Towns had to pursue more self-sufficiency, with more focus on the securement of business district and promotion of industry and employment. Also, the Phase IV New Towns introduced latest technology for smart resource management such as the Smart City solution.

Figure 13 Evolvement from Phase III to IV (Masterplans of Bundang and Dongtan)



Source: MLTM (2012), KRIHS (2015).

Table 7 Comparative Analysis between the Phase III and IV New Towns

	Phase III New Towns (1989-1996)	Phase IV New Towns (2001-present)
Average distance from Seoul	22km	40km
Average area	10.02km^2	13.11km^2
Average population	234,019 people	120,700 people
Average population density	23,355 people/km^2	9,207 people/km^2
Land use	Bundang New Town • Residential: 32.4% • Commercial: 4.5% • Business: 3.8% • Green space: 19.3%	Pangyo New Town • Residential: 26.8% • Commercial, business: 3.1% • Land for self-sufficiency (industrial): 4.8% • Green space: 25.0%
Environmental standard	• Parks and green areas ratio: 12.5%-25% • Green space: 9.2m^2/person	• Parks and green areas ratio: 25%-35% • Green space: 26.7m^2/person • Green network, ecological park, waterway etc. • Smart resource management (power plant, waste treatment, water treatment facilities etc.)

Source: Lee, 2011. MLTM, 2012.

3.4 Key Metrics of Relevant Elements of New Town Development Planning

Development Planning for Phase III (1989-96) New Towns

In the late 1980s, site development became unavailable due to lack of developable land within Seoul. This led to the construction of five New Towns in outer rings of Seoul that were designated as green belt area. These five New Towns were planned as integrated new towns equipped with houses, commercial offices and shops, government offices, parks and recreational facilities, athletic facilities, green areas, and other conveniences. The plans for Phase III New Towns were made by the government and developer (mainly Land and Housing Corporation or LH) based on the Housing Site Development Promotion Act which was amended by Act No. 3315, Dec, 1980, which defines general rules of New Town development from designated of prearranged area to attribution of public facilities as below.

Figure 14 Housing Site Development Promotion Act for Phase III New Towns

HOUSING SITE DEVELOPMENT PROMOTION ACT	<Main Contents>
Amended by Act No. 3315, Dec. 31, 1980 Amended by Act No. 3357, Jan. 29, 1981 Act No. 3406, Mar. 31, 1981 Act No. 3642, Dec. 31, 1982 Act No. 3755, Dec. 15, 1984 Act No. 3843, May 12, 1986 Act No. 4429, Dec. 14, 1991 Act No. 4530, Dec. 8, 1992 Act No. 4781, Aug. 3, 1994 Act No. 5109, Dec. 29, 1995 Act No. 5453, Dec. 13, 1997 Act No. 5454, Dec. 13, 1997 Act No. 5688, Jan. 25, 1999 Act No. 5893, Feb. 8, 1999 Act No. 5911, Feb. 8, 1999 Act No. 6068, Dec. 28, 1999 Act No. 6655, Feb. 4, 2002 Act No. 6656, Feb. 4, 2002 Act No. 6841, Dec. 30, 2002 Act No. 6916, May 29, 2003 Act No. 7517, May 26, 2005 Act No. 7678, Aug. 4, 2005 Act No. 7715, Dec. 7, 2005 Act No. 7921, Mar. 24, 2006 Act No. 8014, Sep. 27, 2006 Act No. 8338, Apr. 6, 2007 Act No. 8352, Apr. 11, 2007 Act No. 8355, Apr. 11, 2007 Act No. 8370, Apr. 11, 2007 Act No. 8384, Apr. 20, 2007 Act No. 8819, Dec. 27, 2007	• Designation of Prearranged area • Examination of Prearranged area • Restriction on Conduct • Implementer of Housing Site Development Business • Formation of Housing Site Development Plan • Land Expropriation • Installation of Arterial Facilities • Opening Cost for Housing Site Creation • Attribution of Public Facilities etc. • Restriction, etc. on Disposal of National and Public Lands • Others

Source: MLIT, 2014.

Housing Site Development Promotion Act has been the basic standard for New Town planning. However, having taken a comprehensive approach for the first time, the Phase III New Towns were faced with some criticism for their limitations in self-sufficiency and sustainability. In response, the Korean government enacted ‘Sustainable New Town Planning Standards’ in 2002.

Sustainable New Town Planning Standard of the Phase IV (2001-present) New Towns

After the construction of the five New Towns in Phase III, the government launched a project to build ten more new towns to resolve ongoing housing shortages and unplanned, irregular development that continued to take place in the Capital Region. To ensure high quality for the Phase IV New Towns, the government began to apply the Sustainable New Town Planning Standard from 2004 as well as the Housing Site Development Promotion Act. The Sustainable New Town Planning Standard provides specific standards of New Town Planning and its construction as below, with an emphasis on the following three categories: (i) social mix (social sustainability), (ii) self-sufficiency (economic sustainability), and (iii) environment friendly (environment sustainability).[1]

Table 8 Framework of Sustainable New Town Planning Standard

Category	Components
1.Socio-Cultural Continuity	1.1. Community revitalization 1.2 Expansion of urban infrastructure 1.3.Cultural facility
2. Housing Construction for Social Mix	2.1. Ratio of housing type mix (%)
3.Historic-Cultural Continuity	3.1. Preservation of historic-cultural heritage 3.2. Preservation of cultural landscape
4. Economic Continuity	4.1.Retainment of self-sufficiency 4.2. Creation of reservoir area
5. Environmental Continuity	5.1. Nature adaptive development 5.2 Promoting accessibility 5.3. Public transportation system (e.g, ITS, barrier-free design etc.) 5.4. Energy use and recycling resources 5.5. Creation of ecological environment 5.6. Creation of clean environment 5.7. Establishment of Green-Plan
6. Landscape Formation and Management	6.1. Direction and Scope of Plan 6.2.System of Plan 6.3.Specific standards

