Transition to Sustainable Forestry Management and Rehabilitation in The Republic Of Korea

Author
Mi Sun Park

Research Institute for Agriculture and Life Sciences
Seoul National University

CONTENT

ABBREVIATIONS

CNTDP	Comprehensive National Territorial Development Plan
KCC	Korea Coal Corporation
KFS	Korea Forest Service
GDP	Gross Domestic Product
GNI	Gross National Income
LCGG	Low Carbon, Green Growth
NEDP	National Economic Development Plan
NFDP	National Forest Development Plan
MAF	Ministry of Agriculture and Forestry
MCI	Ministry of Commerce and Industry
MHA	Ministry of Home Affairs
MLIT	Ministry of Land, Infrastructure and Transport
SFM	Sustainable Forest Management
SU	Saemaul Undong
UNKRA	United Nations Korean Reconstruction Agency

1 BACKGROUND

1.1 Ecological Factor

1.1.1 Geography and Climate[1]

Location and land size

The Republic of Korea is a country in East Asia. The territory of the Republic of Korea is comprised of the southern part of the Korean peninsula, which is located between 33˚7´ and 43˚1N latitude and 124˚11´and 131˚ 53´ E longitude. The land size of the Korean Peninsula comes to about 220 000 sq km, while that of South Korea comes to 99 900 sq km accounting for 45% of the entire peninsula. The Republic of Korea shares land borders with the Democratic Peoples' Republic of Korea to the north, and oversea borders with China to west and Japan to the east. The size of South Korea is similar to that of Hungary, Portugal or Iceland.

Topography

Mountainous areas and inland waters account for three-quarters of the country's entire land mass. Most of the high mountains are located near the East Coast. Thus, the entire topography shows that the eastern section is higher than the western section, with the Taebaek Mountains in the South and the Nangrim Mountains in the North forming the backbone of the peninsula (Figure 1.1).

The total length of the coastline of the Korean Peninsula is about 17 000 km (including islands). Each of the East, West and South Coasts has its own unique characteristics. The steep slopes of the Hamgyeong Mountains and Taebaek Mountains extend into the sea. Thus, the sea along the East Coast is deep. Most of the eastern coastline is relatively straight.

The South Coast forms an archipelago comprised of 2 000-plus islands (mostly in the western section). Jeju Island, the largest of the South Korean islands, is located about 165 km from the South Coast. The West Coast is comprised of relatively flat terrain. Wide reclaimed land has been formed along the coast by utilizing the big difference between the rise and fall of the tide.

[1] It was based on 'the Explore Korea through Statistics 2012' published by Statistics Korea (pp.8~11).

Figure 1.1 Topography of Korea peninsula.
Source: Korean Culture and Information Service (2013[2])

Climate

The country is geographically located in the mid-latitudinal, temperate climate zones and thus the climate has clear-cut temperature changes between the four seasons, with summer and winter longer than spring and fall. In winter, it is cold and dry under the influence of continental high pressure. In summer, the climate is influenced by a hot and humid North Pacific high pressure. In spring and fall, the weather is mostly fair and clear under the influence of migratory high pressure.

With the exception of the mountainous areas in the central section of the country, the annual average temperature comes to 10–16˚C; while it goes up to 23–27˚C in August, the hottest month in the year. Monthly average temperature is 16–19˚C in May, 11–19˚C in October and 6–7˚C below zero in January, the coldest month in the year.

Annual precipitation stands at 1 000–1 800mm for southern areas and 1 100–1 400mm for central areas. 50–60% of annual precipitation occurs in summer. Humidity is particularly high in July and August when it stands at around 80%, nationwide. The humidity falls to about 70% in September and October, resulting in pleasant weather (Figure 1.2). Towards the end of June, a long spell of rainy weather starts in southern areas, including Jeju Island, and spreads northward. It lasts for about a month. Out of about 28 typhoons that develop in the western section of the North Pacific every year, two or three have an impact, either directly or indirectly, on the Korean Peninsula.

[2] http://www.korea.net/AboutKorea/Korea-at-a-Glance/Facts-about-Korea (30th August, 2013)

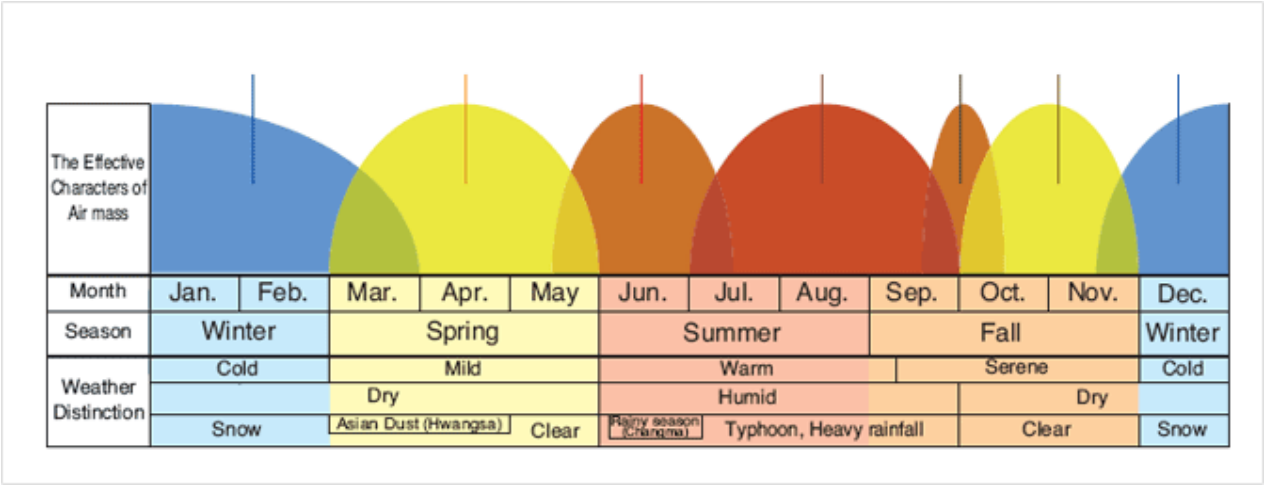


Figure 1.2 Seasonal climate characteristics.
Source: Korea Meteorological Administration (2013[3])

1.1.2 Forest Ecosystem[4]

Due to high proportion of forest area in the total land, flora could be classified following major forest types; warm temperate forest, cool temperate forest, and sub-boreal forest (Table 1.1).

Table 1.1. Major flora.

Forest zone	North latitude	Annual mean temperature	Forest cover type and tree species
Warm temperate forest	Below 35°	Above 14℃	Broad-leaved deciduous forests, conifer and deciduous mixed forests, and pine forests : evergreen broad-leaved trees, Camellia japonica, etc.
Cool temperate forest	Between 35~43° except for alpine regions	5–14℃	Mostly pine forests but a few broad-leaved deciduous forests: deciduous broad-leaved trees, oak trees, pine trees, bamboos, etc.
Sub-boreal forest	Uplands and alpine regions	Below 5℃	Mixed forests: spruce trees, Korean pines, etc.

Source: KFS English homepage (2013)

Large mammals such as tigers, bears, and lynx were once abundant throughout the Korean peninsula. However, many have disappeared due to human settlement, loss of forest habitat and over-hunting. The Siberian tiger has been hardly sighted in South Korea. Bears and wildcats can still be found in the more remote areas, such as Jiri-san and Seorak-san.

South Korea also has several indigenous species of deer, including the roe deer and the Siberian musk deer. Wild boars have been growing more common in recent years, thanks to reduced hunting pressure. One of the most interesting things about the Korean environment is the demilitarized zone

[3] http://web.kma.go.kr/eng/biz/climate_01.jsp

[4] It is a part of English homepage by Korean Forest Service (http://English.forest.go.kr).

(DMZ), a strip of land bordering between two Koreas. It has been untouched since 1953 so it has become a haven for wildlife, particularly migrating birds.

1.1.3 Land Use

Forests comprised 64% of total land with 20% of farm land, 3% of road and 3% of building site (Figure 1.3). For the past several decades, Korean has undergone rapid urbanization and industrialization which expedited population influx into the cities and caused increasing land use for factories and housing. Therefore, total forest and farm land has been decreased while the building sites have been increased. From 1990 to 2010, during two decades forest area has been decreased about 1.6% from 65 571 sq km to 64 504 sq km (Figure 1.4). At the same time, the farm land (upland and paddy field) has drastically decreased about 8.7% from 21 484 sq km to 19 617 sq km. Besides, sandbar which is highlighted because of its environmental importance has been decreased dramatically from 3 204 sq km to 2 489 sq km. It is approximately 22.3% of total sandbar area. However it has maintained its area for recent ten years.

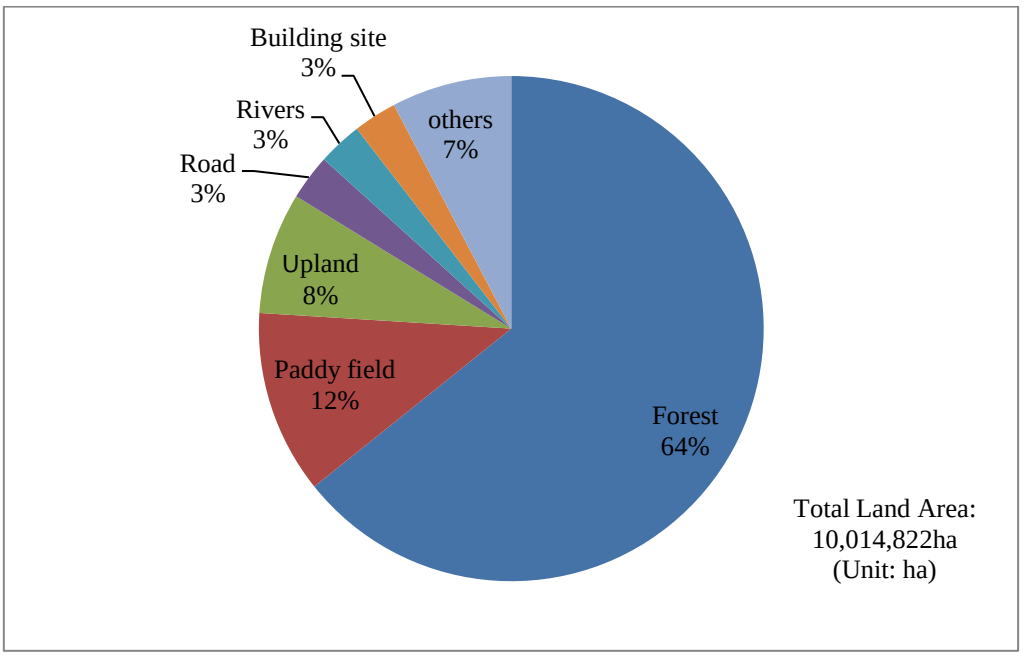


Figure 1.3. The state of land use.
Source: KFS (2012)

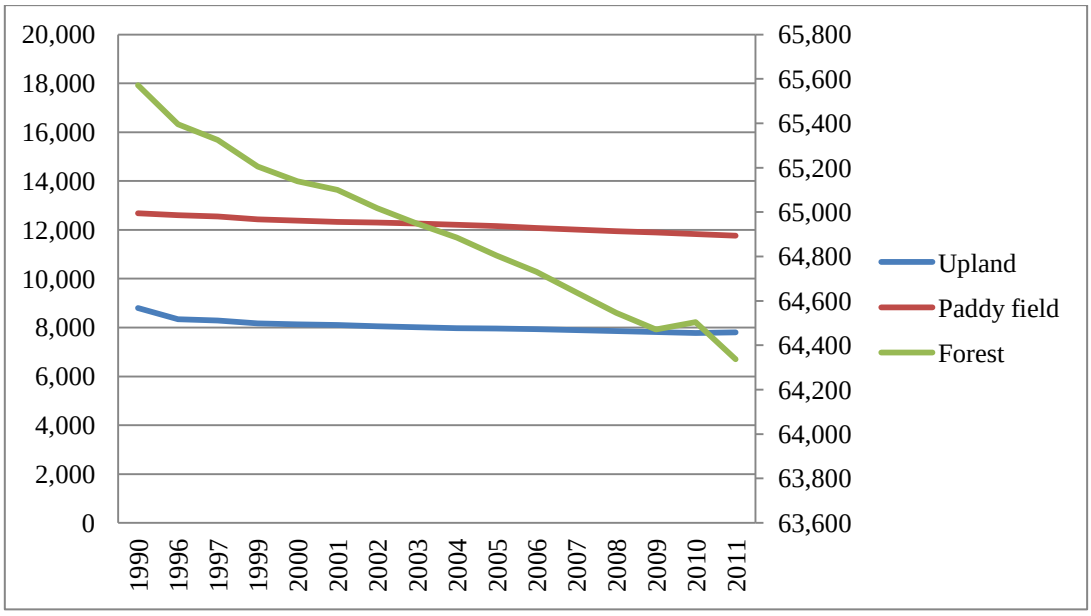


Figure 1.4. Trends of Land Use 1990–2011 (sq km).
Source: MLIT (2012: 24)

1.2 Economic Factors

1.2.1 GDP

GDP is an indicator showing the size of a country's economy. Since 1970 GDP (Gross Domestic Product) of South Korea has increased continuously, except in 1998 due to the economic crisis (Figure 1.5). It is a result of success of national economic development policy. In 2011, the country's nominal GDP (Gross Domestic Product) stood at Won1 237 trillion, a 5.4% year-on-year increase. In U.S. dollars it stood at USD1 116.4 billion, a 10.0% year-on-year increase, helped by an exchange rate drop of 4.2%. In 2010, the country's GDP ranked the 15th largest globally, compared to China (2nd), Japan (3rd) and India (9th).

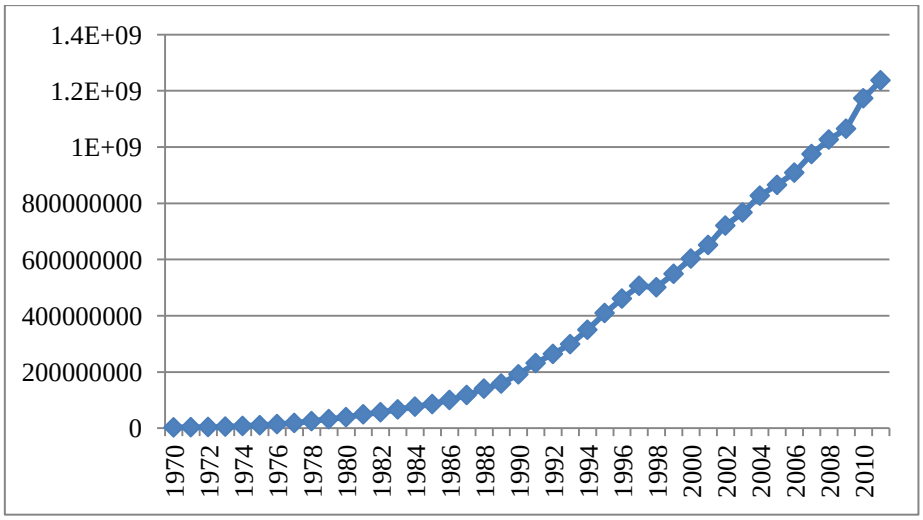


Figure 1.5. Change of GDP in South Korea (USD Million).
Source: United Nations (2013)

1.2.2 Industry[5]

The industrial structure of the Republic of Korea has changed from a typical agricultural country in the 1960s to industrialized country. It is now being transformed into a service industry country. The share of agriculture, forestry and fisheries towards GDP was only 2.7% in 2011, the share of manufacturing in 2011 was 31.2% and the share of services was 58.1% of GDP (Figure 1.6).

