



## lessons learned from the Republic of Korea's National Reforestation Programme



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Leveraging public programmes  
with socio-economic and development objectives to  
support conservation and restoration of ecosystems:

# lessons learned from the Republic of Korea's National Reforestation Programme



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The views expressed in this publication do not necessarily reflect the views of the Parties to the Convention on Biological Diversity, the Secretariat of the Convention on Biological Diversity or the Korea Forest Service.

# ACRONYMS

Acronyms used throughout the paper and the page where each one is first used and defined is listed below.



Acronyms	Meaning	Page
DPRK	Democratic People's Republic of Korea	10
GDP	Gross Domestic Product	6
KFRI	Korea Forest Research Institute	22
KFS	Korea Forest Service	16
KCC	Korea Coal Corporation	12
KMA	Korea Meteorological Administration	10
MAF	Ministry of Agriculture and Forestry	16
MAFF	Ministry of Agriculture, Forestry and Fisheries	24
MCE	Ministry of Culture and Education	36
MCPI	Ministry of Culture and Public Information	36
MHSA	Ministry of Health and Social Affairs	36
MIA	Ministry of Interior Affairs (=MOHA)	19
MND	Ministry of National Defense	36
MOAF	Ministry of Agriculture and Fisheries	36
MOHA	Ministry of Home Affairs	16
MTI	Ministry of Trade and Industry	40
ROK	Republic of Korea	6
SFM	Sustainable Forest Management	27
UNDP	United Nations Development Program	18
WFP	World Food Program	18

## Foreword



In recent decades, forest restoration has emerged as a key issue in the field of environment. Many ongoing discussions including the Global Partnership on Forest and Landscape Restoration, Bonn Challenge, and the New York Declaration on Forest

reflect the grim reality of human and nature still suffering from degradation in various areas. The 4th Global Biodiversity Outlook (GBO-4) published at the 12th meeting of the Conference of the Parties to the Convention on Biological Diversity also draws the same picture. Despite our continuous and vigorous effort, forest cover and restored areas have been decreasing. This is not news to the Republic of Korea.

Taking up 64% of the Korean land, forest has been important part of Koreans' lives. Forests can be found in numerous works of Korean artists of different times. Korean people also depended largely on forests for cultivation and fuelwood. Needless to say, the Korean peninsula had degraded over a long period of time. In the 1900s, degradation had exacerbated due to overexploitation during the Japanese occupation, the Korean War, and drastic increase of population. By the 1960s, the condition had gotten so severe that it was almost impossible to find trees around populated areas. Consequently, natural disasters such as floods, droughts occurred frequently and damaged crops, farmlands, and other facilities threatening food resources and livelihoods.

Soon the government and people realized that, in order to lift them out of the difficult circumstances, forest rehabilitation efforts needed to be carried out. The Korean government utilized the post-war reconstruction loan from the International Bank for Reconstruction and Development (IBRD) to rehabilitate degraded forest. Our first attempt failed due to various reasons: diminutive public participation, continued illegal-logging, poor choice

of seedlings, and hasty implementation of restoration projects.

Nevertheless, Korea did not give up. Learning from the failure, the new regime made rehabilitation its top priority along with the economic development. The 10-year Forest Rehabilitation Plans were established and integrated into multiple government programmes. With structured plans and expansion of alternative fuels, Korea was able to successfully rehabilitate its degraded forests. Now, Korean forest generates about US103 billion dollar worth of ecosystem services. This study examines the drivers of forest degradation, describes the implementation process, and then analyzes key success factors and lesson learned.

There already have been a number of studies on Korea's restoration success experience. However, preparing this study allowed the Korean government to review its experience and identify strengths and weaknesses. It has been a great chance for Korea to construct new ideas and means to support the Parties with their own restoration efforts through cooperation with related agencies and the recently launched Forest Ecosystem Restoration Initiative at COP 12. In addition, preparing this study also shed light on a need for more in-depth research on biodiversity in Korea. I would like to express my gratitude to the CBD Secretariat and the government of Germany for enabling this Global study project.

As Korea was able to look back its past restoration experience, I hope that this study can remind the readers how important forest restoration is and provide them with an opportunity to think about restoration programmes. Through our concerted efforts, I have no doubt that we could restore once degraded forests.