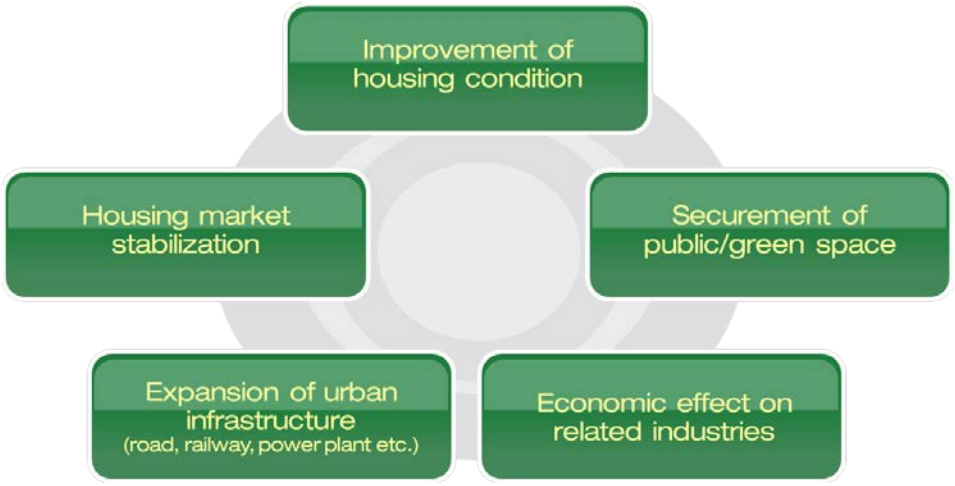
[1] Yet, it is important to know that the Sustainable New Town Planning Standard belongs to each related laws in New Town Development such as Urban Development Act, Housing Site Development Act, Road Traffic Act, Environmental Impact Assessment Act, etc. It means that the Sustainable New Town Standard is subordinated to each higher law.

7. Disaster and Crime Prevention	7.1.Disaster prevention plan 7.2 Crime prevention plan
8. Spatial Design System	8.1.Basic direction of spatial environment design 8.2 Basic plan of spatial environment design

Source: MLIT, 2014.

Through the New Town development experience of over 50 years, Korea has reaped many valuable outcomes. The New Towns approached to tackle Korea's urban challenges stemming from the phenomena such as large rural to urban migration (especially to the capital Seoul), i.e. rapid urbanization and resulting over-concentration of population, by providing large-scale housing incrementally in a diffusive manner according to the periodic needs: starting from inside Seoul (Phase II), then in the outer ring of Seoul (Phase III), in the Capital Region (Phase IV) and across the nation (Phase V).

Figure 15 Outcomes of the New Town Development in Achieving Urban Sustainability



Source: KRIHS, 2015.

As shown in the diagram above, from this large-scale supply of modern housing, two of the evident outcomes were housing market stabilization and improvement of housing condition, thus preventing the expansion of urban slums resulting from lack of housing. The New Town's attention to social mix and provision of units for the lower income population has gradually improved over time as well. Also, the publically managed development method has effectively geared the development gain to secure public and green space. Later New Towns (Phase IV and V especially) demonstrated their increased focus on environmental sustainability such as the

securement of parks and green area as well as application of advanced technology for efficient resource management in the sectors of transport, water, waste, energy, etc., including the Smart City initiative. The space and revenue generated for public development through development gain also enabled the large-scale expansion of urban infrastructure such as roads, railway, metro, power plant, etc., ensuring the connectivity of New Towns with Seoul as well as with one another, reducing the level of traffic congestion within Seoul and encouraging mode transfer from passenger car to public transportation. Moreover, the New Town development had a large effect on providing economic effect especially on the construction industry as well as other related industries. The Phase IV and V New Towns with increased focus on self-sufficiency and creation of local industry are in the progress of promoting local economic development in underdeveloped regions across the nation.

4. Lessons Learned from Korea's Experience

4.1 Success Factors of Korea's New Town Development

Korea accomplished large achievements in responding to its urban challenges through New Town development initiative since 1960s, by supplying housing and infrastructure in large-scale, making economic effect on related industries, and taking increasingly environmentally-friendly approaches in terms of green space securement and smart urban resource management. This paper suggests for success factors of Korea's New Town development as follows: (i) Feasible planning and concrete implementation strategies, (ii) Institutional driving force and legal support, (iii) Feasible land acquisition methodologies, and (iv) Sustainable New Town design criteria.