Following industrial structure changes, distribution of employment by sector has changed tremendously. The share of agriculture, forestry and fisheries sector towards employment was 63.1% in 1963 but it has dropped to 6.4% in 2011 (Statistics Korea, 2012: 26). On the other hands, mining and manufacturing and service sectors has been increased (Figure 1.7). The share of mining and manufacturing of employments has been increased from 11.2% in 1963 to 16.9% in 2011. Service sector shows obviously these dramatic increasing of share towards employment. The share of service sector of employment was 25.6% in 1963 but it has multiplied to 76.7% in 2011.

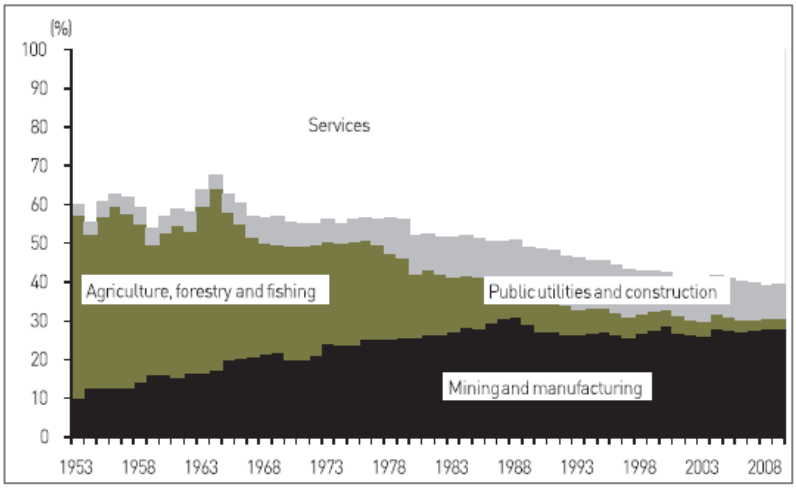


Figure 1.6. Share in gross value-added by sector.
Note: Services include public utilities and construction. Source: Kong and Koh (2010)

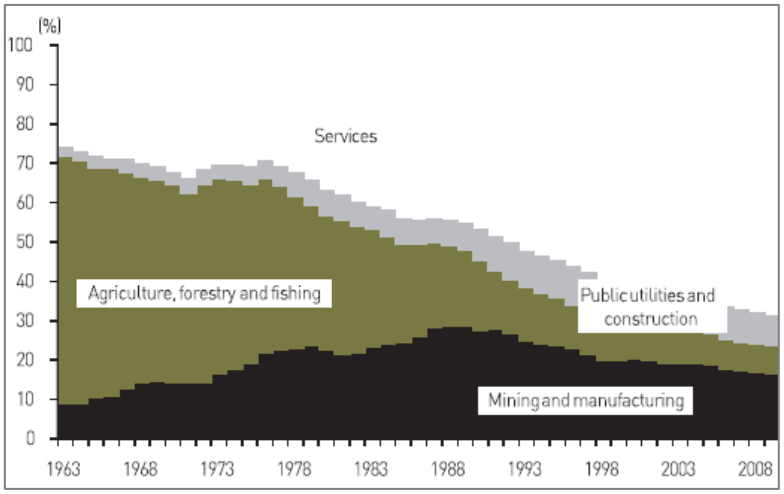


Figure 1.7. Share in total employment by sector.
Source: Kong and Koh (2010)

[5] It includes the part of the book by Kong and Koh published in 2010.

1.3 Social Factors

1.3.1 Population[6]

In 2011, the population of South Korea stood at 49 779 000 and ranked 25th in the world, accounting for 0.7% of the global population of 6 974 040,000. As of 2010, the population density of South Korea stood at 494 person/sq km. With small countries, such as Monaco, Singapore, Malta, Singapore, Malta, Bahrain and the Maldives excluded South Korea ranks third in the world – after only Bangladesh and Taiwan – in terms of population density.

The Korean population grew from 20 million to 50 million between 1949 and 2011. The population growth was particularly strong in the early years, but slowed with the falling fertility rate. In 2009, the population growth rate was 0.3% and the fertility rate 1.15 children per woman (Figure 1.8). The current fertility rate is well below the replacement level of 2.1 and is one of the lowest in the world. With the improvement in nutrition and health care, the life expectancy at birth increased from 52.4 years to 80.1 years between 1960 and 2008.

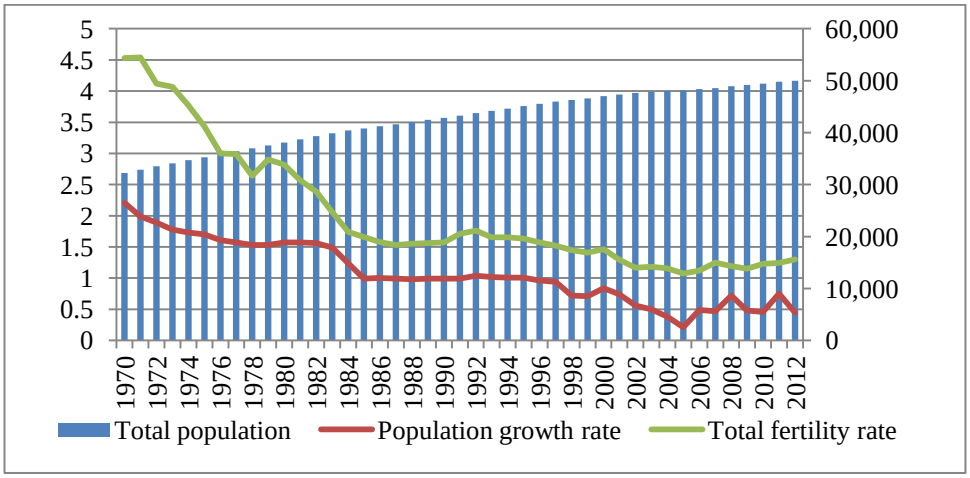
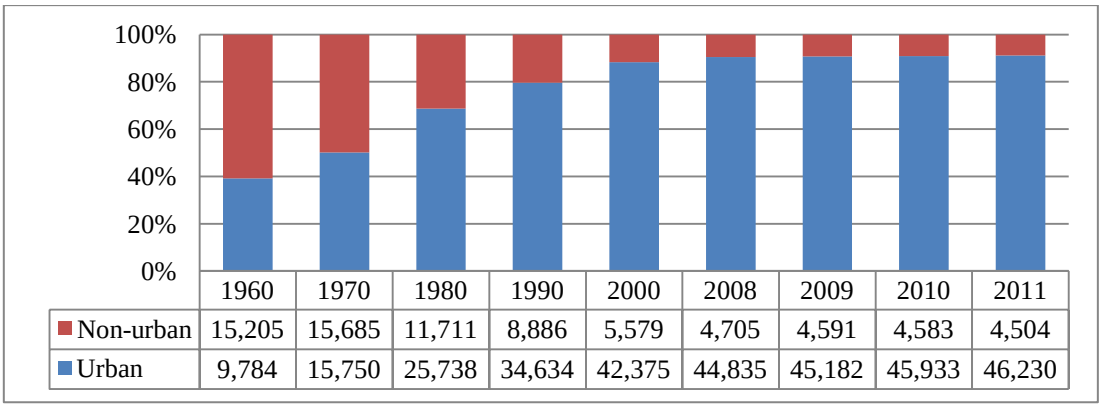


Figure 1.8. Population growth and fertility rate (PGR, TFR (%), TP (thousand persons)).
Source: Ministry of Environment (2013)

1.3.2 Urbanization

Along with industrialization and modernization, huge amount of population has moved from rural area to urban area to seek jobs and education opportunity. Urbanization rate is defined that proportion of population within in urban area of total national population. Regarding urbanization rate, it was 39.1% in 1960 but it became half of the total population in 1970 (Figure 1.9). Finally, 91.1% of total population in Korea lives in urban area in 2011.

[6] This description is based on 'Explore Korea through Statistics 2012' published Statistics Korea.



	1960	1970	1980	1990	2000	2008	2009	2010	2011
Non-urban	15,205	15,685	11,711	8,886	5,579	4,705	4,591	4,583	4,504
Urban	9,784	15,750	25,738	34,634	42,375	44,835	45,182	45,933	46,230

Figure 1.9. Urbanization trends (1000 persons).
Source: MLIT (2012)

Especially, capital region has undergone severe population concentration. Capital regions including Seoul, Incheon, and Gyeonggi province has experienced continuous population influx for more than half century (Table 1.2). According to National Statistical Office, almost half of total Korean population lives in capital region in 2010.

Table 1.2. Population in the capital region (1000 persons).

	1960	**1970**	**1980**	**1990**	**2000**	**2010**
Nation (A)	24,989	30,882	37,436	43,411	46,136	48,580
Capital region(B)	5,193	8,730	13,298	18,587	21,354	23,836
Seoul	2,445	5,433	8,364	10,613	9,895	9,794
Incheon	401	634	1,084	1,818	2,475	2,663
Gyeonggi	2,347	2,663	3,850	6,156	8,984	11,379
B/A	20.8%	28.3%	35.5%	42.8%	46.3%	49.1%

Source: Statistics Korea (2013)

2 FOREST AND FORESTRY

2.1 Extent of forest

The total land area of South Korea is approximately 10 mil ha (KFS 2012: 19). Forest area is about 6.4 mil ha and it is almost 63.7% of total land. Recently, forest area has been decreased due to land conversion to road, building site, factory site and agricultural land etc. However, the decreasing rate of forest area has been much slower down in 2009–2010 compared to before (Figure 2.1).

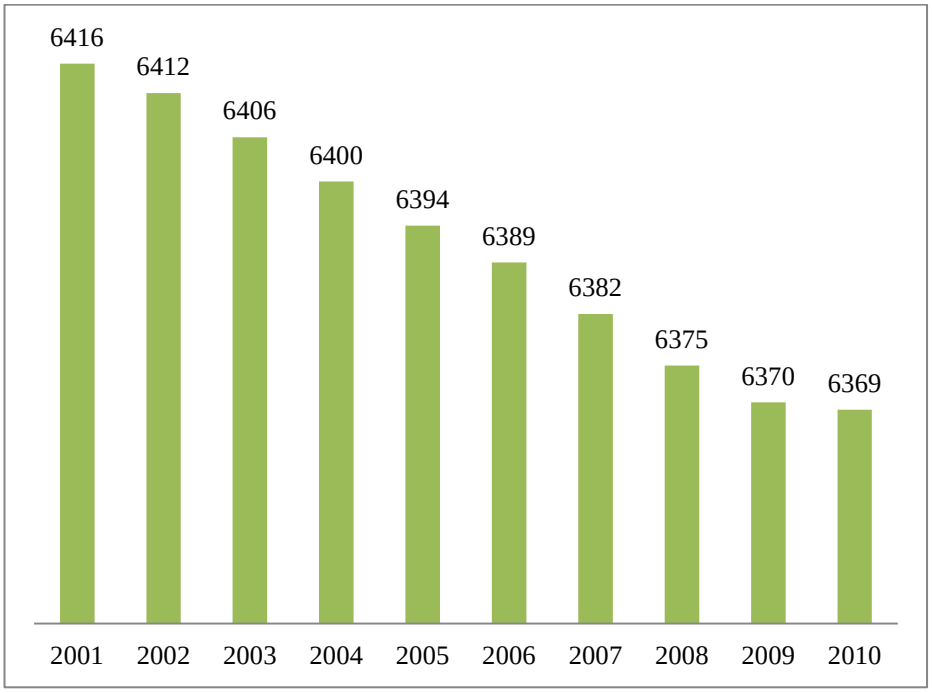


Figure 2.1. Forest Area (1,000ha).
Source: KFS (2012)

Korean forests are composed of coniferous forests (42%). Broad-leaved forests (26%), mixed forests (29%) and other types of forests (3%) (Figure 2.2). Coniferous forest is comprised of *Pinus densiflora* (red pine, 55%), *Larix kaempferi* (Japanese larch, 17%), *Pinus rigida* (pitch pine, 15%) and *Pinus koreiensis* (Korean pine, 9%). Recently, it is observed that the coniferous forest area is decreasing, but on the other hand the mixed forest and broad-leaved forest are increasing.

The total and average volume of growing stock has increased gradually since 1981. In 1981 the total volume of growing stock was 151 mil cu m. The average volume of growing stock is 23.09 cu m/ha. As of 2010, the total volume of growing stock is 800 mil cu m. The average volume of growing stock is 123.6 cu m/ha (KFS 2012: 45).

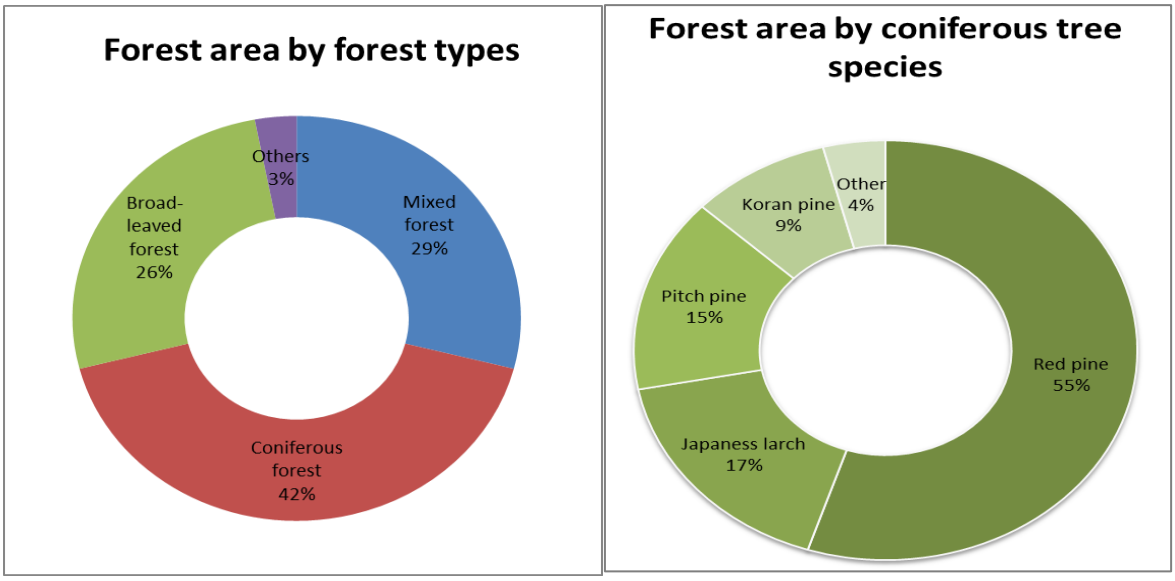


Figure 2.2. Forest area by types and coniferous tree species.
Source: KFS English homepage (2013)

2.2 National Forest Development Plans[7]

i) The First National Forest Development Plan (1973–1978)

In the 1950s, forests were left in a state of extreme devastation as the result of excess cutting during and after the Japanese colonization and the Korean War. To restore these devastated forests causing serious social problems like lack of fuel, severe floods and droughts, the National Forest Development Plan (NFDP) was established.