**Dr. Shin, Won Sop**  
Minister  
Korea Forest Service



The Strategic Plan for Biodiversity 2011-2020 recognises that biodiversity underpins ecosystem functioning and the provision of services that are essential for human well-being. The fourth Global Biodiversity Outlook reports that biodiversity is still being

lost and degraded at alarming rates. This loss threatens development and poverty eradication gains.

The conservation of biodiversity on its own is no longer a sufficient method; actions for restoring degraded ecosystems need to be strengthened and scaled up to maintain biodiversity and the human systems that depend on it.

Some countries have developed public programmes with socio-economic and development objectives that invest in large scale ecosystems conservation and restoration. These programmes offer individuals employment for a number of days each year (employment guarantee schemes) or on-going employment, as required, on a large scale during times of crisis or stress (short-term employment programmes). These programmes utilise labour intensive approaches for both development needs and ecosystem conservation and restoration goals.

The Conference of the Parties (COP) to the Convention on Biological Diversity (CBD) adopted at its eleventh meeting decision XI/16 to promote ecosystem restoration in an integrated manner, building on existing relevant past COP decisions and existing programmes of work, including activities such as addressing causes of ecosystem degradation or fragmentation, and identifying opportunities to link poverty eradication and ecosystem restoration and giving due attention to the rehabilitation of degraded ecosystems in order to restore critical ecosystem functions and the delivery of benefits to people.

By 2020, the Strategic Plan for Biodiversity calls for the rate of loss of all natural habitats, including forests, to be at least halved and where feasible brought close to zero, and degradation and fragmentation to be significantly reduced (Aichi Biodiversity Target 5) and for ecosystem resilience and the contribution of biodiversity to carbon stocks to be enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification (Aichi Biodiversity Target 15).

In this context, the Secretariat of the CBD has initiated this study with the Korea Forest Service on the potential of public programmes with socio-economic and development objectives to contribute to large-scale biodiversity conservation and ecosystem restoration, and how biodiversity conservation and ecosystem restoration can contribute to poverty alleviation and development.

The objective of the study is to provide best practices and lessons learned to assist countries to understand the potential of public programmes with socio-economic and development objectives to contribute simultaneously to poverty alleviation and development and large scale biodiversity conservation and ecosystem restoration goals.

The study elaborates on how the National Reforestation Programme of the Republic of Korea was developed and designed as well as the criteria for success, the enabling factors, and the key principles that can be replicated.

**Bráulio Ferreira de Souza Dias**  
Executive Secretary  
Secretariat of Convention on Biological Diversity

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PART1

# Introduction



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In the early 1960s, the Republic of Korea (ROK) was one of the poorest and least developed countries in the world, with a nominal GDP of \$82 (USD) per capita. It seemed unlikely that the ROK could rehabilitate its forests, which had been devastated during the Japanese occupation (1910-1945) followed by the Korean War (1950-1953). Despite the unfavorable economic climate, the Korean government began a massive tree planting effort in 1962 through the newly instituted National Reforestation Programme.

At the time the programme was instituted, the impacts of deforestation and forest degradation were catastrophic. Each year, repeated floods sank the nation deeper into poverty. During the 10-year period from 1955 to 1964, an estimated 1,300 people lost their lives, and the livelihoods of an additional 220,000 people were destroyed due to floods. An estimated 200,000 ha of farmland was damaged or lost. The problem of forest degradation was further exacerbated by the fact that fuelwood was the primary resource for heating and cooking in most households.

The National Reforestation Programme was initiated with urgency to protect food resources and the livelihoods of the Korean people. The Korean government instituted laws, regulations, and policies to support reforestation efforts, while simultaneously campaigning to increase public awareness. At the time, outreach focused on promoting the belief among the Korean public that participation in tree planting activities would help to lift them out of their difficult circumstances.

The most important driver behind the concerted reforestation efforts was President Park Chung Hee's dedication towards pursuing forest rehabilitation. His personal commitment towards developing the economy and alleviating poverty placed forest rehabilitation efforts at the core of his economic agenda. Consequently, forest rehabilitation was directly linked to major development plans on the national agenda, such as *Saemaul Undong*<sup>1)</sup>.

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1) *Saemaul Undong* (New Village Movement): The successful reforestation of degraded forest can be attributed not only to the massive implementation of forest plans, but also to the initiation of a new community movement called '*Saemaul Undong*'. Launched in 1970 by the president, *Saemaul Undong* was an effort to modernize rural economies of the ROK. Through this movement, the government was able to support human resources by promoting education and conducting training programs

in various parts of the country to increase the number of forest managers and specialists while boosting reforestation and forest management efforts. Local communities were consulted upon implementation of forest policies, and the need for fuelwood was addressed in rural areas through the implementation of fuelwood plantation projects. Along with these projects, the government provided financial support to local communities through forest *kyes* (mutual aid associations).