Feasible Planning and Concrete Implementation Strategies

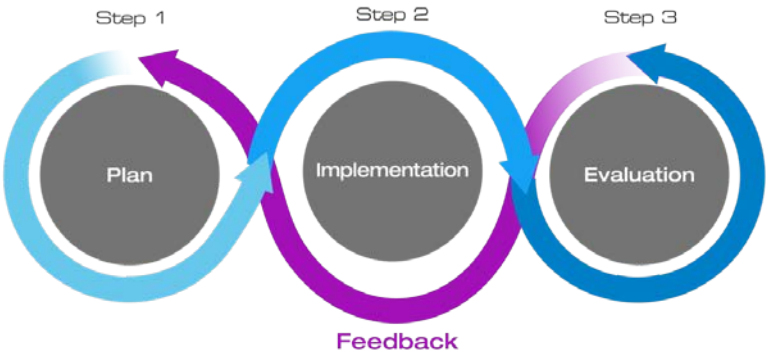
Firstly, feasible planning and concrete implementation strategies were crucial for the success of Korea's New Town development. The New Town development initiative took place in line with Korea's six sets of 5-year economic development plans, in hand-drawn map set out in 1962 (

Figure **16**) when Korea's GDP per capita was below US$200. What enabled the realization of New Town development was the virtuous cycle of plan, implementation and evaluation. Although many of the national development plans in Korea including the New Town, Korea Train Express (KTX) and Incheon International Airport did not escape from facing protests and conflicts, the implementing organizations carried on with the set plans with legal backup system that made the

plans highly difficult to drop, and an evaluation system by national institutions and think tanks that provided valuable feedback to the plan to be updated as needed.

Figure 16 National Land Plan Drawn in 1962 and PIE: Plan, Implementation, Evaluation

Source: Seoul History Museum, 1962.



Source: KRIHS, 2015.

Institutional Driving Force and Legal Support

The second success factor can be identified as the institutional driving force and legal support for the New Town development. The building of five large-scale Phase III New Towns within seven years (1989-96), providing nearly 300,000 housing units, is a good example that demonstrates the institutional driving force. One of the first tasks carried out by the Korean government was establishing a new bureau dedicated for New Town construction within the Ministry of Construction, and assigning the bureau an overarching administrative power with the support of related authorities and public corporations like Korea Land Corporation (now LH), and planning institutes like the Korea Research Institute for Human Settlements (KRIHS) as can be seen in the figures below.

Figure 17 Implementing Organizations of Bundang New Town (1989-96)

Source: KRIHS 2014, 2015.

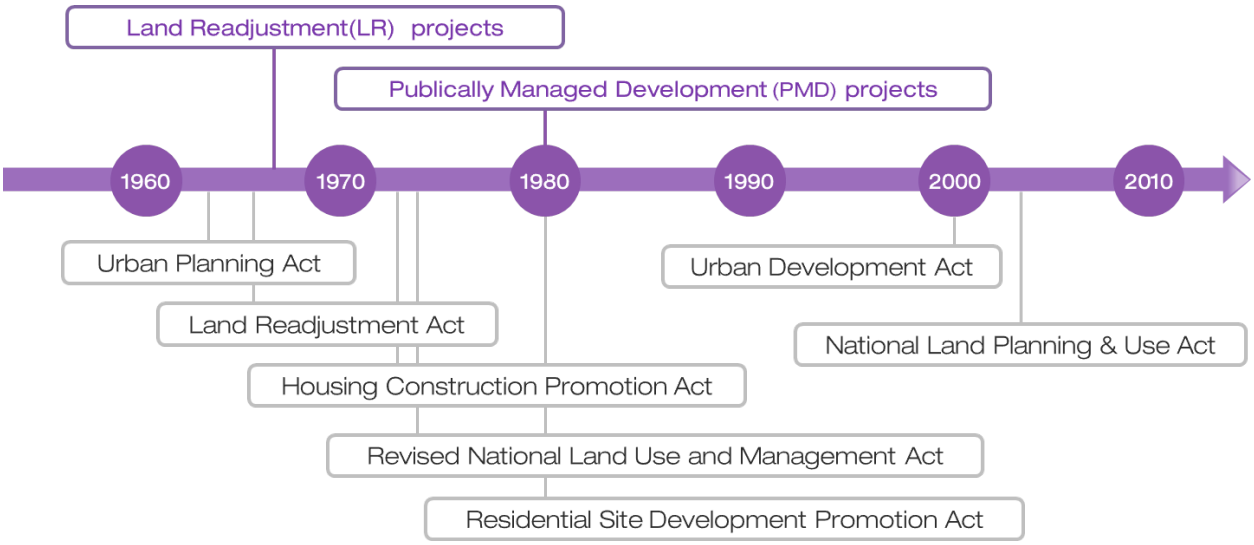
Figure 18 Stakeholder Roles in Bundang New Town (1989-1996)

Stakeholder	Bodies	Role
Central government	Senior Secretary to the President for Economic Affairs, Board of Ministries for Housing Policies, Low-income Housing Bureau	• Mitigate housing prices, disperse population of Seoul • Decide the functions and population of new towns
	New Town Construction Bureau in Ministry of Construction	• Accomplish the national housing policy • Control project, approve basic and action plans, and customize of planning issues
	Public Agencies	• Supply efficiently infrastructures • Construct public facilities such as water, electricity, gas, school etc.
	Korea Research Institute for Human Settlements (KRIHS)	• Perform planning of site master plan, regional transportation plan, and urban design plan and report policy issues
Local government	Seongnam (local government), Gyeonggi (provincial government)	• Control speculation, survey existing buildings, and permit building construction
Developer (public enterprise)	Korea Land Corporation (KLC)	• Implement project (acquisition of land, accomplishment of site master plan, implementation plan, and urban design plan, selling land, construction of roads and parks etc.)
Private sector	Construction companies	• Buy land from KLC, construct and sell houses
	Land owners and residents	• Provide land for development and negotiate the prices of property for compensation

Source: KRIHS, 2014.

The strong institutional driving force was also followed by timely Acts to support the acquisition of land and construction of New Towns, enacted by the Korean government. Established in 1962, The Land Readjustment Act provided an institutional means for 'appropriate compensation' for purchasing lands. Also, as public work projects greatly increased during this period, the 'Exemption Act for Public Land Acquisition and Compensation' was enacted in 1975 to facilitate public land acquisition with proper compensation, providing uniform evaluation criteria, methods, and processes to acquire lands for public works. Accordingly, two development schemes were implemented: Land Readjustment (LR) projects from 1966 and Publically Managed Development (PMD) projects from 1980.