After the legal and institutional preparations in the 1960s, the Forest Rehabilitation Project was finally initiated in 1973. The government declared the Nationwide Tree Planting Period (21 March– 20 April) and Arbor Day to draw out active participation from the public. Finally 1.08 mil ha of denuded forest were restored with fast growing tree species through public participation during the First NFDP. The 10-year project was completed 4 years in advance of its target (the year 1982).

ii) The Second National Forest Development Plan (1979–1987)

The Second 10-year NFDP aimed to establish large-scale commercial forests that could develop into sustainable timber resources for domestic demands on timber. The government implemented various forest policies such as forest rehabilitation, enhancement of forest protection, and foundation of forest development funds to support private and national forests. Along with reforestation projects, erosion control was also actively undertaken to prevent natural disasters. Advanced biotechnology was adopted to control forest diseases and pests as well. Under the Second NFDP 1.06 mil ha of forests had been established.

[7] KFS English homepage (http://english.forest.go.kr)

iii) The Third National Forest Development Plan (1988–1997)

The Third NFDP aimed at harmonizing economic functions and public benefits of the forests. The Plan focused on establishing foundation and infrastructure of forest management including forest road construction, forest mechanization, education for foresters and forestry workers and so on. The KFS carried out forestry income enhancement projects and public awareness-raising programs of the importance of forests and its conservation. It supported overseas plantation projects with the aim of securing stable and long-term timber supply. The KFS developed and implemented policies for improving public benefits of the forests, including creation of recreation forests, water resources conservation, wildlife protection and so on.

iv) The Fourth National Forest Development Plan (1998–2007)

The Fourth NFDP entered a transitional phase of forest policies from mainly focusing economic functions to enhancing multiple benefits of forest including public and recreational benefits. In the Fourth NFDP Sustainable forest management was reflected on forest policies and activities. Especially the KFS emphasized development of valuable forest resources and improvement of competitive forestry industry and increase of public benefits for the people.

The government-led forest management policies turned into forest management with participation by the private forest sector, based on the capability and discretion of forest owners. To achieve implementing objectives for sustainable forest management, the KFS consolidated legal and institutional systems. The Framework Act on Forest, the Act on Promotion and Management of Forest Resources, the Act on the National Forest Management, the Act on Forest Culture and Recreation and the Act on Promotion of Forestry and Mountain Villages were enacted.

v) The Fifth National Forest Development Plan (2008–2017)[8]

The vision of the fifth NFDP (2008–2017) is to realize a forest-based sustainable green nation. Sustainable management of the forests covering 64% of total land area is crucial to realize a green nation. The objectives of the plan are to recognize the economic value of forest resources, to protect the health of forests as environmental resources and to provide recreation areas in forests for the people. The plan includes five key strategies: 1) integrated management and development of multi-functional forest resources, 2) promotion of the forest industry for sustainable use of forest resources, 3) conservation and management of forest as national environmental resources, 4) increasing green zones and services for people, and 5) international cooperation for global forest conservation and timber supply (Table 2.1).

[8] It is a part of the chapter by Lee (2010).

Table 2.1. Main tasks of the five strategies in the Fifth NFDP (2008–2017).

Strategy	Main tasks
Integrated management and development of multi-functional forest resources	Implementation of SFM at local and national levels Enhancement of forest carbon sinks Strengthening public functions Intensive tending of forests Strengthening infrastructure for forest management
Promotion of forest industry for sustainable use of forest resources	Eco-friendly wood industry Competitiveness non-wood forest products New growth engine including bio and environment technology Stable income system in private forests Increasing forest products export
Conservation and management of forests as environmental resources	Eco-friendly forest land management Forest biodiversity and forest ecosystem health Ecological backbone of forests Science-based control of forest disasters Conservation and enhancement of forest landscape
Increasing green zone and services for people	Green zone in urban areas Recreational and cultural services Outdoor activities in forests Social services of forests including job opportunities Public services of national forests Mountain villages as multi-functional living space
International cooperation for global forest conservation and timber supply	Bilateral cooperation for timber resources Regional cooperation for prevention of yellow dust Multilateral cooperation for global environment Inter-Korea cooperation for forest rehabilitation

Source: Lee (2010)

2.3 Forest organizations[9]

The Korea Forest Service has the overall responsibility for establishment and implementation of forest policies and laws. The KFS consists of 5 bureaus, 21 divisions, 5 Regional Forest Services and 27 National Forest Stations (Figure 2.3). It also has affiliate agencies such as the Forest Aviation Headquarters, the Korea Forest Research Institute, the Korea National Arboretum, and the National Natural Recreation Forest Office. The province and metropolitan cities have their local forestry administrative organizations (Figure 2.4).

[9] 2012 Statistical Yearbook of Forestry (KFS) & KFS English homepage

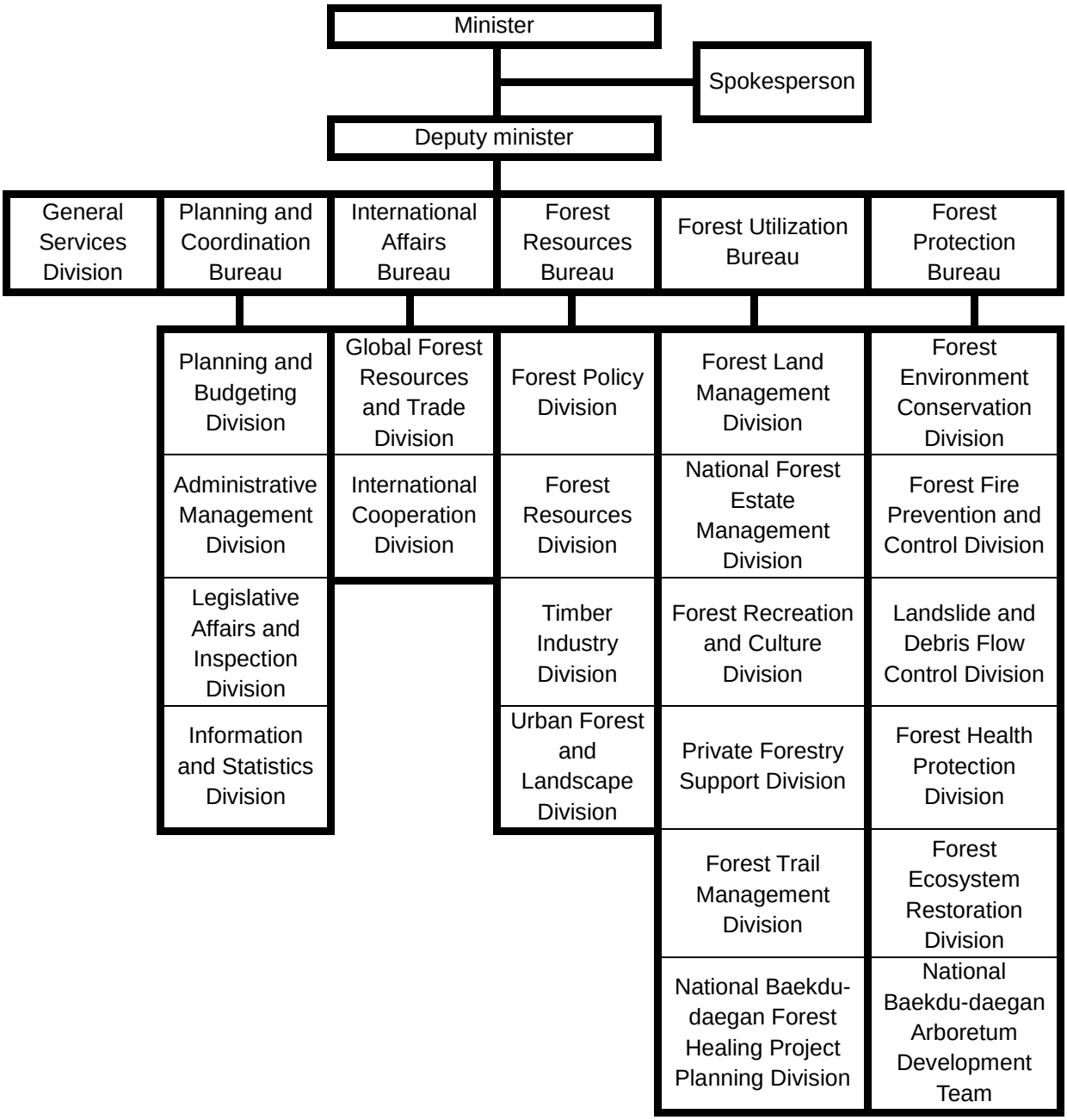


Figure 2.3. Structure of Korea Forest Service.
Source: KFS (2012)

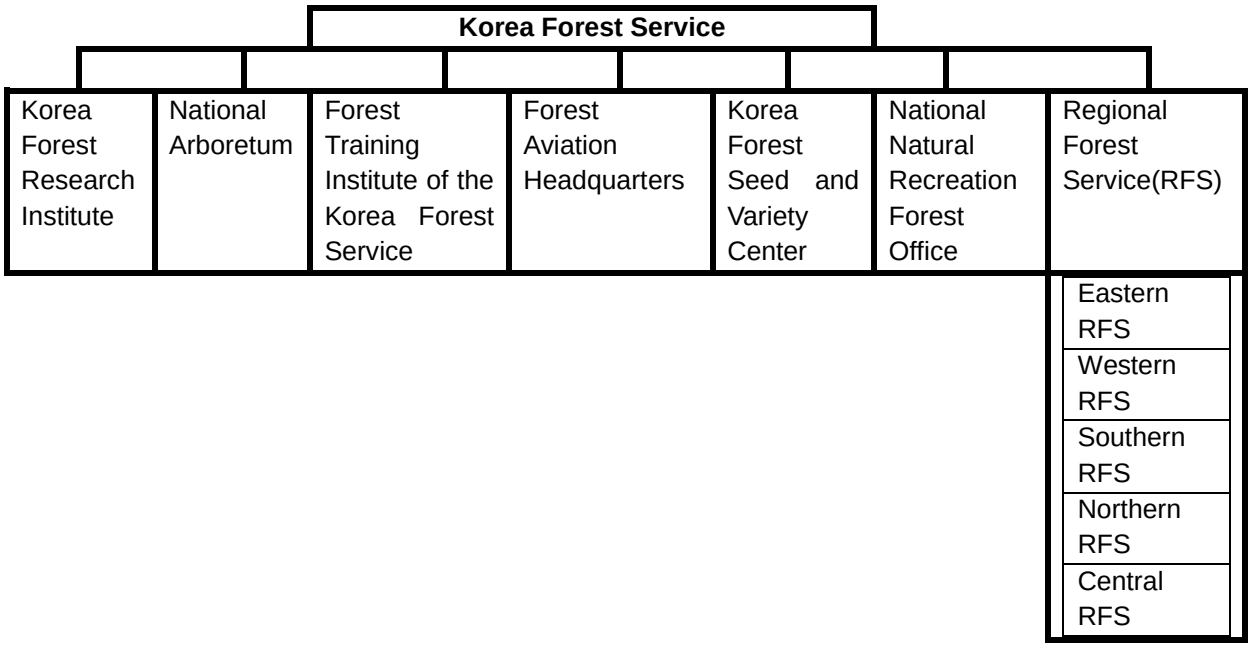


Figure 2.4. Organization chart of Korea Forest Service.
Source: KFS (2012)

2.4 Forest regulation[10]

There are currently 15 laws relating to forests and forestry (Table 2.2). The Forest Law 1961 was enacted to promote forest protection and forest development as well as to enhance forest productivity and public functions. The Law prescribes extension and utilization of forest resources, sustainable development of forests, conservation of natural forests and protected forests, management of national forests among others. Aside from the principal Forest Law 1961, the Erosion Control Act in 1962 for restoration of denuded forest lands and effective erosion control was enacted. The Act of Forestry Cooperatives Federation was established for the organization and functions of Forestry Cooperatives in 1980.

Since 1990s forest legislations was subdivided to various laws. The Act on Promotion of Forestry and Mountain Villages in 1997 was established for intensive management on private forests which accounted for 70% of the forests in the Republic of Korea. In 2001, the Framework Act on Forest was established in order to meet diverse demands on forestry. The outlines basic principles and directions of forest policy and provides forest objectives and responsibilities of foresters. Also in 2001, the Act on Establishment and Promotion of Forest Arboretum was legislated and announced. The purpose of this Act is to secure the creation and operation of a forest arboretum in an attempt to create and enhance forest genetic resources which are expected to contribute to the development of the national economy. Besides, the Forest Land Management Act was enacted in 2002 to prevent frequently occurring negligence in land development that causes damages to forests. It also aims to improve the permission system for forest land use change. In 2003, the Act on Protection of Baekdudaegan Mountain was established with a view to conserve and protect the core of forest ecosystem in Korea.

In line with Article 55 of the Framework Act on Low Carbon and Green Growth enacted in 2010, the Act on the Promotion of Maintaining and Enhancing Carbon Sinks was established in 2012. The purpose of the Act is to respond to climate change and to build a low-carbon society by maintaining and enhancing the role of forests as carbon sinks. The Act requires the forestry sector to maintain and

[10] It includes a part of the chapter by Lee *et al*. (2010)

enhance forest carbon sinks to cope with climate change. It indicates responsibility of the KFS as the central forest agency for mitigating and adapting climate change in the ROK (Park and Youn 2013b).

Table 2.2. Forest related laws.

Title of Law	Enactment Date
Act on the Management and Improvement of Carbon Sink	Feb.22, 2012
Framework Act on Forest	Mar. 24, 2001
Act on Promotion and Management of Forest Resources	Aug. 4, 2005
Act on Promotion of Forestry and Mountain Villages	Apr. 10, 1997
Act on National Forestry Cooperatives Federation	Jan. 4, 1980
Act on Structural Improvement of National Forest Cooperatives Federation	Aug. 3, 2008
Forest Land Management Act	Dec. 30, 2002
Act on National Forest Management	Aug. 4, 2005
Act on Forest Culture and Recreation	Aug. 4, 2005
Act on Protection of BaekduDaegan Mountains System	Dec. 31, 2003
Act on Establishment and Promotion of Forest Arboretum	Mar. 28, 2001
Erosion Control Act	Jan. 15, 1962
Act on Pine Wilt Disease Prevention	May 31, 2005
Act on Distribution of Special Employees for Forest Protection	Feb. 9, 1963
Act on Forest Protection	Jun. 9, 2009

Source: KFS English homepage

2.5 Forest ownership

After the Korean War, the South Korea followed the forest ownership structure from the Japanese colonial rule. In 1952, South Korean forests consisted of national (19.2%), local government owned forests (8.7%) and private forests (72.1%). In 2008 national forests reached 23.8% (Table 2.3). However private forest still accounts for two thirds of the total forest lands in the South Korea.