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From 1962-1987, the National Reforestation Programme was responsible for the planting of an astronomical volume of trees throughout the ROK. Tree seedlings were supplied from multiple sources, including government-owned nurseries, forest co-ops, and seedlings grown locally in villages. Trees were planted to supply both fuelwood and a revenue source for local communities. Erosion control projects were carried out in conjunction with tree planting. Men and women of all ages and occupations were encouraged to participate in the programme. The concerted government-led efforts coupled with the public campaign allowed the ROK to become an internationally recognized example of forest restoration a mere 25 years after the programme's inception. Today, the ROK remains one of only a handful of reforestation success stories.

This case study first examines the drivers of forest degradation within the historical, economic, social, and administrative contexts of the ROK. It then describes the background, methodology, and implementation processes which led to the success of the National Reforestation Programme in the ROK. An analysis of the key factors which contributed to this success story may be useful to other nations with similar objectives, who can learn from the Korean model and adapt it to their own needs.





## PART 2

# Forest Degradation

- 01. Historical Context
- 02. Economic Context
- 03. Social Context
- 04. Administrative Context

### Degraded Forest in the 1950s

(Provided by the Korea Forest Service)



Clear recognition of the main drivers of forest degradation is the first step to planning an effective forest rehabilitation project. After Japanese occupation of the ROK, the indirect drivers of forest degradation were the South-North division, the Korean War, population increase, poverty, and weak administrative power. The direct drivers were the collection of fuelwood for household uses, shifting cultivation methods, and illegal and indiscriminate logging.



## 01 Historical Context

Forest degradation in the ROK began to occur even before the 18<sup>th</sup> century. However, massive exploitation of natural resources to support Japanese war materials during World War II accelerated forest degradation. The northern region of the Korean peninsula was more forested but a greater proportion of this land was privately owned. The more densely populated southern region experienced more extensive forest degradation, especially after the South-North division.

Prior to the Korean War, national timber supply was able to meet demand, although there were some regional differences in resource availability. When the country was divided into the DPRK (North) and the ROK (South), the ROK soon faced a timber shortage, as it ended up with less timber per capita than the DPRK. The population in the ROK was about 1.6 times larger than the DPRK, whereas the forest cover and growing stock were only 71% and 57%, respectively, of what the DPRK received after the division. In 1945, the growing stock per ha in the ROK was just 16.6 m<sup>3</sup>, which equates to 13% of its growing stock in 2010. Differences in the volume of growing stock per capita paint an even gloomier picture of the resource disparity between the two countries. The ROK had only 4.7 m<sup>3</sup> per capita, 36% of what the DPRK had at the time. In this respect, the division of Korean peninsula was one of the fundamental drivers of forest degradation in the ROK (Bae, 2010).

A more critical driver of forest degradation was the Korean War (June 1950 - July 1953). The war lasted thirty-seven months and resulted in massive human losses and property damage. Military forces from sixteen United Nations member countries served in the war, resulting in 1.6 million military deaths. Close to one million civilians lost their lives or were seriously injured. By August 1951, the ROK's manufacturing sector had suffered severe damage, and it was estimated that 44% of the buildings and 42% of the facilities were destroyed (Institute for Military History Compilation, 1996). The entire country was a battlefield, and direct damage of the war spanned much of the Korean peninsula. For Korean forests, this destruction was coupled with increases in illegal logging and the expansion of slash-and-burn agriculture in the midst of post-war social unrest.

During the Korean War, almost half of the forest land was destroyed. The average volume of growing stock dropped to 10.5 m<sup>3</sup> per ha, about 36-40% of pre-war estimates. The state of Korean forests had reached a historic low, having been further degraded from an already damaged condition after the South-North division. Erosion control facilities were destroyed and consequently, heavy rainfalls during monsoon season caused secondary damage.

## 02 Economic Context

After liberation from the Japanese occupation in 1945, the ROK experienced a period of severe poverty and social turmoil which lasted until 1960. Cutting economic ties with Japan temporarily led to serious economic chaos. Political turmoil and inconsistent economic policies further aggravated the situation. To make matters worse, the outbreak of the Korean War destroyed the remaining manufacturing facilities and transportation infrastructure, leaving the majority of Koreans in economic hardship.