Figure 19 Acts and Development Schemes to Support New Town Development in Korea



Source: KRIHS 2014, 2015.

Reasonable Land Acquisition Methodologies

Reasonable land acquisition methodologies can be suggested as the third success factor of Korea's New Town development. These methodologies include two major development schemes applied for the New Town development: Land Readjustment (LR) projects (1960-70s) and Publically Managed Development (PMD) projects (1980s-present).

Land Readjustment (LR) Projects (1960s-70s)

The Land Readjustment Act enacted in 1966 was mainly used in the 1960s-1970s for the New Town developments in Korea. The concept is that the landowners make their land available for

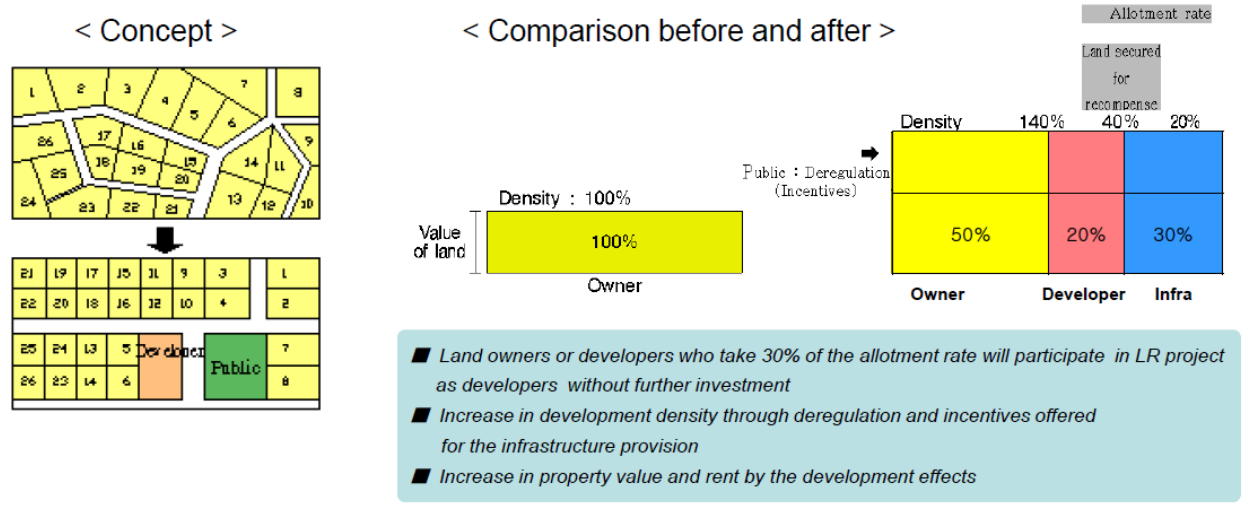
development and receive in return either serviced land or money in proportion to the value of the land they contribute to the project. LR projects are self-financing projects; 30% for infrastructure, 20% for development cost recovery, and 50% for readjusted land to the original land owners. It benefits public sector by saving costs for infrastructure provisions and self-financing development. It also benefits landowners by the expected increase in land price after project completion. The main characteristic of LR projects is that it does not involve land acquisition, compensation or individual resettlement; it functions in an institutional structure of sharing the development gains with the landowners and public developers.

Table 9 Concept of Land Readjustment (LR) Project

Components	Main Concept
Land Readjusted	Grant new property rights to the existing land owners after development, with the consideration of location, land use, and other conditions
Allotment Rate	The ratio of the land provided for recovering development costs and dedicating urban infrastructure
Land Secured for Cost Recovery	Developers dedicate land for infrastructure (including roads, parks, etc., burden the development costs, and gain profits by selling the newly-prepared land

Source: KRIHS, 2014.

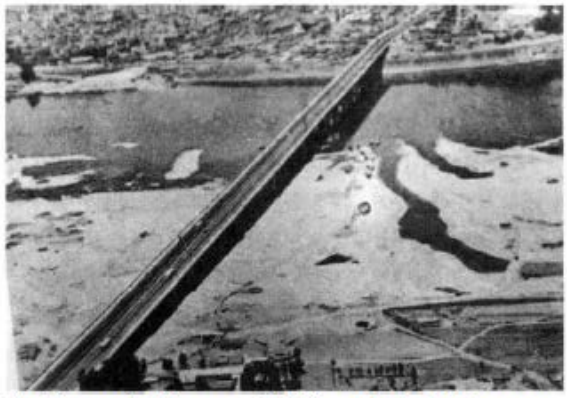
Figure 20 Concept of Land Readjustment (LR) Project



Source: KRIHS, 2014.

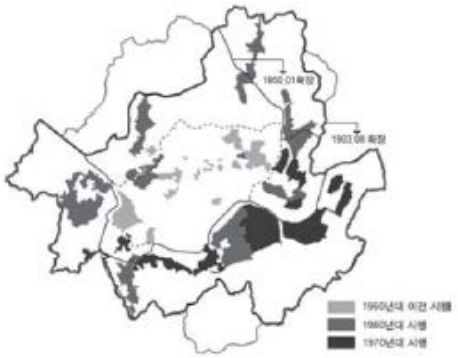
Gangnam area, one of the three major CBDs of Seoul, used to be a farmland of vegetables, fruits and rice in the 1960s. Land Adjustment (LR) was applied to Gangnam in the 1970s along with transport infrastructure. Commercial and office buildings were built along the major arterial roads and housing. Sufficient provision of infrastructure by high allotment rate with good locational advantage was the factor that made Gangnam area a representative CBD with comfortable living conditions in Seoul.