Table 2.3. Changes in forest ownership structure (1927 to 2008).

Year	National Forests	Local govt. owned forest	Private forests	Total
1927	55.7	3.5	40.8	100.0
1942	32.7	6.6	60.7	100.0
1952	19.2	8.7	72.1	100.0
2008	23.8	7.7	68.5	100.0

Unit:%, Source: Bae (2010: 25)

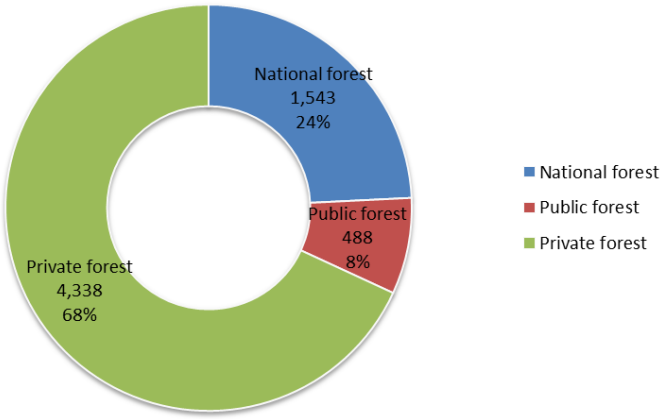


Figure 2.5. Forest ownership (1,000ha).
Source: KFS (2012)

As of 2011 (KFS, 2012), the number of private forest owners was 2.07 mil and the area of the private forests was 4.3 mil ha. Among these forests owners, 91% own less than 5ha of forest land (Table 2.4). 54% of the total forest owners reside in places located away from their own forests, making it difficult for them to manage their forestlands effectively.

Table 2.4. Ownership scales of private forests.

Size (ha)	Forest owners (persons)		Area (ha)		Plot No. (lots)	Average (ha/plot)
	No. of owners	%	Area	%		
~1	1,351,005	65.19	354,312	8.19	1938047	0.18
1~5	540,780	26.09	1,252,483	28.95	1160197	1.08
5~10	109,782	5.30	759,676	17.56	352223	2.16
10~30	58,162	2.81	916,364	21.18	291950	3.14
30~50	7,314	0.35	276,774	6.40	65870	4.20
50~100	3,680	0.18	249,775	5.77	48021	5.20
100~500	1,688	0.08	294,458	6.81	60656	4.85
500~1000	88	-	59,213	1.37	18623	3.18
1000~	70	-	163,324	3.78	88184	1.85
Total	**2,072,569**	**100.00**	**4,326,379**	**100.00**	**4023771**	**25.85**

Source: KFS (2012)

2.6 Forest utilization and management

2.6.1 Forest land classification

According to Forest Land Management Act, KFS designs forest lands. Korean forest lands are classified into two types, conservation and semi-conservation forest (Figure 2.6). Conservation forests are divided to forest lands for forestry use and public uses. Forest lands for forestry use refer to forest lands as necessary to enhance functions of forestry production, such as creating forest resources and establishing the foundations for forest management. Forest lands for public interest refer to forest lands to enhance public interest functions, such as natural disaster prevention, water source protection, natural ecosystem preservation, natural scenery preservation and promotion of public health and recreation. Semi-conservation forests refer to forest lands other than conservation forests.

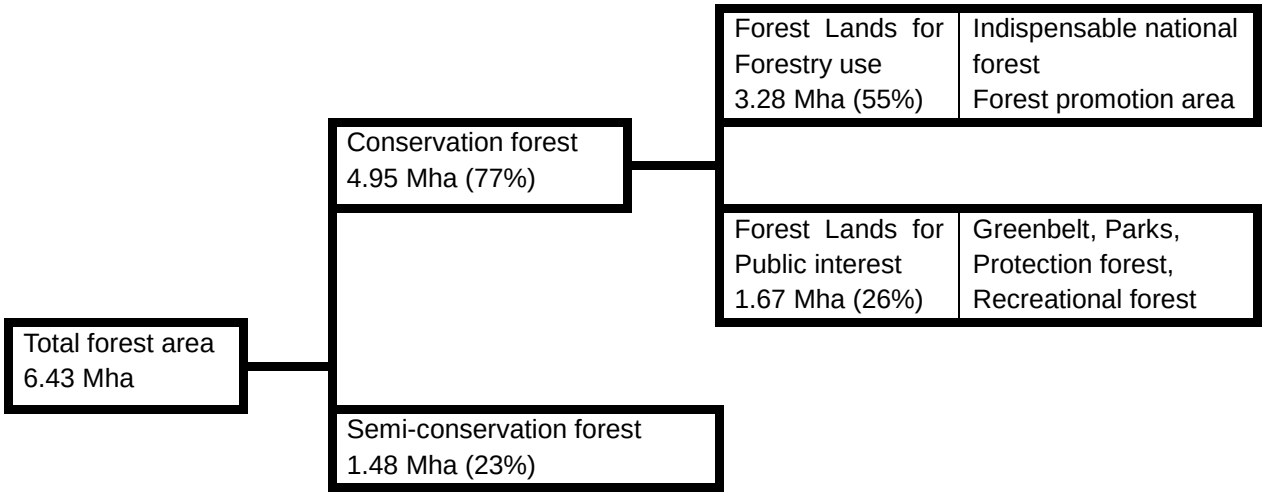


Figure 2.6. Forest land classification.
Source: KFS (2012: 178)

2.6.2 Sustainable Forest Management

Korean forest policies reflect global discourse on forest management. The discourse on sustainable development facilitated the discourse on sustainable forest management (SFM) in the forest sector. The Forest Principles are a non-legally binding agreement on forests signed by many countries at the United Nations Conference on Environment and Development (UNCED), which was held in Rio de Janeiro in 1992. These Principles recommend sustainable forest management to meet the social, economic, ecological, cultural and spiritual needs of present and future generations (United Nations, 1992). Following this, KFS established and implemented policies toward SFM. The primary objective of the Fourth NFDP (1998-2007) was to establish and develop a foundation for SFM.

In the international dimension criteria and indicators were developed to evaluate SFM. As of the year 2008, about 0.12 mil ha of national forests were certified by Forest Stewardship Council (Table 2.5). Korea Forest Research Institute developed Korean criteria and indicators of SFM in 2005, considering Korean forest conditions (Table 2.6). It helps to measure the process of SFM in the Republic of Korea considering Korean forest conditions. KFS is trying to link the Korean system with the international forest certification institutions.

Table 2.5. Status of SFM accredited forest.

Year	Certified area(ha)	Administration body
2006	2,741	Korea Forest Research Institute Warm-temperate and Subtropical Forest Research Center
2006	33,696	Hongcheon National Forest Station
2007	35,222	Inje National Forest Station
2007	18,227	Gangwon Provincial Office Research for Forestry Development
2007	31,376	Pyeongchang National Forest Station
2008	80	Uljin National Forest Station
Total	121,342	

Source: Lee *et al*. (2009: 36)

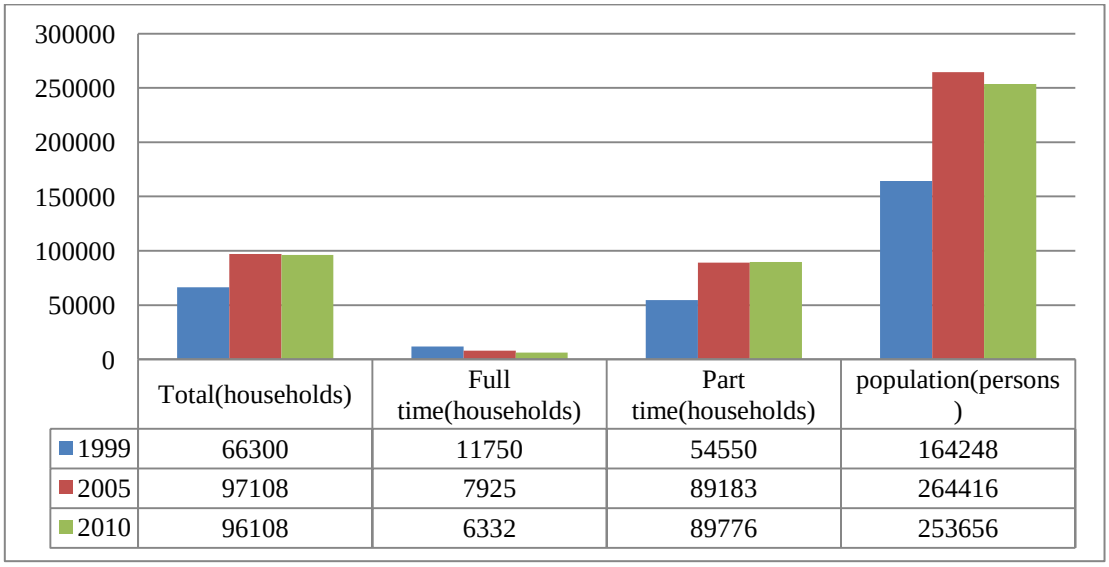
Table 2.6. SFM criteria.

Criteria	Contents
Criteria 1	Conservation of biodiversity
Criteria 2	Maintenance of productive capacity of forest ecosystems
Criteria 3	Maintenance of forest ecosystem vitality and health
Criteria 4	Conservation and maintenance of soil and water resources
Criteria 5	Maintenance of forest contribution to global carbon cycles
Criteria 6	Maintenance and enhancement of long-term multiple socio-economical benefits
Criteria 7	Legal, institutional and economical frameworks for forest conservation and sustainable management

Source: KFS English homepage

2.6.3 Forestry Households

As of 2011 the number of forestry households is 94 563 (KFS 2012: 246). Full-time forestry households account for 6.6% (6,332 households) of the total. Most (93.4% of the total) is part-time forestry households conduct non-forestry activities such as agriculture. 7.318 forestry households gather fruits, wild vegetables, medical herbs and mushrooms. Pine mushroom takes a significant part of household incomes.



	Total(households)	Full time(households)	Part time(households)	population(persons)
1999	66300	11750	54550	164248
2005	97108	7925	89183	264416
2010	96108	6332	89776	253656

Figure 2.7. Forestry households.
Source: KFS (2012: 244)

2.7 Forest products and market

As of 2011, forest products account for 0.1% (Won1.6 trillion) of GDP (Won1 237 trillion or USD1116.4 billion) in the ROK (KFS 2012: 306). Including net gross growing stock, the total value of forest products is 5726.7 billion won. Total quantity of timber was 3 957 309 cu m. It value is Won280 billion. Material for landscape (13%), nuts & fruits (12%), wild vegetables (7%) and mushroom (5%) have portion of forest products than timber (5%) respectively (Figure 2.8).

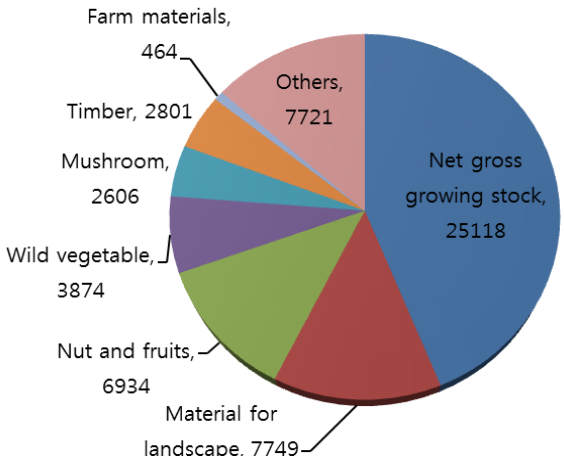


Figure 2.8. Production of forest products. (Won 100 million). Source: KFS (2012: 302)

As the Figure 2.9 shows, the net gross growing stock has increased rapidly. Nuts and fruits and wild vegetables have increased slightly since the mid of 2000s. Products of material for landscape and mushroom moved within narrow limits.

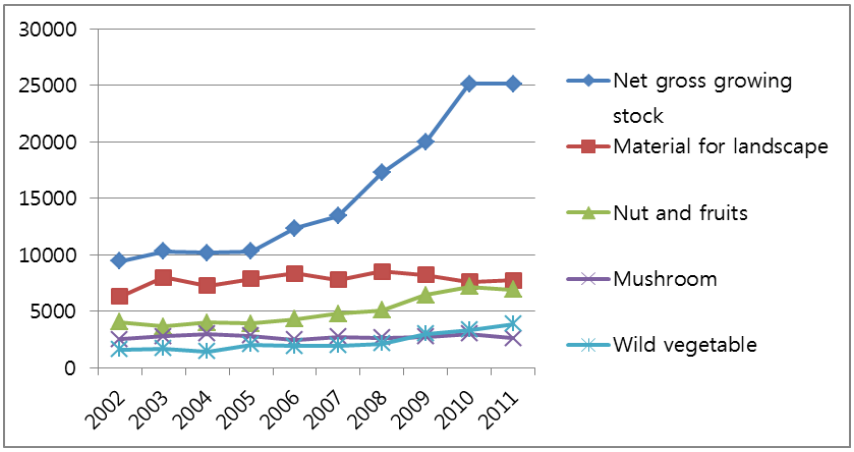


Figure 2.9. Trends of production of forest products (Won 100 million). Source: KFS (2012: 302)

As of 2011, the amount of export of forest products was USD 245 million. Exported products are wood & wood products (USD 67.8 million, 28%), chestnut (USD 28.9 million, 12%), stone (USD 15.3 million, 6%), mushroom (USD 7 006, 3%) and plywood (USD 5 370, 2%). Major target countries for export of South Korean forest products are China, Vietnam, Japan, Taiwan, United States, Indonesia and Mexico.

The amount of imported forest products has increased except 2009 and 2010 (Figure 2.10). As of 2011, the amount of imported forest products was USD 3 772 million. Imported forest products were log (USD 794 million), stone (USD 635 million), plywood (USD 537 million) and other woods (USD 494 million), sawn wood (USD 437 million), particle board (USD 143 million), resin & rosin (USD 76 million), bamboo (USD 6.5 million) and so on. Importing countries are China, United States, New Zealand, Canada, Malaysia, Indonesia and Russia.

As of 2011, South Korean demand on timber is 27.6 mil cu m. Timber self-sufficiency ratio was 15.1%. It has increased over time (Figure 2.11).