With aid from the international community, industrial production in the ROK began to recover around 1952. Until the late 1950s, however, the Korean government was too busy rebuilding the country's devastated infrastructure to focus on restoring denuded forest land. Rebuilding was almost completed in the late 1950s when foreign aid started to shrink. This coincided with the April Revolution<sup>2)</sup> in 1960, which was the beginning of another period of political turmoil that exacerbated the economic situation.

Korean GDP per capita was considerably lower than developed nations during this period (USD 50 in 1945; \$65 in 1950 and \$79 in 1960) and the majority of Koreans had to worry about meeting their basic needs. President Park instituted the First 5-Year

Economic Development Plan in 1962, and its effects started gaining momentum around 1967, during the start of the Second 5-Year Economic Development Plan. In addition, a family planning policy was successfully implemented during this time, resulting in a decline of the population growth rate. Although income per capita began rising with increasing economic growth and decreasing population growth, the GDP per capita was still low (USD 255) in 1970.

During the 1960s, Korean development policies focused on promoting heavy industry and export-oriented economic sectors to establish the foundation for economic independence. Thus, there were no political or financial incentives to restore degraded forest land. While manufacturing increased, this period saw little improvement for agriculture. Consequentially, the economy of rural areas remained in a deep depression, resulting in *Bo-rit-go-gae*<sup>3)</sup> and food shortages. Poverty drove people in these areas to illegal logging, slash-and-burn agriculture, and the collection/sale of fuelwood, all of which resulted in further forest degradation and loss.

### Box 1. The Geography and Climate

A divided nation, the two Koreas (the DPRK and ROK; North and South) are located in Northeast Asia. The Korean Peninsula is situated between 33.7° and 43.1° North latitude and 124.1° and 131.5° East longitude, sharing a border with China in the northwest and Russia in the northeast. It extends for approximately 1,000 km from north to south and is 170km wide from east to west. The ROK has a total area of 1,000 km<sup>2</sup> and a population of over 50 million. The country is mostly mountainous with forests accounting for 63.7% of the total land area. In general, mountains and uplands are located primarily along the east coast, while the western part of the peninsula is characterized by plains and lowlands. The climate of the Korean Peninsula varies, but is predominantly temperate. Except for some mountainous zones, annual mean temperature ranges from 5° to 14° C from March to October. The annual mean temperature in the southern region (between 33° and 37° North latitude) is 12.5° to 15°C, 10° to 12.2° C in the central region (between 37° and 39° North latitude), and 2.5° to 10° C in the northern region (between 39° and 43° North latitude). In August, it reaches 26° C, and in January drops to -6° C. Over half of all rainfall takes place in summer, with the annual mean precipitation of 1,000 to 1,800 mm in the southern region and 1,100 to 1,400 mm in the central region (Lee and Heo, 2011; KMA).



2) The April Revolution was a popular uprising in April 1960, led by labor and student groups, which overthrew the autocratic First Republic of the ROK and led to the transition of the Second Republic.

3) *Bo-rit go-gae* is a Korean term referring to an annual period of spring hardship before the 1980s. Since rice could not be cultivated in all areas, and was unaffordable for many Koreans, barley (*bo-rit*) was an important alternative to rice for commoners. In most parts of Korea, barley was planted in winter and harvested in early summer, often making spring a time of great hardship for farmers, as winter food stores became depleted. This period was called the 'barley hump' (*bo-rit go-gae*), as one had to survive, or 'get over the hump,' until the barley could be harvested. For most Korean farmers before the 1980s, it was an exceedingly difficult period to endure, as reflected in a Korean saying: 'the barley hump is higher than a great mountain.' (Pettid, M.J., 2008. Korean cuisine: An illustrated history. Reaktion Books Ltd, London, p. 36.)

### 03 Social Context

The Korean population increased 25.4 % between 1945 and 1950. This post-war population boom had adverse impacts on forest resources management and the volume of growing stocks. Fuelwood and charcoal accounted for 90.5% of the ROK's primary energy sources in 1950, and 62.5 % in 1960 (KCC, 2001). It was estimated that the increase of 4.5 million people between 1945 and 1950 would require the consumption of an additional 2.63 million m<sup>3</sup> of charcoal per year (Bae and Lee, 2006). Since the total volume of growing stock in 1945 was 74 million m<sup>3</sup>, it was evident that the annual growth increment would be completely used to make up for the additional charcoal consumption. The population growth in the 1950s was drastic, and remained steady in 1960s. The population boom not only increased charcoal demand, but also demand for construction timber, causing even further forest degradation.