Figure 21 Road Infrastructure along with the Gangnam Development and LR/PMD Sites

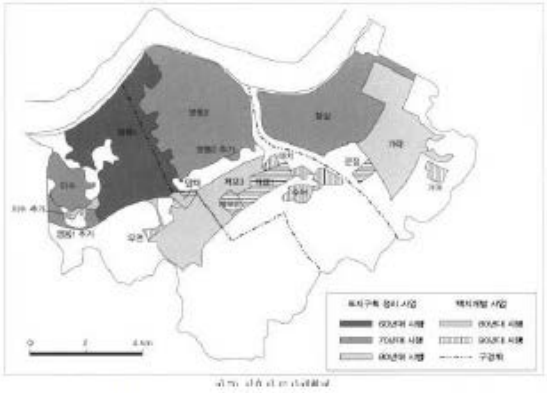


The Hannam bridge opened(1969): a catalyst of Gangnam development

The opening of the Seoul-Busan highway (1970.7) accelarated Gangnam development



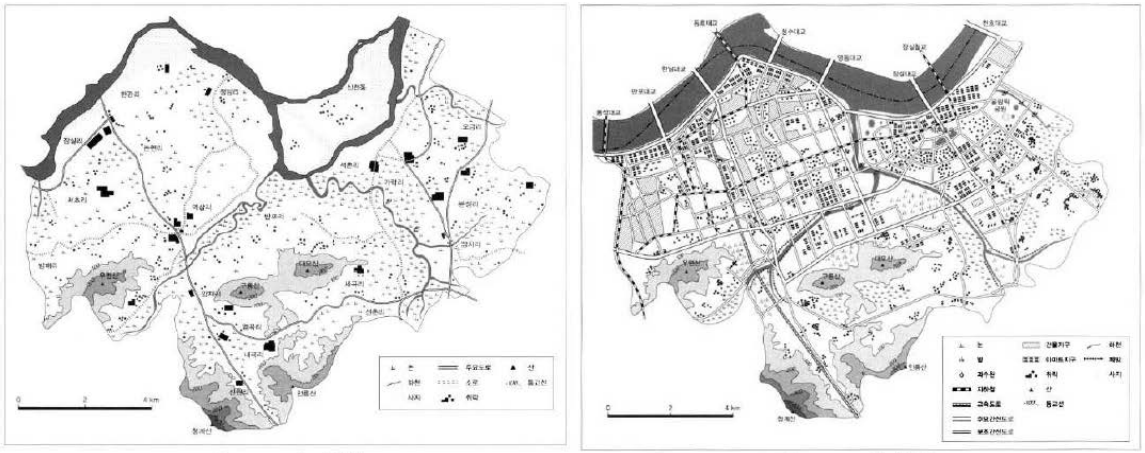
LR projects of the 60s and 70s in Seoul



LR and PMD sites in Gangnam area

Source: KRIHS, 2014.

Figure 22 Map of Gangnam Before and After Development (1957 and 1988)



< Gangnam in 1957 > < Gangnam in 1988 >

Source: KRIHS, 2014.

Despite of its effectivity, there were two major negative effects of the LR project. One was that development gains were solely returned to private landowners, mostly due to the lack of relevant tools to collect capital gains; and the other was inefficient land use of serviced land as LR projects were mostly used for detached housing that are unable to accommodate increasing urban housing needs. Partly due to these reasons, LR projects were prohibited within large cities from 1984, and Public Management Development (PMD) projects became prevalent since the 1980s. LR was later revisited with the enactment of Urban Development Act in 2000.

Publicly Managed Development (PMD) Projects (1980s-present)

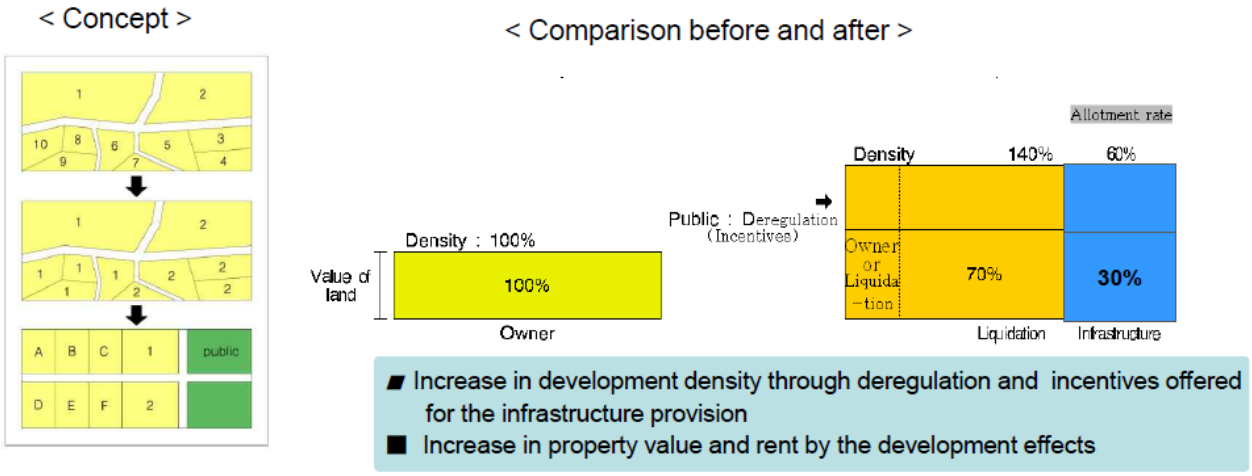
During the late 1970s, land speculation prevailed due to the mismatch of demand and supply of urban land; hence the Residential Site Development Act was enacted in 1980 along with the Publicly Management Development (PMD) of land. The main contents of PMD projects includes the developing of Comprehensive Housing Construction Plans, consulting with the central and local governments regarding the Plan, designating Residential Site Development Planned Zone, and choosing developers from the central/local governments and public enterprises. After 2000, the private sector can join the PMD project with the limitation of 49.9% share. In PMD projects, the administrative process is greatly simplified, the implementing project plans are financed with the developer's own funds, and the services lands are resold in the private market.