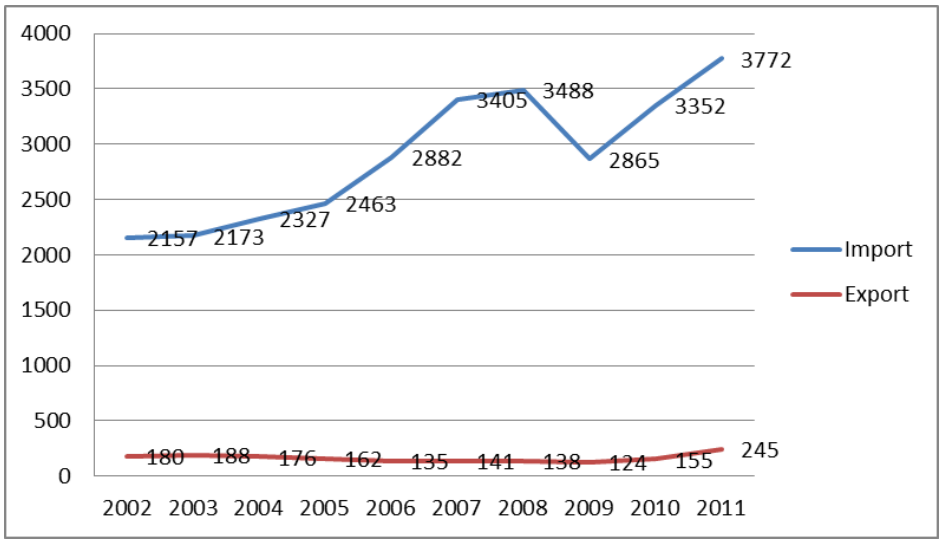
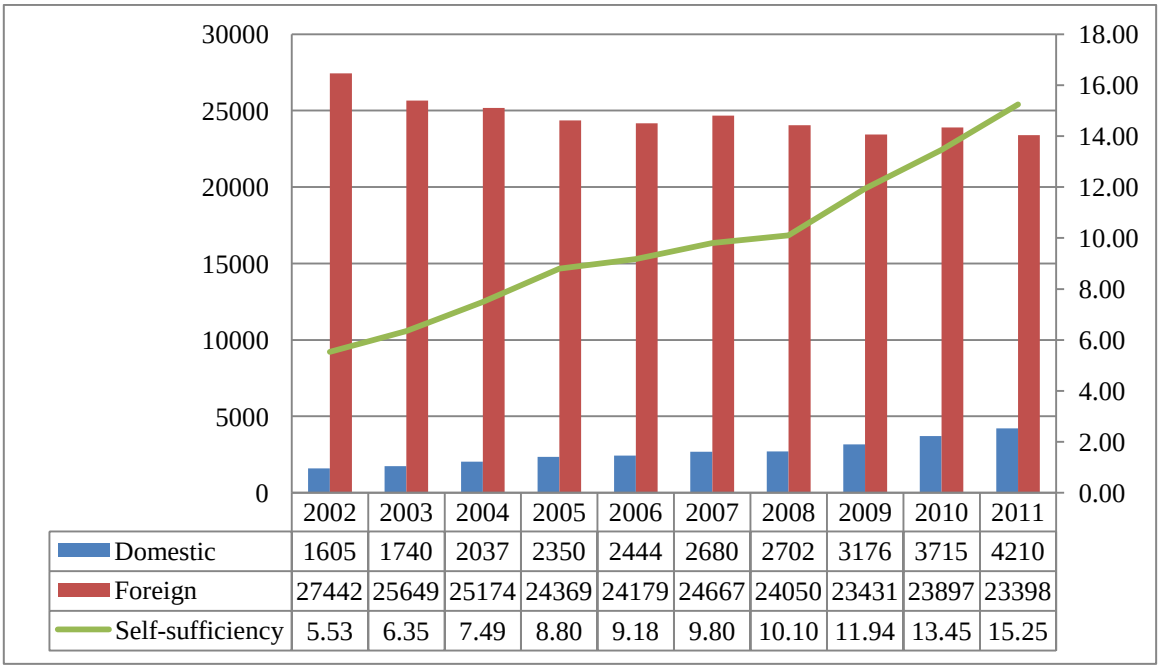


Figure 2.10. The amount of imported and exported forest products (USD million)
Source: KFS (2012: 303)



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Domestic	1605	1740	2037	2350	2444	2680	2702	3176	3715	4210
Foreign	27442	25649	25174	24369	24179	24667	24050	23431	23897	23398
Self-sufficiency	5.53	6.35	7.49	8.80	9.18	9.80	10.10	11.94	13.45	15.25

Figure 2.11. The trends of timber self-sufficiency ratio (1,000 cu m).
Source: KFS (2012: 304)

3 KOREAN FOREST TRANSITION

3.1 Forest Cover Change

3.1.1 Forest cover

Korean forest area has gradually decreased in 1940s and 1950s. During Korean War, from 1950 to 1953, Korean forests were severely degraded as the Figure 3.1 shows. The Korea Forest Service estimated that the damaged forest land was 780 ha as of October 1950 (KFS 1988 cited in Bae *et al.,* 2012). However after the Korean War, Republic of Korea government established and implemented national policy for reforestation. The First National Forest Development Plan (1973 to 1978) and the Second (1979–1987) were initiated and successfully implemented. During this period, the Korea Forest Service has surprisingly reforested around 2 mil ha. According to the study by Bae *et al.* (2012), forest cover has increased since 1955. The forest area moved within narrow limits in 1960s and 1970s (Table 3.1). It entered the stable stage in the 1970s.

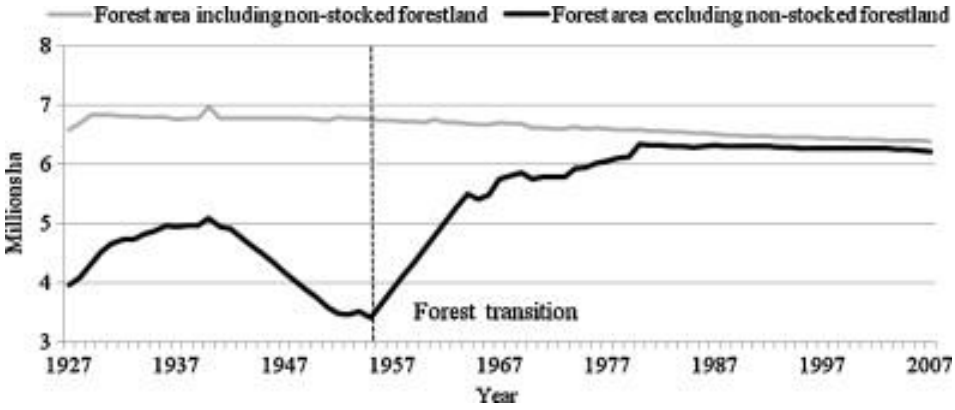


Figure 3.1 Forest area change in South Korea from 1927 to 2007.
Source: Bae *et al*. (2012: 200)

Table 3.1. Changes of forest area and growing stock from 1945 to 1970.

Year	Forest area (mil ha)	Growing stock (mil cu m)
1945	6.834	74.372
1950	6.811	52.157
1955	6.756	49.429
1960	6.701	55.144
1965	6.669	61.746
1970	6.611	68.773

Source: Bae (2010: 31)

3.1.2 Growing stock

Bae *et al*. (2012) divided change of the average volume of growing stock to three stages: reduction period (1927–1952), stagnation period (1953–1972) and expansion period (1973—2007) (Table 3.2). Both per-hectare and per-capita volume of growing stock decreased during the reduction period, had no change during the stagnation period and increased during the expansion period. Comparing the period of increase of forest cover in the mid of 1950s, the growing stock increased in the 1970s (Figure 3.2). Tree plantation with a large scale during 1960s offered the recovery of growing stock in the 1970s (KFPS, 1975 cited in Bae *et al*. 2012). Therefore, if forest transition is measured with increase of the forest area as a quantitative indicator as well increase of growing stock volume as qualitative indicator, Korea forest transition occurred in the 1970s.

Table 3.2. Average annual rate of changes in growing stock volume in three stages.

	Forest degradation (1927–1952)	Forest stagnation (1953–1972)	Forest growth (1973–2007)
Per-capita volume of growing stock (%)	-2.9	0.0	14.4
Per-hectare volume of growing stock (%)	-1.9	0.3	20.0

Source: Bae *et al.* (2012: 201)

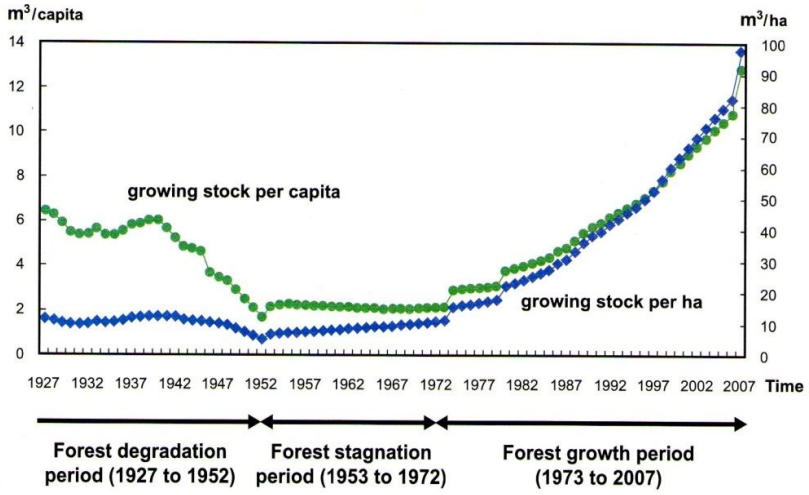


Figure 3.2. Change in annual average growing stock in Korea (1927–2007).
Source: Bae *et al*. (2010: 28)

3.2 Drivers to deforestation and forest degradation

There are many kinds of drivers to deforestation and forest degradation in the ROK. Depending on proximate causes and underlying driving forces of deforestation found by Geist and Lambin (2002), several causes are described. In the Korean case Korean War caused deforestation and forest degradation almost in the whole country. After the War, poverty accelerated conversion of forestlands to agricultural lands and others for foods. Social demand on fuelwoods for heating and cooking was high. In this chapter drivers to deforestation and forest degradation from 1940s to 1970s including the period of forest transition were described.

3.2.1 War

Geist and Lambin (2002) mentioned social trigger events can cause deforestation. In the case of South Korea, Korean War, which occurred from 1950 to 1953, caused rapid deforestation and forest degradation in the large areas. In 1945 the total area and total volume of growing stock of South Korean forests were estimated as 6.8 mil ha and 74 mil cu m respectively. After the Korean War, in 1955, the total area and total volume of growing stock of South Korean forests decreased to 6.7 mil ha and 49.4 mil cu m (Bae 2010: 29).

3.2.2 Logging

The predominant causes of deforestation and forest degradation are large-scale clearing of forests and exploitation of forest resources (Lee and Lee 2005: 3). Firewood has been used for heating and cooking in the Korean villages. Before In 1955, South Korean used approximately 10 mil cu m of wood for domestic fuel, which amounted to 17% of the total volume of growing stock (Bae and Lee 2006). In

1960, firewood and charcoal accounted for 62.5% of the total primary energy source (KCC 2001). Therefore demand for wood was very high. In spite of introduction of forest protection policy, illegal logging was not controlled. From 1945 to 1961 the frequency of illegal logging was 24,085 and the average volume of illegally logged timber was 92,853cu m/year (Kim *et al*. 2009).

3.2.3 Agriculture

Expansion of agriculture caused deforestation. From 1952 to 1968, some non-stocked forests were converted to agricultural lands, resulting in increased agricultural land from 1.97 mil ha to 2.34 mil ha (Bae *et al*. 2012: 200). In the 1970s, some forest lands were converted to agricultural lands and then concerted to residential, industrial and other uses.

Slash-and-burn cultivation was also a cause of deforestation. The area of illegal slash-and-burn fields and the number of slash-and-burn households increased from 46 190 ha and 136 138 households in 1967 to 124 643 ha and 300 796 households in 1979 respectively (Lee and Bae 2007: 327). Especially in the Gangwon Province, where forests comprised 80% of total land, the illegal slash-and-burn fields occupy 31% of total forest area in 1974 (Ho 1975). Slash-and-burn cultivation caused also soil erosion and then increased risks of flood and landslides.

3.2.4 Other

South Korean population has increased gradually since 1945. It has changed from 15.9 million in 1945 to 21.5 million in 1955 and 28.7 million in 1965 (Bae 2010: 31). This increase might cause increase of demand on woods in South Korea.

3.3 Drivers to afforestation and forest rehabilitation

Lambin and Meyfroidt (2010) classified forest transition pathways to five; forest scarcity, state forest policy, economic development, globalization and smallholder, tree-based land use intensification pathway. Korean case fallows the pathway by the state forest policy. Government-led efforts led successful afforestation and forest rehabilitation. In this chapter governmental policies for reforestation were described not only in the forest sector and but also in the non-forest sector.

3.3.1 National Forest Development Plans

The First and Second National Forest Development Plans played a pivotal role in the South Korean forest transition. The first plan focused on reforestation. National tree-planting movement was implemented and citizens participated in reforestation projects. During the first plan (1973–1978) 1.08 mil ha was successfully reforested. The second plan emphasized and establishment of large scale commercial forests for providing timber supply. It also included reforestation policy. As a result, 1.064 mil ha was reforested.

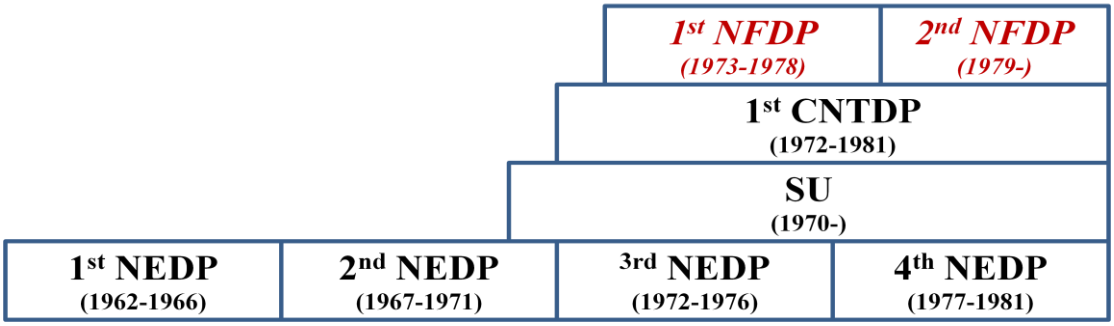
South Korean forests are vulnerable to erosion due to steep slopes and localized heavy rain in summer. Since the 1960s, South Korean government has implemented erosion control program. In 1950s deteriorated areas reached more than 680,000ha in the ROK, It is about 10% of the total forest land of South Korea. Through strong government program, deteriorated areas rapidly decreased to 120,000ha in 1972 (Lee *et al*. 2010). During the First NFDP, from 1973 to 1978 in the total 41,932ha erosion control works were conducted (Table 3.3) under the new community movement called “Saemaul Undong (SU)” which was begun in 1970 in the South Korea. As a result, the First and Second NFDP brought complete restoration of the denuded hillsides and coastal areas.

Table 3.3. Erosion control works.