The increased demand for forest resources continued to put pressure on forest lands. Until the 1960s, the ROK's limited import capacity caused it to rely heavily on domestic timber production for fuelwood and building materials. In 1955 approximately 100 million m<sup>3</sup> was consumed for household heating and cooking, equating to 17% of the total growing stock (Bae and Lee 2006). If this level of consumption had

continued, Korea would have faced the complete depletion of its forest resources within 10 years. The most direct driver of forest degradation was exploitation of forest resources to meet household energy needs.

Illegal logging was another direct cause of forest degradation until the early 1970s. It was so prevalent that it was considered 'one of five social evils'<sup>4)</sup> at that time. From 1967-1972 there were about 3,000 cases of illegal logging with an average volume of 17,673 m<sup>3</sup> destroyed annually. Shifting cultivation also played a damaging role in forest degradation until the 1970s. When the First 10-Year Forest Rehabilitation Plan was implemented in 1973, around 300,000 households were still practicing slash-and-burn agriculture taking up 125,000 ha of forest, which was 1.3% of total forest land. Although this percentage may seem small, slash-and-burn represented 13-14% of all agricultural activity in the ROK at that time.

4) President Park's administration designated smuggling, narcotics, illegal logging, gangs, and quasi-journalists as five social evils.



Fuelwood Collection and Consumption  
(Provided by the Korea Forest Service)

### 04 Administrative Context

Although the ROK was left in serious disarray after three years of the Korean War, the Korean government legislated the 'Temporary Measures for Forest Protection Act' in 1951 and established the 'National Arbor Day' in 1946. However, these efforts could hardly be effective due to insufficient financing and weak administrative power.

Following its liberation in 1945, the ROK was left with no replacement for the Japanese colonial government's strict regulations. The newly formed national administration faced major obstacles in the control of deforestation as most of the nation depended on illegal logging for fuelwood. The government called for 'severe punishment for any extent of illegal logging.' Without providing an alternative energy source, however, this amounted to little more than an empty threat, since the livelihood of many villages depended solely on fuelwood collection (Jung, 2000).

Governments play a key role in the success of forest rehabilitation, especially in developing countries where financial means are limited (Mather, 2007). The weakened administration of the ROK left after the extreme chaos of liberation was unable to prevent illegal logging and shifting cultivation. In fact, the government was also a prominent cause of forest degradation at this time.



PART 3

# National Reforestation Programme

01. Background

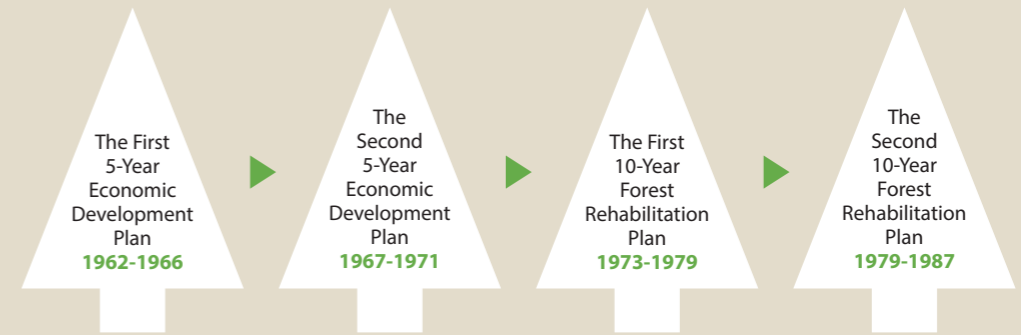
02. Reforestation Efforts

03. Implementation Process and Tools

04. Outcomes of the National Forest Rehabilitation Programme



Figure 1. Timeline of the National Reforestation Programme



This chapter describes background, reforestation efforts, implementation processes and tools, and the outcomes of the National Reforestation Programme. The programme was implemented over 25 years (1962-1987) and can be divided into two major periods, or 'Plans,' based on the main driving force behind the Plans as summarized in Figure 1. The first period took place when the Forest Rehabilitation Plan was still a part of the pan-government Economic Development Plans (1962-1971). The second period took place when the Korea Forest Service (KFS) led the establishment and facilitation of the Forest Rehabilitation Plans (1973 to 1987). This second period can be further divided into two 10-Year Forest Rehabilitation Plans (hereafter referred to the First and Second Plans).