Table 10 Concept of Publicly Managed Development (PMD) Project

Components	Main concept
Expropriation	Transfer of the property rights (from the existing land owners to those who will buy the newly-prepared land after the development)
Allotment Rate	The ratio of the land provided for urban infrastructure to the total project site; more development profits are expected than the LR project thus, developers take a higher allotment rate.

Source: KRIHS, 2014.

Figure 23 Concept of Publicly Managed Development (PMD) project



Source: KRIHS, 2014.

4.2 Sustainable New Town Design Criteria

As previously introduced above, the evolving Sustainable New Town Planning Standards played its role in guiding the New Town development in Korea to the direction of increasing emphasis in sustainability. This paper presents the following Sustainable New Town Design Criteria as one of the most import lessons that the countries in LAC can learn from the Korea's experience.

Figure 24 Sustainable New Town Design Criteria

Criteria	Contents	Outcome
Social sustainability	• Securement of housing for the population of middle and mid-low income level - 35% of housing below 60m^2 - 35% of housing between 60-85m^2 - 30% of housing above 85m^2 • Securement of more than 30% of rented housing	Social inclusion
Economic sustainability	• Securement of land for self-sufficiency (i.e. for industrial purpose such as IT, R&D, urban factory, etc.) - Above 15% of land for self-sufficiency for population above 200,000. - Above 10% of land for self-sufficiency for population below 200,000. • Establishment of area-wide transport network plan in order to secure connectivity and business mobility	Self-sufficiency connectivity
Environmental sustainability	• Securement of land for green area - Above 25% of green area for a New Town above 16.5km^2 - Above 23% of green area for a New Town above 9.9km^2 - Above 20% of green area for a New Town above 3.3km^2 • Smart resource management (power plant, waste treatment, water treatment facilities etc.)	Green space Smart City & smart resource management

Source: MLIT, 2014.

4.3 Limitations of Korea's New Town Development

Inevitably, the New Town development in Korea experienced a number of limitations during its implementation from 1960s. Firstly, there were conflicts among stakeholders, especially from the landowners who were unwilling to sell, or demanded large compensation for selling their land to make the New Town construction possible. Also, in the 1960-70s, the Land Readjustment (LR) projects that took place tended to benefit the landowners with the development gain generated. This was later improved to the form of Publically Managed Development (PMD) projects form 1980 in order to gear the development gain more for public benefit, including the securement of public/green space and infrastructure. For developments that did not take place at a totally vacant

land, there were issues about relocating some residents who were already living in the project site. Negotiation and compensation measures were developed becaming more structured and detailed with experience.

There were also social inequality issues, as many of the early New Towns were perceived as new modern housing for the affluent population. As the economy became more mature, later New Towns incorporated more detailed social inclusion measures, defining the ratio of housing size as well as the housing for rent and sale in order to accommodate a population of more diverse economic class.

Another concern that was brought up mainly for the Phase III New Towns was the self-sufficiency issue. As the focus was on providing additional housing for the population who were migrating to Seoul, the New Towns were built in the periphery or in the outer ring of Seoul with mainly residential function. Although they succeeded in solving the lack of housing in a large-scale manner, some criticized these Phase III New Towns are ‘satellite towns’ or ‘bed towns’. There were long commuting issues for the residents of Phase III New Towns initially; however they responded to these criticisms and gradually increased the attraction of companies to generate employment within the New Town. At present, the Phase III New Towns (Ilsan, Pyeongchon, Sanbon, Bundang and Jungdong) accommodate larger business districts than before, allowing more of their residents to work within the Town. As explained above, the development of Phase IV New Town focused on improving this issue of self-sufficiency by securing certain percentage of land for the industrial purpose. This matter of self-sufficiency is addressed even more so in Phase V New Towns with special purpose across Korea. The new administrative capital Sejong City houses the offices of numerous government buildings and public research institutions, while ‘innovation cities’ and ‘enterprise cities’ are vigorously attracting public corporations and private companies, respectively, to locate their offices in less developed parts of the nation

Countries and cities in LAC that consider the New Town approach as a solution to urban problems can take into account and learn from the above mentioned issues that Korea faced in its implementation process.