Year	Controlled area (ha)	Investment (million Korean won)	Mobilized population (1,000 persons)
Total	41,932	37,433	23,685
1973	4,961	2,148	2,424
1974	9,381	3,314	3,992
1975	9,204	4,619	4,342
1976	5,648	5,632	3,469
1977	5,228	9,769	3,727
1978	7,510	11,951	5,731

Source: KFS (1996: 414)

The NFDP was designed and implemented liking with other national plans such as Comprehensive National Territorial Development Plans and Five-Year Economic Development Plan. Temporally the plans were interlinked and functioned. The First CNTDP (1972–1981) was initiated for building the foundation for long-term economic growth. It included resource development and environmental conservation. The forest sector belonged to the plan with other sectors of agriculture, water resource, energy and reclamation. Also the Second Economic Development Plan (1967–1971) and Third Economic Development Plan (1972–1976) emphasized reforestation policies (The Academy of Korean Studies 1969 and 1972). This integrated structure (Figure 3.3) supported reforestation activities in the South Korea.



NEDP: National Economic Development Plan
SU: Saemaul Undong
CNTDP: Comprehensive National Territorial Development Plan
NFDP: National Forest Development Plan

Figure 3.3. Integrated structure of National Plans.

3.3.2 Energy Substitution

Firewood has been used for heating and cooking in the Korean villages. In 1955, South Korean used approximately 10 mil cu m of wood for domestic fuel, which amounted to 17% of the total volume of growing stock (Bae and Lee 2006). In 1960, firewood and charcoal accounted for 62.5% of the total primary energy source (Korea Coal Corporation 2001: 70) (Figure 3.4). After the Korean War, the South Korean government carried out energy policies to overcome the lack of fuel. In particular the Ministry of Commerce and Industry (MCI) carried out policies for increasing coal output as energy source.

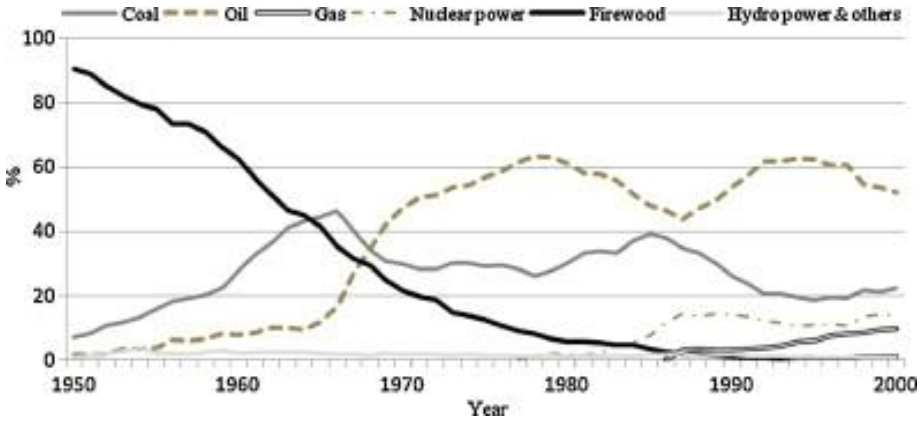


Figure 3.4. Trends in primary energy consumption.
Source: KCC (2001) cited by Bae et al. (2012)

For the first time, the government established 5 Year-Coal Mine Development and Comprehensive National Energy Plan in 1956. The Plan was revised year by year and then was succeeded to the five year- National Economic Development Plan (NEDP) 1962–1966 (Korea Coal Corporation, 2001: 73). In the 1960s an expansion of energy source such as coals was regarded as a major target of intensive investment for economic development in the ROK. South Korean government signed the agreement for development of coal mine with United Nations Korean Reconstruction Agency (UNKRA) in June 1965. UNKRA invested total 14.95 million US dollar for developing of coal mine including training for technical experts in the ROK (Korea Coal Corporation 2001: 70). MCI completed construction of coal railroad lines in the mid of 1950s.

The NFDP was incidental to the NEDP. For forest rehabilitation, MCI expanded the supply of coals for the public with the rest of coals which were used in industrial, transportational, military and official supplies in 1960s (Korea Coal Corporation, 2001: 84). Production of coal briquettes sharply increased in urban areas in the 1960s. As a result, by the 1970, only 7% of urban areas continued to use firewood for heating and cooking at homes (Bae *et al*. 2012: 204). To reduce use of firewood, the MAF implemented policies prohibiting the inflow of firewood into major cities in 1958 (Bae and Lee 2006: 63). The MAF also established fuelwood forests in the agricultural and mountainous villages. From 1959 to 1967 total 784 239 ha of fuelwood forests were established in 153 cities and counties by 21,330 forest communities named *Sanlim Gye* in Korean. However the total area of fuelwood forests decreased up to 435 555ha due to deforestation and dull growth (KFS 1997: 407). Since the First NFDP, the area of established fuelwood forests increased continuously (Figure 3.4). As a result, total 210,000 ha of fuelwood forests were established during the First NFDP. The loan from IBRD was used for planting 127 000 ha of fuelwood forests (KFS 1997: 45).

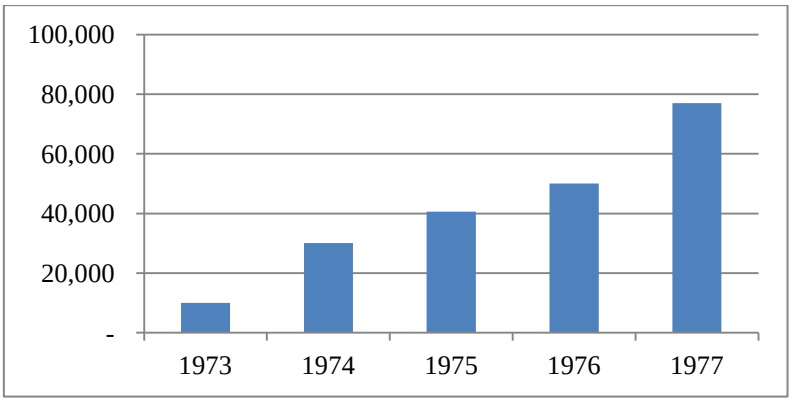
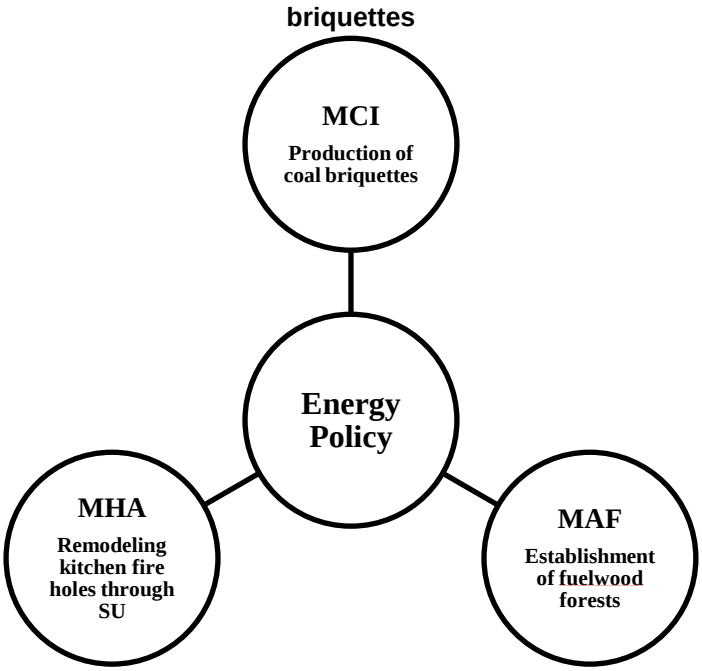


Figure 3.4. Area of established fuelwood forests by year.
Unit: ha, Source: KFS (1997: 408)

During the First NFDP, numerous projects were implemented to substitute home firewood with fossil fuels, such as coal briquettes. In the 1970s, agricultural villages began to use coal briquettes as fuel for home use, and gas and coal were used for cooking and heating in the 1980s. Governmental efforts to substitute firewood with fossil fuels linked with SU. Ministry of Home Affairs (MHA) designed and implemented SU. This movement included remodeling kitchen fire holes to use coal briquettes instead of fire wood with consideration for energy efficiency. Korean Forestry Experiment Station developed the new models of kitchen fire holes for using coal briquettes. In the change of the heating system of Korean households, the household which had traditional kitchen holes using firewood to the total households decreased from 37.9% in 1980 to 5.8% in 1990 (Bae and Lee 2006: 70). This substitution of firewood for home decelerated forest degradation in the South Korea. Therefore in this chapter it was examined the several governmental agencies including MCI, MHA and MAF collaborated each other for substitution of firewood with coal briquettes (Figure 3.5). This collaboration brought stability of energy and reforestation.



MCI: Ministry of Commerce and Industry
MHA: Ministry of Home Affairs
MAF: Ministry of Agriculture and Forestry
SU: Saemaul Undong

Figure 3.5. Collaboration among governmental agencies for substitution of firewood with coal.

3.3.3 Organizational reformation

Recognizing importance of forest rehabilitation and strengthening forest policies, the Bureau of Forest under the MAF needed to be expanded for effective and efficient forest policy. Korea Forest Service with a Korean forest administration was established in 1967. Before the establishment of KFS, forest policies oriented to forest protection. KFS widened its approach to forest policy including promotion of forestry as an industry.

For strong and efficient implementation of forest policies, KFS under the MAF was moved to the MHA in 1973. KFS was under the control by MHA from 1973 to 1987. The period includes definitely the First and Second National Forest Plans. This reorganization is nowhere to be found in Korean policy arrangement. It means reforestation was prioritized in the policy making. At that time the MHA controlled local and police administration. Therefore, after the transfer to the MHA, KFS could strengthen forest protection policies using local administration and police administration and facilitate forest investment using local finances. The reorganization brought that the governors of provinces and mayors had assumed responsibility for comprehensive protection and management of forest and local associations and communities consisted of residents have participated in forest managements. In 1973 all provinces except the province of Jeju and all counties have established the Division of Forest (KFS 1997:395). At that time, for implementing SU, the MHA created the Local Development Bureau, Urban Development Bureau and Rural Development Bureau for SU. It caused organizational reform in the various dimensions. The MAF, MCI and Ministry of Education established the divisions of SU. Provinces, Cities and Districts established also the divisions of SU. This structure enabled the local residents to participate in the reforestation projects on a national scale. Multi-level governmental organizations functioned as action agencies for forest rehabilitation.

After the transfer of KFS to the MHA, the chief of polices controlled illegal logging at the local levels. During the period of reorganization, illegal logging decreased (Figure 3.6). The frequency illegal logging decreased from 17,923 during 1967–1972 to 2,526 during 1979–1987. The volume of illegally logged timber also decreased from 17,673 cu m/year to 2,211 cu m/year at the same period (KFS 1997). It indicates effectiveness of police administration power in forest protection.

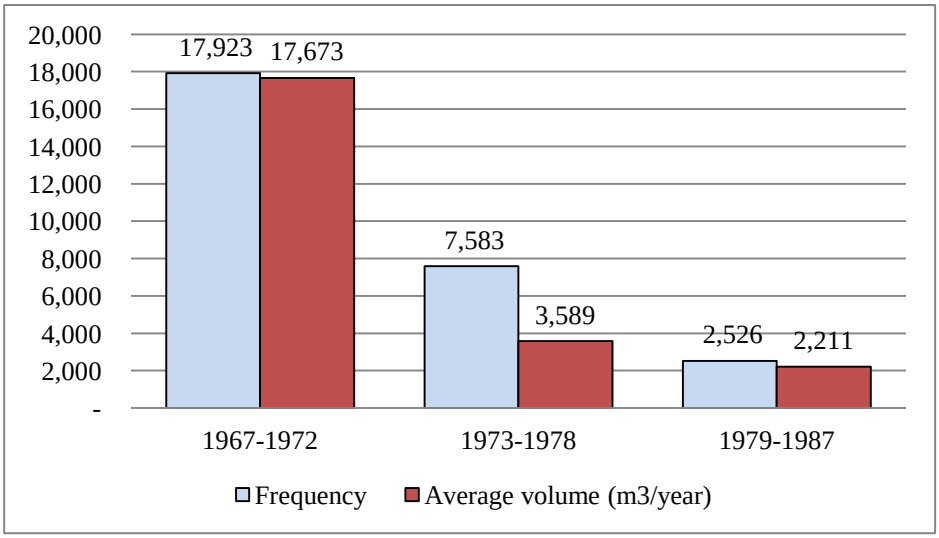


Figure 3.6. Frequency of illegal logging and average volume of illegally logged timber.
Source: Kim *et al*. (2009)

3.3.4 Economic Development

From 1962 to 1981, four Five-Year National Economic Development Plans (NEDPs) were formulated and implemented. As the Table 3.4 shows, the First NEDP (1962–1966) set attainment of coal and electricity as energy source as a major target. Above mentioned mining development policy influenced the substitute of firewood with coal briquettes. The Second NEDP (1967–1971) and Third NEDP (1972–1976) emphasized reforestation policies (The Academy of Korean Studies, 1969 and 1972). In the two NEDPs include investment plan on forestry sector including afforestation, protection and erosion control.

Table 3.4. Objectives of Five-Year National Economic Development Plans.

NEDP	Period	Objectives
1st	1962–1966	• ***Securement of energy sources (Coal and electricity etc.)*** • Increase of farm household income through improvement of agricultural productivity & correction of structural imbalance of national economy • Expansion of basic industries and social capital • Employment increase and ***national territory development*** • Improvement of international balance of payment focusing on increase in export • Technology promotion
2nd	1967–1971	• Self-sufficiency of food, ***reforestation*** and fishery development • Enhancement of industries (chemistry, steel and machine industry) • Improvement of international balance of payment (550 million dollars export) • Employment increase and family plan • Increase of national income (Increase of farm household income) • Science and management technology promotion
3rd	1972–1976	• Self-sufficiency of food, increase of farm household income and mechanization of agriculture • Building health and cultural facilities in farming and fishing villages • Improvement of international balance of payment (3.5 billion dollars trade balance) • Development of heavy and chemical industries • Technology promotion and expansion of educational facilities for employment increase • Balanced development of social infrastructure • ***National territorial development*** and development of the export industrial complex • National welfare and life improvement
4th	1977–1981	• Self-growth structure o Self-raising investment finance o Balance of international balance of payment o Sophistication of industrial structure • Social development • Technical innovation and improvement in efficiency

Source: Kang (2000)

Relation between economic development and reforestation can be found in the structure of governmental accounts. In 1966 the total national accounts for reforestation was around 1.4 billion Korean Won. General account was just 90 million Korean won. Instead special accounts for economic

development and national forest management were 0.9 billion Korean won and 0.3 billion Korean won respectively (Kim et al., 2009). During the Second and Third Five-Year NEDPs (from 1967 to 1976), reforestation activities were supported from special account of economic development. Special account is an account separated from general account for special purposes in the national budgetary allocation. Therefore assignment of special account of economic development presents priority of economic development policy. This structure of national budget indicates that the economic development policy included reforestation policy. Also the annual amount of forest investment from special account of economic development increased gradually during the Second and Third NEDPs (Table 3.5).

Table 3.5. National account for forest management in South Korea.