## 01 Background

The extreme degradation of forests during the Japanese occupation and Korean War became a huge obstacle to attaining national restoration goals and increasing the national standard of living. Damage due to droughts and floods occurred each year, causing losses in agricultural productivity, the destruction of roads, damage to industrial facilities and residential properties, and even the loss of human lives. Soil erosion worsened these effects by filling in river beds. This caused floods to become more frequent and shrank the foundation for industrial developments. Policy makers recognized the need for forest rehabilitation. They included the reforestation project as part of the First 5-Year Economic Development Plan (1962-1966), which reflected the goals of the Forest Law<sup>5)</sup> enacted in 1961.

The Korean economy responded well to the Economic Development Plan. The national income increased, and there were changes in energy use. Widespread recognition of the importance of reforestation helped launch the KFS as a separate organization under the Ministry of Agriculture and Forestry (MAF)<sup>6)</sup> in 1967. Under the newly formed KFS, the Second 5-Year Economic Development Plan (1967-1971) included more extensive forest policies regarding issues such as reforestation and forest protection, as well as promotion of forest industries.

The First and Second 5-Year Economic Development Plans prioritized building infrastructure such as railroads, highways, and electricity. As a consequence, forest rehabilitation projects were low priority and they did not see their expected results. When President Park became aware of this problem, he reorganized the KFS under the Ministry of Home Affairs (MOHA)<sup>7)</sup>, allowing it to lead forest rehabilitation efforts. At the time, the ROK needed a strong and comprehensive set of policies to promote fuelwood plantations, both to meet energy needs of rural areas and to quickly restore degraded forests, while preventing further losses.

Under these circumstances, the Korean government established the 10-Year Forest Rehabilitation Plans in 1973. In total, the plan aimed to restore 39% of total forest land in the ROK, totalling 2,637,000 ha of forests. One million ha was to be restored during the First Plan and the rest during the Second Plan. The First Plan was scheduled to be carried out from 1973 to 1982, but it was completed in only six years (1973-1978); the Second Plan also met its goals a year early (1979-1987). The Third National Forest Resource Plan (1988-1997) was initiated in 1988.

5) Forest Law was replaced by the Framework Act on Forests (2001) and the Act on the Creation and Management of Forest Resources (2005), repealed in 2005.

6) Ministry of Agriculture and Forestry (1948-1973)  
⇒ Ministry of Agriculture and Fisheries (1973-1986)  
⇒ Ministry of Agriculture, Forestry and Fisheries (1986-1996)  
⇒ Ministry of Agriculture (1996-2008)  
⇒ Ministry for Food, Agriculture, Forestry and Fisheries (2008-2013) ⇒ Ministry of Agriculture, Food and Rural Affairs (2013-present)

7) Ministry of Government Administration (1948-1998) & Ministry of Home Affairs (or Ministry of Interior Affairs, 1948-1998)  
⇒ Ministry of Government Administration and Home Affairs (1998-2008)  
⇒ Ministry of Public Administration and Safety (2008-2013)  
⇒ Ministry of Security and Public Administration (2013-present)

## 02 Reforestation Efforts

### *The First 5-Year Economic Development Plan (1962-1966)*

There had been continuous but inefficient efforts to control forest degradation and promote forest rehabilitation in the ROK before the 1960s; however, it wasn't until the early 60s when the systematic approach was taken by the government. The government included the forest rehabilitation project in the First 5-Year Economic Development Plan, setting the forestry policy goals as: ①protection and nurturing of forests, ②enhancement of forest resources, ③preservation of land, and ④development of national economy in line with the goals of the Forest Law enacted in 1961. To accomplish these goals, special focus was given to the establishment of plantations to address issues of erosion control and fuel demand in rural areas.

The shortage of fuelwood reached a critical level during the First 5-Year Economic Development Plan. It was so serious that the people had resorted to using shrubs like *Rhododendron* and *royal azalea* as fuelwood. The government calculated the fuelwood usage of the 2.4 million rural households as 5t per year, and attempted the establishment of 1.2 million ha of fuelwood plantations. However, only 237,000 ha of fuelwood plantations were established by 1965 for the following reasons: ①forest owners preferred fruit orchards, ②villagers still did not see fuelwood collection as unlawful behavior, and ③selected fast-growing species were planted in equal proportions throughout the country without regard to local habitat suitability (KFS, 2007).