5. Implications for Sustainable Cities in LAC

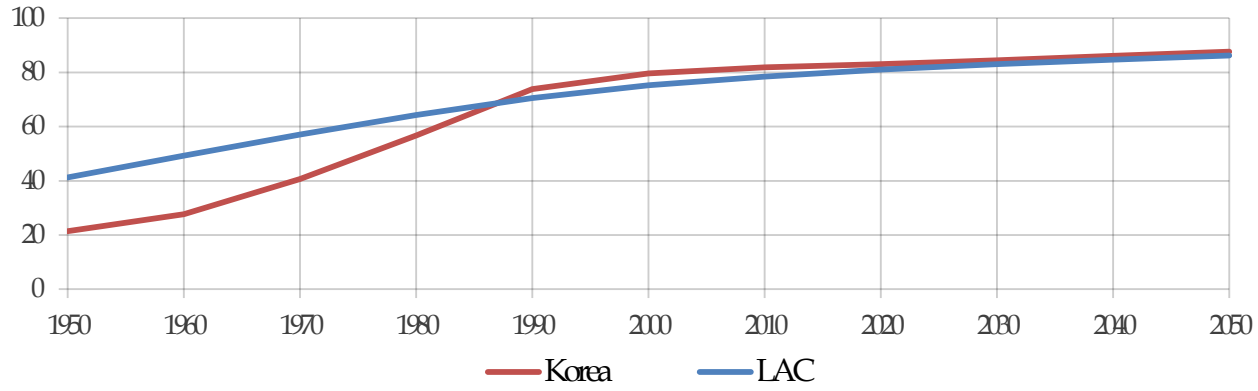
In order to draw some implications for LAC from Korea’s experience in the topic of Sustainable

Cities, the differences of urbanization characteristics and challenges between Korea and LAC will first be addressed, followed by some specific points of consideration for LAC when promoting New Town development.

5.1 Differences of Urbanization Characteristics and Challenges between Korea and LAC

Korea's urbanization history began later than most countries in LAC. However, while LAC countries are at present continuing to and projected to experience high rate of urbanization in the future, Korea's urbanization stabilized from 1990, after 30 years of rapid urbanization since 1960, as shown in the figure below.

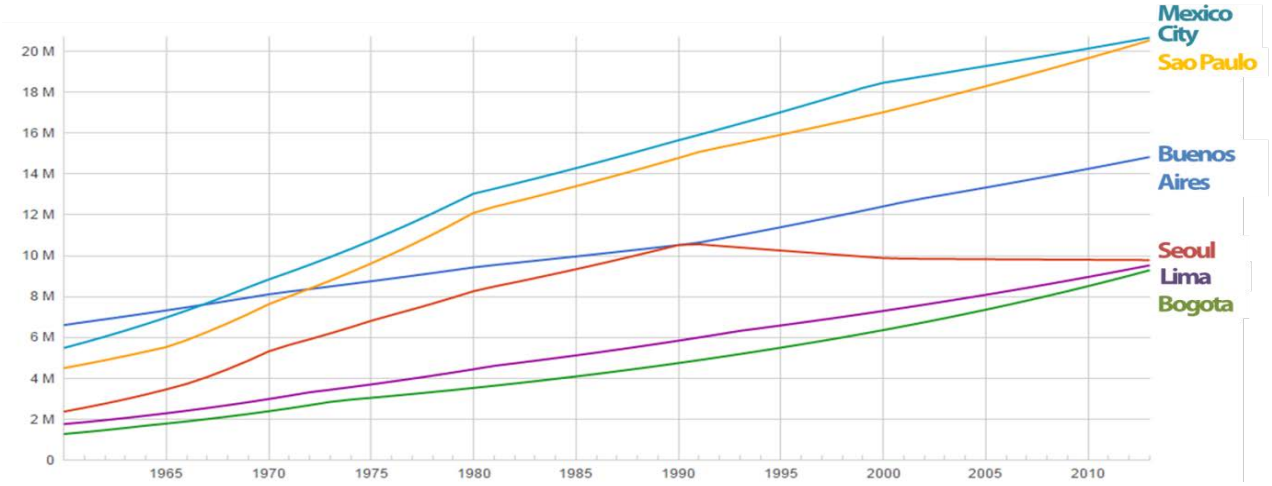
Figure 25 Percentage of Urban Population in Korea and LAC (1950-2050)



Source: United Nations, 2014.

Another indicator that illustrates Korea's turning point in urbanization is the number of urban population living in the country's largest city. While the urban populations of LAC countries continue to concentrate in one major urban center, this phenomenon of Seoul was stopped in 1990 by the government's various urban policies, including New Town Development, as can be seen in the graph below.

Figure 26 Urban Population Living in the Country's City (1960-2014)



Source: United Nations, 2014.

The population of Seoul in 1960 (2.4 million) is similar to that of LAC cities in 2014, such as Belo Horizonte, Brazil (2.5 million); Guayaquil, Ecuador (2.4 million); Madellin, Colombia (2.3 million); Havana, Cuba (2.1 million); and Caracas, Venezuela (2.0 million). Seoul has reached its peak population in 1990 (10.6 million) and since then the population is in a trend of gradual fall.

Table 11 Population of Seoul and its Share of National Population

Year	1960	1970	1980	1990	2000	2010	2013
Area (km^2)	268.35	613.04	627.06	605.34	605.50	605.25	605.20
Population of Seoul (1,000 person)	2,445	5,433	8,364	10,613	10,373	10,575	10,388
Share of national population (%)	9.8	17.6	22.3	24.5	21.5	20.0	21.0

Source: Seoul Metropolitan Government, 2014.

Therefore, Korea's past experience of rapid urbanization, expansion, the success and drawback of its national response to the subsequent outbreak of sever urban challenges, and its increasing pursuit for 'Sustainable Cities' in recent times can bring useful implications for cities in LAC that are facing similar issues at present.

5.2 Points of Consideration for LAC When Promoting New Town Development

Social Sustainability (Social Mix)

New Town projects should consider raising public awareness in order to be given its justification. Hence, Sustainable New Town Standard specifies housing construction standard for social mix. First, the Standard provides the land mix ratio of housing construction by housing type with the ratio of apartment the highest (60-75%). Second, it allocates the size of house in apartment housing type with at least 60% of housing with the size below 85m^2, as indicated in tables below.