Year	NEDP	General Account	Special Account			Total
			Management of National Forests	Finance Management	*Economic Development*	
1967		193	581	50	1,256	2,080
1968		310	863	100	1,986	3,259
1969	2nd	473	942	192	3,055	4,662
1970		667	921	273	3,030	4,891
1971		683	1,445	282	3,452	5,862
1972		742	1,556	300	3,677	6,275
1973		4,595	1,527	151	3,958	10,231
1974	3rd	5,932	2,612	-	5,201	13,745
1975		7,640	4,642	-	6,749	19,031
1976		11,001	4,388	-	9,699	25,088

Unit: million Korean won, Source: Kim et al. (2009)

3.3.5 Timber Demand and Supply Control

For industrial development, timber demand has increased after the Korean War. Since 1960, Korean Government has started to control the demand and supply of timber (KFS 1997: 355). For controlling demand of domestic timber, regulative instruments were applied. Notification No. 58 of the KFS, 'Limit of timber utilization (7 December 1973)' indicated that domestic timber could not be used in producing hangers, chopsticks, umbrella stands, matchsticks and ice cream sticks, instead popular and imported timber could be used through approval by Mayor and Governors. According to Revised Notification No. 9 of the KFS, 'Limit of timber utilization (10 September 1980)', approved producers should plant popular. Notification No. 5 of the KFS, 'Limit of Permission Application for Timber Harvest in Private Forests for Controlling Timber Demand and Supply (20 April 1987)', handling permission application for timber harvest was prohibited except thinning, removing damaged trees and harvesting hindrance trees for urban plans and land development.

Overall domestic and foreign timber supply increased from 1962 to 1977 (The Korean Society of Wood Science Technology 1977: 9). Amount of domestic timber supply increased three-fold from 348 thousand cu m in 1962 to 1,047 thousand cu m in 1977. On the other hand amount of foreign timber supply increased almost fifteen-fold from 590 thousand cu m in 1962 to 8 770 thousand cu m in 1977 (Table 3.6). Timber self-sufficiency ratio decreased from 53% in 1963 to 11% in 1977. Korean Government has met the increased demand of timber with the foreign timber. The approach contributed to protecting South Korean forests.

Table 3.6. Domestic and foreign timber supply.

Year	Domestic timber (1,000cu m)	Foreign timber (1,000cu m)	Total (1,000cu m)	Self-sufficiency ratio (domestic/total)
1962	348	590	938	37%
1963	473	423	896	53%
1964	494	564	1,058	47%
1965	503	756	1,259	40%
1966	779	1,098	1,877	42%
1967	791	1,529	2,320	34%
1968	800	2,010	2,810	28%
1969	884	2,650	3,534	25%
1970	845	3,155	4,000	21%
1971	1,034	4,026	5,060	20%
1972	795	4,553	5,348	15%
1973	959	5,453	6,412	15%
1974	1,000	5,356	6,356	16%
1975	908	5,557	6,465	14%
1976	959	6,866	7,825	12%
1977	1,047	8,770	9,817	11%

(The Korean Society of Wood Science Technology, 1977: 9)

3.3.6 Public Participation

Public participation is a significant factor of successful reforestation in South Korea. Forest projects by public participation were integrated with SU. 23.68 million villagers were mobilized for erosion control works (KFS 1997: 414) as a program of SU. In particular the unit of ‘forest gye’ as forest community with a small size consists of residents in villages participated in erosion control activities. Under SU, community forestation projects including establishment of fuelwood forests in the agricultural and mountainous villages belonged to income-generating projects like joint farming, pasturage and so on (Yoo 1987). Some of participants have gained wheat flour supported from UNKRA as a payment for erosion control activities (Kim *et al*. 2009). Villagers could gain wood fuel for heating and cooking through participation in reforestation projects (KFS 1997: 320–321). Therefore reforestation projects contributed to increase of livelihood of communities through foods and fuels. The benefits motivated public participation in reforestation projects.

3.3.7 Training and Education

In 1968 KFS offered the Guidelines of training forestry technology which included instruction of various forest technologies: forestation, erosion control, harvest of forest products, forest protection, forest planning, wildlife management, forest related laws and so on. Trainers visited forest owners and conducted workshops for training (Kim *et al*. 2009). In 1977 Forestry Training Institute was established and provided specialized education course for local government officials and forest experts. In the process of SU, local governmental officials and members of forest cooperatives transferred methods to plant trees and manage them to rural communities which participated in forest projects.

Excellent performers of forest projects received special awards and were assigned as ‘model forest managers’ whose experiences and potentials of forest management are evaluated as superior than other forest managers. Sincere forest managers had various benefits such as financial support for forest activities and material support such as seedling, chemicals, machines and fertilizers (Kim et al., 2009). This system still continues.

3.3.8 Other

Rural-urban migration also influenced reforestation in South Korea. The population of the ROK increased from 21.5 million in 1955 to 32.2 million in 1970 (Bae 2010: 31). During the same period, urban population rose from 3.5 million to 17.8 million. Rural population decreased since 1970s (Figure 1.9). The decrease of the rural population using firewood led to the recovery of forests partially. This migration might be interpreted as a result of NEDP. As productivity of agricultural lands increased by the improved agricultural technology, pressure of conversion of forestlands to agricultural lands decreased. It also might be caused by the NEDP (Table 3.4).

3.4 Conclusion

The above data present that Korean government concentrated on reforestation using the various policy instruments; regulations, national accounts, national plans and so on. The National Comprehensive Territorial Development Plans and National Economic Development Plans were interlinked with the National Forest Development Plans. To implement forest policies efficiently, KFS under the MAF was transferred to MHA. This organizational reformation strengthened forest administration power adding local and police administration power by MHA. In particular under the control of MHA SU was linked with forestation projects. It led forest projects to nation-wide movement by public participation. Energy policy, timber demand and supply control and economic development policy was designed and implemented considering reforestation and forest protection. In the process of implementing forest projects, various governmental agencies collaborated and produced integrated plans. Therefore, in the case of South Korea, the policy integration approach (Lafferty and Hovden 2003) contributed to success of reforestation.

4 FORESTS IN THE FUTURE

After the Korean forest transition, KFS focused on multi-functions of forests. As the urban population increased, concerns and demands of urban forest policy is increasing. The function of forests as carbon sink for mitigating and adapting climate change is recently remarkable. Therefore forest policies considering urban forests and climate change should be expanded in the future.

4.1 Urban Forests[11]

The fourth National Forest Plan introduced the concept of sustainable forest management, aiming at the enhancement of overall forest benefits including public welfare and recreational benefits. In accordance with the discourse about SFM in pursuit of maximizing the multiple functions of forests, urban forests were considered an ecological and social space for urban dwellers' recreation and health. With economic development, quality of life became more important as Korean society started to recognize the values of post-materialism (Ingelhart 1997). City dwellers demanded more green areas for recreation and health within their urban environment. Focusing on social and recreational functions of forests, policies on urban forest management became relevant for enhancing the quality of urban life. Since the 1990s, the term "urban forest" has been mentioned in ROK policy documents. The Establishment and Management of Forest Resources Act enacted in 2005, for example, included articles on the establishment and management of urban forests.

According to the Creation and Management of Forest Resources Act, the Korea Forest Service (KFS) established a basic plan for urban forests (2008–2017) in 2007. Local governments then established and implemented local plans for the creation and management of urban forests under this basic plan. Following these plans, central and local governments are constructing and managing various types of urban forests including street trees, urban parks and school forests.

Korean society has been active in protecting urban forests and green areas against the urban development plans of governments and enterprises through forest movements since the late 1990s (Park, 2009). Since the late 1990s, several forest NGOs were established, and they contributed to the establishment of urban forests. Forest for Life, a Korean forest NGO that was established in 1998, has led a movement for creating school forests by replacing the stone walls surrounding schools with forests. As a result, total 869 school forests were created through the participation of teachers, students and parents until 2010 (KFS 2011: 371). A private enterprise, Yuhan-Kimberly, which has conducted a long-term environmental campaign, has provided financial support for the school forest projects (Chung et al., 2011). The school forest movement thus shows how the governance structure relating to the urban forest policy can develop through the collaboration between NGOs, enterprises and citizens. Seoul Forest in Seoul Metropolitan City is another representative example of governance based on the increased involvement of the private sector (Stoker 1998) in the South Korea. In 2003, Forest for Life and Seoul Metropolitan City agreed on a Seoul Green Trust movement that was based on a partnership between Seoul Metropolitan City, enterprises and citizens. Citizens played an important role in the whole process of establishing new forests in Seoul, from the initial design stage to the construction stage, and finally to the on-going management of urban forests. They made a decision to establish the Seoul Forest Park in the site of a golf course and horse track at a location in the central part of Seoul City, and they followed through by donating money and planting trees. Therefore, the Seoul Forest Park was constructed and continues to be managed through public participation. Agreements or contracts play a role as new rules in the field of urban forest management. If it is for the purpose of expanding parks and green spaces, mayors may enter into contracts with the owners of any land in an urban area which has natural vegetation or a forest cover if the contract relates to support for the preservation, maintenance and utilization of such vegetation on the relevant

[11] This chapter includes parts of the two articles by Koo et al. (2013) and Park and Youn (2013a).

land on the condition that the relevant land is made accessible to citizens (Act on Urban Parks and Green Spaces, Article 12). Several Metropolitan Cities have collaborated with private sector actors in forestation projects based on partnership agreements. In 2003, Seoul Metropolitan City and Forest for Life entered into an agreement to expand forest areas in Seoul and conducted the collaborative project for constructing Seoul forests. The agreements and contracts between the public sector and the private sector can be considered a type of new public management through institutional reforms (Kaboolian 1998). Economic and budgetary restraints and demands for urban forests drove public management reforms (Wise 2003) in urban forest management in South Korea.

According to a national survey of the awareness of Korean citizens regarding forests, 80.4% of respondents predict that the demand for urban forests will increase dramatically in Korea (Gallup Korea 2006). To increase citizens' satisfaction with urban forests, these forests must be designed in a manner that responds to and incorporates the current needs of the citizens as users of urban forests (Bell *et al.* 2005). Therefore it is necessary for Korean policy makers to understand citizens' preferences toward the recreational service of urban forests. Detail information on the condition of urban forests and preferences for urban forests is useful in establishing and implementing urban forest policies.

4.2 Climate Change and Forests[12]

The fifth National Forest Plan (2008–2017) highlights the importance of forest functions in dealing with climate change based on global climate discourse. President Lee Myung-bak, in his address to the nation on the occasion of the 60th anniversary of the founding of the ROK in 2008, embraced a vision of "Low Carbon, Green Growth (LCGG)" as a new paradigm to lead Korea's future development for the next 60 years. After that address, LCGG was positioned as a guiding principle for the establishment and implementation of Korean policies in all sectors including the forest sector. Discourse on LCGG combines economic development discourse and environmental discourse. Under the national discourse on LCGG and the global discourse on climate change, national and local legal frameworks and plans regarding the expansion forests as carbon sinks have been established and implemented with the aim to mitigate and adapt to climate change in the South Korea.

The Korean government enacted and promulgated the Framework Act on Low Carbon and Green Growth in January, 2010. Article 2 of the Framework Act defines low carbon as "lowering dependency on fossil fuels, expanding the use and distribution of clean energy, reducing greenhouse gases to an appropriate or lower level and expanding carbon sinks." The Framework Act acknowledges securing carbon sinks, including forests, as a means of mitigating CO2 emissions. The Act on the Promotion of Maintaining and Enhancing Carbon Sinks was established in February 2012. The purpose of the Act is to respond to climate change and to build a low-carbon society by maintaining and enhancing the role of forests as carbon sinks in line with Article 55 of the Framework Act on Low Carbon and Green Growth. The Act on the Promotion of Maintaining and Enhancing Carbon Sinks requires the forestry sector to maintain and enhance forest carbon sinks to cope with climate change. The KFS as the central forest agency has responsibility for mitigating and adapting to climate change in the South Korea. KFS is designing a Korean forest offset system which can link with domestic carbon market. To introduce Korean forest offset system, KFS should communicate with other sectors and various stakeholders.

[12] This chapter includes a part of the article by Park and Youn (2013b).

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APPENDIX

CASE STUDY

Induced Community Participation in South Korean Reforestation

South Korea achieved reforestation in spite of severe deforestation and forest degradation after the Korean War (1950–1953). During the First National Forest Development Plan (NFDP) (1973 to 1978) and the Second Plan (1979–1987), the Korea Forest Service (KFS) has reforested nearly 2 mil ha. South Korea experienced forest transition which is defined as a turnaround in forest cover trends from net deforestation to net reforestation (Mather 1992). South Korean case followed the forest transition pathway of state forest policy. Several scholars argued the government-led efforts are a major driving force on successful rehabilitation of forests in South Korea (Lee *et al*. 2010, Bae *et al*. 2012, Lee 2013). However not only the public sector but also private sector participated in the process of forest restoration policy making. Several scholars argued that public participation contributed to successful forest restoration in the Republic of Korea (Lee *et al.* 2010, Bae *et al*. 2012). However the previous researches were limited to historical description of forest restoration activities by communities under the national greening programme. They did not indicate research findings using policy theories. The systematic analysis was needed for interpreting and understanding the features of community participation in the process of reforestation policy making better. Therefore this study aims at identifying and interpreting the characteristics of community participation in the South Korean reforestation programme, using the theory of public participation.

1. Saemaul Undong as a new community movement

Since 1967 it was established, the KFS has a dominant authority of South Korean forest policy. For effective and efficient implementation of forest restoration policies, in 1973, KFS under the Korean Ministry of Agriculture and Forestry (KMAF) was moved to the Korean Ministry of Home Affairs (KMHA) which controlled local and police administration at that time. Consequently the KFS was under the control by KMHA from 1973 to 1987 (Park and Youn 2013). This organizational reformation means local and police administration power was added to forest policy administration. The time period includes definitely both the First and Second NFDPs which emphasized forest restoration activities. Under the National Economic Development Plan, the KMHA designed and supported a new community movement called “Saemaul Undong (SU)”. SU motivated people in the rural communities to work voluntarily, diligently and cooperatively for rural development (Lee and Lee 2006). It was conducted as nation-wide movement. SU supported implementation of Korean economic development policy since 1970 and has continued until 1990s.

SU was developed and conducted by development efforts of governments with straightforward political power under the South Korean socio-political context. The heavy bureaucratic push was put on villagers to encourage participation in SU (Moore 1984). Since President Park Chung Hee began to take a major interest in Saemaul in 1972, the proportion of central government development expenditures classified as SU expenditures increased from 4 percent in 1972 to 38 percent in 1978 (Moore 1984: 588–589).

SU was related to an upsurge in rural incomes by government. Community forestation projects including establishment of fuelwood forests in the agricultural and mountainous villages belonged to income-generating projects like joint farming, pasturage and so on (Yoo 1987). Government served financial and technical support for reforestation projects and encouraged villagers to take up projects cooperatively. The key to successful completion of reforestation projects lies within interventions and innovations of administrative reforms in South Korea (Yoo 1987) such as coordinated national plans, collaboration among the governmental branches, and organizational reformation (Park and Youn 2013).