In 1962, the government enacted the Erosion Control Work Act, and pursued erosion control works across 377,717 ha over the course of two years. During this period, it is recorded that about 330,000 ha of erosion

control works was completed. However, the quality of this work was very poor, and subsequently required much maintenance in later days. One reason for this is that the government paid wages to technicians, but many unskilled laborers were paid in grains and did not have the proper skills required.

The government secured seedlings for tree-planting through multiple sources, including government-owned nurseries, forest co-ops, and seedlings grown locally at village levels. It is worth noting that although the National Reforestation Programme was initiated by the Korean government, nurseries in about three hundred villages were actively facilitated to provide economic opportunities to the locals. This encouraged community participation. Tree-species cultivated in the nurseries were fast-growing trees for fuelwood, fruit trees for food resources, and long-term trees for high quality timber.

Increased national income in urban households because of economic development led to greater use of anthracite coal for heating and cooking. Simultaneously, the government banned bringing fuelwood into the densely populated capital area to further encourage the transition from fuelwood to coal.

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### The Second 5-Year Economic Development Plan (1967-1971)

The successful implementation of the First 5-Year Economic Development Plan (1962-1966), increased national income, and new anti-fuelwood policies caused urban households to use more anthracite coal. Forest protection and reforestation policies maintained their effectiveness as more cities began to make the switch towards coal.

The Second 5-Year Economic Development Plan started with the establishment of the KFS. With the inauguration of the KFS, the basic direction of the forest policy had changed from 'protection-centered' to 'promotion of forest industries', but reforestation efforts continued. Reforestation efforts included planting fuelwood plantations to secure the long-term provision of fuels for rural areas, and industrial plantations to generate revenue with fast growing tree species, genetically improved poplar, fruit trees, commercial trees, and bamboo. In 1967, 360,000 ha of fuelwood plantations were created, and an additional 150,000 ha were reforested, resulting in a total of 440,000 ha of fuelwood forestation by 1972. Fuelwood plantations were mainly created by the *forest kye* (*kye* is the Korean term for a type of social network within communities, created to share credit and labor and to buffer hardships). According to the forest leasing and profit-sharing system outlined in the Forest Law, profits from fuelwood plantations were to be divided between forest owners (20%) and *forest kyes* (80%).

Erosion control work was carried out within the national budget as well as aid from the United Nations Development Programme (UNDP) and World Food Programme (WFP). Between 1967 and 1971, KRW 4.8 billion was invested in the hillside, sea shore, and torrent erosion control projects. This accounted for 20% of the entire forest budget for that time period. The KFS's budget increased rapidly from KRW 2.1 billion in 1967 to KRW 6.3 billion in 1972. The special account for national forest management saw an especially large increase, from KRW 330 million in 1966 to KRW 2,556 million in 1972.

Until 1972, neither erosion control plans nor efforts to create 780,000 ha of fuelwood plantations were met with success. In a 1972 assessment conducted on the 784,239 ha of fuelwood plantations established between 1959 and 1967, researchers found that 47% had failed (Korea Forest Policy Society, 1975). Erosion control work was in a similar condition due to a lack of funding and fuel shortages in rural villages. The Korean government was concerned that the planted seedlings were being collected for fuelwood (Korea Forest Policy Society, 1975). Although legislation and other efforts to reduce slash-and-burn agriculture were introduced in 1966, targeting mainly Gangwon Province (the region in the ROK where slash-and-burn practices were most prevalent), the government was unable to gather accurate statistics to assess the extent of the problem (KFS, 1980), making it difficult to address.



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### The First 10-Year Forest Rehabilitation Plan

As the KFS was reorganized under the MOHA (transferred from the MAF), which controlled the local administrative power and police force, the National Reforestation Programme had a better environment to practically and effectively implement its projects. In principle, the First Plan was to be closely aligned with the Economic Development Plans, the National Comprehensive Development Plan, and the *Saemaul Undong*. This was the period for regional development based on industrialization and comprehensive land development under the Third 5-Year Economic Development Plan (1972-1976). In other words, the Korean government changed its policy from the previous pro-growth economic model to a balanced development approach aimed at closing the gap between the urban and rural areas. This was done primarily through the *Saemaul Undong* (a rural livelihood improvement and rural development movement). As a result, rural villages as well as cities could begin replacing fuelwood with anthracite coal. In this way, *Saemaul Undong* helped to maintain the effectiveness of the reforestation policies.