Table 12 Land Mix Ratio of Housing Construction by Housing Type

Type	Ratio (%)
Detached house	20-30
Town & Multiplex house	5-10
Apartment	60-75

Source: MLIT, 2014.

Table 13 Size of House in Apartment Housing Type

Size	Ratio (%)
Below 60㎡	25-35
60-85㎡	35-45
Above 85㎡	25-35

Source: MLIT, 2014.

Third, Sustainable New Town Planning Standard allocates 70% of housing for sale and 30% for rental. Last, the Standard gives guidelines of public facilities and regional facilities by population and area of New Town as shown in the Table below.

Table 14 Public and Regional Facilities by Population and Area

Hierarchy	Facility	Population	Area (㎡)
Public Facility	Community Service Office	9,000-30,000	600-700
	Police Office	15,000-30,000	600-700
	Fire Station	15,000-30,000	800-1,200
	Post Office	15,000-30,000	600-800
Regional Facility	Library	20,000-30,000	3,000-5,000
	General Hospital	Total population	25,000-30,000
	Hospital	9,000-12,000	500-1,500
	Sports Center	25,000-40,000	-

Source: MLIT, 2014.

Economic Sustainability (Self-sufficiency and Mobility)

Phase III New Towns were criticized because they were constructed largely focusing on the expansion of residential area to ease the overpopulation of Seoul. Sustainable New Town Planning Standard provides the self-sufficiency criteria to evade becoming a bed town and build up a foundation of regional economy. First, local government and new town developer should establish 'Self-sufficiency Plan' for New Town. Second, they should make a 'Land for Self-sufficiency Facilities'. The size of land for self-sufficiency facilities is differentiated 'distance' and 'intermodal transportation' from mother city (mostly Seoul). Also, the types of self-sufficiency facilities should be considered in land for self-sufficiency facilities. Sustainable New Town Planning Standard defines the type of self-sufficiency facilities as well as the ratio of land for self-sufficiency by size of New Town as described in the below Tables.

Table 15 Type of Self-sufficiency Facilities

Type	Examples
Sales	Department store, shopping center
Business	Office-studio, convention center, government office
Research	University, research and training centers
Distribution	Delivery center, warehouse
Factory	Apartment type factory, urban type factory
Tourism	Amusement Park, hotel

Source: MLIT, 2014.

Table 16 Ratio of Land for Self-sufficiency by Size of New Town

Size of New Town	Ratio of Land for Self-sufficiency
Above 9.9million ㎡ or Population above 0.2 million	Above 15%
Below 9.9million ㎡ or Population below 0.2 million	Above 10%

Source: MLIT, 2014.

Environmental Sustainability (Green Area and Smart Resource Management)

Since 2000s, environmental sustainability has been regarded importantly in Korean society. In this context, New Town Planning Standard provides guidelines for environmental sustainability. First, New Town Planning has to establish a Green-Plan for reducing environmental burden. This includes i) Nature Locational Land-use Plan, ii) Clean Environmental Urban Plan, iii) Plan for

Nature Coexist in Urban Area, iv) Plan for Ecological Circulation in Urban Area, and v) Amenity Plan. These plans are under the Environmental Impact Assessment Act. Second, it secures ratio of parks and green areas based on the size of business district, as shown below.

Table 17 Ratio of Parks and Green Areas

Category	Size of Business District	Standard (Ratio)
Parks and Green Areas	Above 16.5 million ㎡	Above 25%
	Above 9.9 million ㎡	Above 23%
	Above 3.3 million ㎡	Above 20%

Source: MLIT, 2014.

Third, Sustainable New Town Planning Standard provides guidelines for waste disposal facilities and waste water management. Lastly, Sustainable New Town Planning Standard provides guidelines for ubiquitous city (U-City). U-City service can be applied to many aspects in New Town as the below Table shows.

Table 18 U-City Services in New Town

Field	Service	Contents
Public	Environment	Surveillance of Environment (water, air, soil, noise)
	Transportation	ITS, BIS, BRT etc.
	Facilities	Management of Underground(sewage) road, and transportation facilities
	Disaster & Crime Prevention	Natural disaster, Crime
	Administration	e-government, Civil affairs
Private	Biz	Lease of ICT and application facilities, Videoconferencing service for convention and telecommuting
	Home	Remote Control of home appliances and gas
	Education	Homeschooling, Remote lecture, Safety service for students
	Tourism	Tourism information service

Source: MLIT, 2014.

6. Conclusion

This paper has examined the process of Korea's New Town development, its success factors as well as limitations. Through this, the study has also proposed some Sustainable New Town standard and design criteria that can be considered when a country or a city in LAC wishes to consider introducing the New Town initiative. The research team believes that exchanging such experience and knowledge of Korea and promoting mutual cooperation would be highly valuable for the cities in LAC to minimize the trial and error and maximize the success factors experienced by Korea as an attempt to relieve the challenges of rapid urbanization they are faced with at present.

As emphasized throughout the paper, the success of New Town development largely depends on the strong administrative driving force and willingness of the country and/or city government from planning stage to implementation and evaluation. Technical assistance from countries with rich New Town development experience would be greatly beneficial, and along with the funding support from international organizations such as the Inter-American Development Bank, the vision of New Town project can be promising in the LAC region as a response to their ever-increasing urban challenges and pursue sustainability of cities. In this regard, it is anticipated that Korea can actively share its accumulated New Town experience and knowledge and act as one of the promising development partners of the countries in LAC.

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