2. Theoretical Framework: Public Participation

There are various typologies of public participation. Arnstein (1969) illustrated participation in a ladder pattern with each rung corresponding to the extent of citizens' power in determining the end product, from manipulation to citizen control. Sabucedo and Arce (1991) used two dimensions for classifying political participation. The one is a dimension distinguishing political action within and outside the system. The other is a progressive-conservative scale. They labeled four types of political participation; electoral persuasion, conventional participation, violent participation and direct non-violent participation. Zimmerman (1986) classified the forms of citizen participation as passive and active. Tosun (1999) extended classification of participation to three types – spontaneous participation, induced participation and coercive participation – with consideration for multiple attributes. Spontaneous participation is a voluntary and autonomous activity on the part of people to handle their problems without governmental or other external agencies' help. Induced participation is sponsored, mandated and officially endorsed. Coercive participation is compulsory and manipulated. Table 2 shows different characteristics of three types of community participation by attributes. Participation can be divided to two by spontaneity; active and passive. Spontaneous participation is active participation which takes place when its purpose and content clearly originate with people themselves (Tosun 1999: 118). Induced and coercive participation is passive participation designed and controlled by others. Under the attribute of policy making process, spontaneous participation works in whole process of policy making; policy formulation, implementation and evaluation (Krott 2005). Induced and coercive participation represents the involvement of a community in the policy implementation. Spontaneous and induced participation requires a community to participate in sharing benefits. Whereas coercive participation needs not necessarily sharing benefits (Tosun 1999: 121). In the types of induced and coercive participation, rules and contents of participation are determined by government. Both types are sanctioned in choosing alternatives. As circumstances require, a community has no choice in coercive participation. Coercive participation represents higher degree of tokenism and manipulation than induced participation. Over all the typology of participation by Tosun reveals dimensions of relationship between the state and communities in policy making process. Following the focus of Tosun's typology, this study attempts to investigate features of South Korean community participation in reforestation and to find a locus of Korean case in the spectrum of community participation.

Table 1. Characteristics of participation by attributes.

Attributes	**Type of Participation**		
	Spontaneous	**Induced**	**Coercive**
Direction	Bottom-up	Top-down	Top-down
Spontaneity	Active	Passive	Passive
Policy making process	Whole process	implementation	implementation
Interests	Benefit-sharing	Benefit-sharing	not necessary benefit-sharing
Choice	Self-choice	choice between proposed alternatives and feedback	choice between limited alternatives or no choice
Tokenism	coproduction	tokenism and manipulation	high degree of tokenism and manipulation

3. Research Design

A case study method was used to investigate features of South Korean community participation in reforestation. 'Sanlimgyes' as forest communities with a small size consists of residents in villages were selected as the case study subject. The word Sanlimgye comes from a combination of two words, 'Sanlim' and 'Gye'. Sanlim and Gye literally mean forest and social organization for community cooperation and mutual assistance respectively. A Gye as a traditional community was formed to collect taxes imposed on village members and to pool resources for important events like weddings and funerals (Chun and Tak 2009: 2023).

This study relies largely on historical records and previous articles regarding reforestation in South Korea. Particularly the studies of SU were used to interpret features of community participation in the process of South Korean reforestation. The characteristics of community participation in reforestation were described and interpreted with the six attributes; policy direction, tokenism, spontaneity, choice, policy making process and interests.

4. Results: Characteristics of Community Participation in Reforestation

After the Korean War, Korean Government established and implemented reforestation policies. Because of limit of governmental resources, government emphasized participation by local communities such as Sanlimgye. Strategically government highlighted self-planting by peoples.[13] In this chapter characteristics of community participation in reforestation were interpreted using the attributes of community participation (Tosun 1999); policy direction, tokenism, spontaneity, choice, policy making process and interests (Table 2).

Table 2. South Korean community participation in reforestation.

Attributes	Induced	Contents
Policy direction	Top-down	Administrative guidance
Tokenism	Manipulation	Manipulation by instructions
Spontaneity	Passive	By governmental instructions
Choice	choice between limited alternatives or no choice	Compulsory labor
Policy making process	implementation	Planting trees and forest protection activities
Interests	Benefit-sharing	Foods and fuels

Policy Direction (Top-down) and Tokenism (Manipulation)

For reforestation, Korean government used 'administrative guidance' as one way of administration which has been a traditional governing style since Japanese colonial era (Han 2004: 147). KMAF directly and indirectly guided local people for implementing forest activities. Compulsory mobilization for national projects can create hostility among the people. Therefore government used guidance as a policy means with non-legal binding. "*Administrative guidance occurs when administrators take action of no coercive legal effect that encourages regulated parties to act in a specific way in order to realize some administrative aim* (Young 1984: 923)." Administrative guidance which may bind practically is indeed very valuable for the maintenance of a policy system of limited government (Anthony 1992). However under the military government in 1970s and 1980s villagers might regard governmental guidance as commands with legal-binding effect.

[13] "The 5th is Arbor Day. Planting and tending trees. Calling for people's cooperation." Chosunilbo (Korean Newspaper), 5th April, 1953.

KMAF promoted social associations and delegated authority to them in implementing forest activities under the governmental control. The social associations played a role as proxy agents for forest management due to lack of governmental resources. South Korean government established National Forestry Cooperative (NFC) as a social association in 1962. NFC took tasks to guide forest owners and villagers for understanding of policies and participating in forest projects. Contents of administrative guidance included forest owners' legal obligations such as prohibition of illegal activities, public mobilization and technical information on reforestation activities. In the process of establishment of fuelwood forests, NFCs guided the way of planting and managing trees and transferred general information on governmental strategies and importance of planting trees as well specific information on tree species, planting ways and project procedures. Sanlimgye was a unit of communities to be guided by NFCs. KMAF distributed seedlings and monitored planting trees to villagers using the one-way network between NFCs and Sanlimgyes (Figure 1). The NFCs with the hierarchial structure from central to county played a role as policy brokers in reforestation policy making process.

Administrative guidance for reforestation was linked with programme and organizations for SU. For executing SU at the local level, Provinces, Cities and Districts established the divisions of SU. Each officer from the division of SU has responsibility for SU in a village (Kim *et al*. 2009). This structure enabled the villagers to participate in the reforestation projects on a national scale. Multi-level governmental organizations functioned as action agencies for forest rehabilitation.

Figure 3. Administrative guidance from government to villagers via social associations.

Spontaneity and Choice

Sanlimgye has a historical background. 'Gye' is a traditional social organization formed for community cooperation and mutual assistance in the Korean agricultural community. In the sector of forestry, 'Songgye' was formed nearly 300 years ago to secure the communal use of forests around the villages (Chun and Tak 2009). Song literally means pine. Songgye was a community-based grassroots movement to protect people's interest in pine which was a dominant tree species in Korean forests and made the most valuable timber (Chun 2003, Chun and Tak 2009). It includes traditional knowledge for sustainable forest management by local people (Chun and Tak 2009). Sanlimgye was based on the history of Songgye. However it was not spontaneously formed by villagers. Government encouraged communities to build Sanlimgyes consists of forest owners and villagers for protecting and planting trees, while governmental resources were limited to reforestation. According to Article 4, the Provisional Forest Protection Act enacted in 1951, Minister of the KMAF may organize and de-organize Sanlimgyes and require certain activities to Sanlimgye in the process of monitoring forest management. Toward the end of the 1950s, the total 21,628 of Sanlimyges which consisted of over 2 million members were established (Choi 2008: 316).

Sanlimgyes were created from South Korean governmental needs for human resources in forest management. South Korean government attempted to apply traditional culture of community to

reforestation projects using its authority. South Korean government mobilized villagers for reforestation projects due to lack of financial resources in spite of external aids. The Ordinance on Compulsory Labor enacted in 1953 exacted statute labor from villagers for tree planting and erosion control projects (Kim *et al*. 2009). The Provisional Act on Land Greening enacted in 1963 indicated that Mayors and Governors may require compulsory labor from villages. If the individuals remanded to the compulsory labor could not accede to the order, they shall pay for labor wages. Otherwise other people may replace it. At that time, compulsory labor was an effective instrument for implementing reforestation policy in spite of insufficient national budget. Members of Sanlimgyes were stipulated as one of the prior targets for compulsory labor according to the Act. Sanlimgyes played a role as the compulsory labor organizations which followed the orders from the local ministers (Choi 2008). Not villagers but South Korean government established the managerial regulation of Sanlimgyes, 'the Articles of Sanlimgye' in 1962. The Articles included the tasks of Sanlimgye like following:

> *The Article 9. 1. The members of Sanlimgye shall not collect the violated forest products by the Acts. 2. If the members of Sanlimgye find persons who collect the violated forest products by the Acts shall give a report to the Sanlimgye offices immediately…. 4. The members of Sanlimgye shall be assigned to fatigue duty such as fire control by the directions of Sanlimgye leaders in order to protect forests within Sanlimgye. … 12. The members of Sanlimgye shall follow instructions by the governmental agencies or National Forestry Cooperatives for implementing forest policies.*

Implementation in the policy making process

Policy making process consists of three main phases; formulating, implementing and evaluating policies (Krott 2005). In the phase of policy formulation, the policy issues are identified and selected and policy programs are formulated. In the phase of policy implementation, formulated policies are executed in practice. Implementation requires the stakeholders to take action according to program. Evaluation as the final phase of policy making contains assessing the results of policy formulation and implementation. In the South Korean case of reforestation projects, communities and villagers took part only in the stage of implementation by strong bureaucratic pressure. KMAF used Sanlimgyes as human resources for implementing reforestation policies. Sanlimgyes was mobilized for implementing forest management activities such as forestation, erosion control, illegal logging control, forest fire control and so on. Mayors and Governors could command the individuals, who violated the regulation of behavior control in the protection forests, to do action for the return to the original state. If the violators did not follow the command, Mayors and Governors made Sanlimgyes replace the action and the violators charge expense payment. If forest owners did not conduct forest management activities such as forest disease control, Mayors and Governor could bid Sanlimgyes act on behalf of forest owners. For controlling forest fires, members of Sanlimgyes were required to organize and manage the forest fire control teams (KFS 1997: 211).

The one of predominant causes of deforestation and forest degradation is illegal logging (Lee and Lee 2005). In spite of introduction of forest protection policy, illegal logging was not controlled. From 1945 to 1961 the frequency of illegal logging was 24,085 per year and the average volume of illegally logged timber was 92,853cu m/year (Kim et al. 2009). For control of illegal logging, the members of Sanlimgyes were called for keeping watch on illegal logging activities (KFS 1997: 210). Firewood has been used for heating and cooking in the Korean villages. In 1960, firewood and charcoal accounted for 62.5% of the total primary energy source (Korea Coal Corporation 2001: 70). To control logging and offer energy source, the KMAF established fuelwood forests in the agricultural and mountainous villages. From 1959 to 1967, total 784,239 ha of fuelwood forests were established in 153 cities and counties by 21 339 Sanlimgyes (KFS 1997: 318). During the First NFDP, from 1973 to 1978, in the total 41 934 ha erosion control works were conducted. 23.7 million villagers were mobilized for this works (KFS 1997: 414) as the Table 3 shows.

Table 3. Total work area and number of participants in the erosion control projects.

Year	Erosion controlled area (ha)	Number of Participants (1,000 persons)
1973	4,961	2,424
1974	9,381	3,392
1975	9,204	4,342
1976	5,605	3,469
1977	5,228	3,727
1978	7,510	5,731
Total	41,934	23,685

(KFS, 1997: 414)

Interests: Benefit sharing

For facilitating public participation in reforestation activities, the South Korean government paid fees to the people who participated in building village nurseries and planting trees to control erosion (Lee and Lee 2005: 11). Participants in reforestation projects gained grains (KFS 1997: 313). Some have gained wheat flour supported from the United Nations Korean Reconstruction Agency (UNKRA) as a payment for erosion control activities (Kim *et al*. 2009). At that time it was a means for villagers to overcome poverty in the rural communities. As well, planted trees provided villagers with fruits as foods. National forestation plans included tree plantation projects for increasing farm income (Table 4). In 1970s reforestation projects in communities focused on planting fruit trees according to the First NFDP (KFS, 1997: 398). This focus of reforestation policy contributed to increase of economic benefits from fruit trees such as chestnut trees, walnut trees, persimmon trees, ginkgos, citron trees and so on.

Table 4. Tree plantation plan within private forest areas in 1969.

Focus of forestation projects	Target area (ha)	Numbers of trees (1,000)
Increasing for farm income	16,578	6,999
Trees for special use	8,568	3,189
Bamboo forests	1,010	1,010
Improved popular forests	7,000	2,800
Timber production forests	77,965	233,895
Fuelwood forests	50,331	201,324
Total	144,874	442,218

(KFS, 1997: 314)

As written at the previous session, Sanlimgyes took part in establishing fuelwood forests. According to the Forest Act enacted in 1962, benefits of fuelwood forests were distributed to forest owners (20%) and Sanlimgyes (80%) (KFS 1997: 320–321). Sanlimgyes could gain wood fuels for heating and cooking through participation in reforestation projects. Since 1970, reforestation activities were integrated with SU. SU programme included projects for increasing forest income. For example, if villagers collected lawn seeds from neighboring hills and brought them to SU leaders in villages, they earned money (Kim *et al*. 2009). Therefore reforestation projects contributed to increase of livelihood of communities in practice.

5. Conclusion

This study described and interpreted the characteristics of community participation in reforestation projects from 1960s to 1980s in South Korea, in particular, with the focus on Sanlimgyes as forest communities. The features of community participation in Korean reforestation can be summarized to three.

Firstly, community participation in South Korean reforestation was created and executed by governmental control. Sanlimgye was not a spontaneous community, while traditional Gye was voluntarily organized and managed. Sanlimgyes were established by governmental needs for mobilizing villagers for implementing reforestation projects. Therefore communities were required to follow reforestation policy with the top-down direction. Government's administrative guidance pointed out importance of community participation implementing reforestation projects and encouraged villagers to participate in them.

Secondly, community participation was an instrumental decision for achieving reforestation in South Korea. Communities took part in the stage of implementing reforestation projects such as planting and protecting trees. On the other hand, communities were excluded from the phase of policy formulation and evaluation in the reforestation policy making process. Their labors were used as a policy instrument for implementing reforestation projects. Extremely compulsory labors by villagers were stipulated according to the legal framework.

Thirdly, community participation in reforestation was means of livelihood. Despite of coercive mobilization, participated villagers got paid for their labor. The benefits from planted trees such as foods and fuels were shared with participants in reforestation projects. These benefits contributed to increase of livelihood of communities.

In conclusion, community participation in South Korean reforestation could be shaped between the type of induced and coercive participation, depending on the spectrum of community participation by Tosun (1999). Induced participation is the most common mode to be found in developing countries, since government has a central role to initiate participatory action and institutionalize it in many developing countries (Tosun 1999: 120). Strong governmental authority induced community participation in South Korea. South Korean Government used administrative guidance as a soft means as well compulsory labor as a strong means for achieving reforestation. Consequently mobilized labors of communities functioned as a significant resource for reforestation. It is clear that induced community participation is a major driving force for rapid reforestation in South Korea, in spite of limited governmental budget. Especially administration power enabled reforestation projects to be integrated with the new community movement, SU toward rural development. South Korean reforestation process was based on the centralized control instead of democratic cooperation. Therefore Korean case might be a good model for the states with a high centralized system of government.

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