The First Plan established by the KFS (under the MOHA) stated the following four objectives in its preface: ①making it all citizens' patriotic duty to participate in forest rehabilitation and ensuring that forest resources are profitable, ②reforesting 2,637,000 ha of denuded forest land, ③creating new economic zones in forest areas by systematically managing all forest earnings in stock, ④mobilizing local communities, local government agencies, police, forest officials and forestry schools together towards the development of forest area (MIA, 1973).

Of the objectives in the First Plan, the quantitative goal to reforest 2,637,000 ha of denuded forest land (one million ha during the First Plan and the rest in the Second Plan) was the top priority. In order to achieve this, the First Plan suggested implementing a nationwide tree-planting effort (objective one, above), and mobilized all available administrative and technical forces (objective four, above). It also suggested raising the income of rural people by creating new forest economic zones (objective three, above). In short, the core of the First Plan was setting the quantitative reforestation goal of 1 million ha, introducing the nationwide tree-planting movement and mobilizing all administrative power to implement the plan.

'Tree-planting system by all people' was not included in the original draft of the First Plan. However, it was adopted as the core tool for implementation. It became a requirement for not only direct stakeholders (such as government and forest owners), but also for people of every class in villages, workplaces, families, organizations, institutions, militaries, and schools to participate in achieving the national reforestation goal. This was often achieved by assigning tree-planting responsibilities to entities. For example, each village was encouraged to reforest the area within a 2 km radius from the village center; organizations and institutions were responsible for reforesting designated areas; forest corporations and land owners mandatorily planted trees; and corporations which did not own forests were encouraged to participate voluntarily in the nationwide tree-planting movement. The movement reflected the will of government to reforest the land in a short time period by mobilizing maximum central and regional administrative power and police force.

Nationwide Tree-Planting Movement  
(Provided by the Korea Forestry Newspaper)



Along with these methods, the government strengthened the promotion of reforestation by appealing to patriotism and invoking a sense of duty among the public. For example, in one speech, the president stated “The citizens have responsibility to keep our land green and beautiful. Also, they have a mission to enrich our land before passing it down to the next generation. Establishing luxuriant forests is the purest form of patriotism and the way to love the country” (Chosun-Ilbo, 1974, April 5). In addition, the Korean government used the slogan, “Let’s go to the mountain singing the national anthem”. Combined with the strong will of the government, the slogan linked social bonding among the Korean public with the goal of reforestation.

As shown in Table 1, most of the targeted goals under the First Plan were achieved within the first 6 years, albeit with slight deviations. The Korean government increased the number of fast growing and long-term trees planted while decreasing the proportion of fruit trees. The overall outcome surpassed the expected goal of 1 million ha. This was reflected in nurseries where the number of fast-growing and long-term tree seedlings far outnumbered fruit tree seedlings.

In contrast to the success of the reforestation goal, erosion control efforts only achieved about half of the original 84,000 ha goal. This was the result of investing 10 times more resources into the erosion control and restoration project in Yeongil district (Box 2) than other project works (Kim and Bae, 1978). Although the erosion control projects did not achieve the original goals, the most important goal of 1 million ha reforestation was successfully accomplished. As a result, in 1978 the Korean government announced the success of the First Plan four years early.

**Table 1. Outcomes of the First Plan (1973-1978)**

Source : KFS(1979)

Per Project	Plan (A)	Outcome (B)	% (B/A)
<b>o Plantation</b>	1,000 ha, a million trees 1,000 (2,132)	1,000 ha, a million trees 1,080 (2,960)	108
- Fruit Trees	300 (120)	154 (61)	51
- Fast-growing Trees	300 (607)	360 (756)	120
- Long-term Trees	195 (585)	358 (1,106)	183
- Fuelwood	205 (820)	208 (1,037)	101
<b>o Tree-tending</b>	3,799,000 ha	4,177,000 ha	110
- Weeding	1,735	2,258	130
- Tending of Young Trees	1,675	1,035	62
- Additional Fertilizer	389	884	227
<b>o Erosion Control</b>	84,000 ha	42,000 ha	50
- Hill-side	83	41	50
- Sea Shore	1	0.6	60
- Torrent	500 km	142 km	28
<b>o Nursery (Seedlings)</b>	2,132 million trees	3,054 million trees	143
- Fruit Trees	120	70	58
- Fast-growing Trees	1,426	1,559	109
- Long-term Trees	586	1,425	243

Despite the overall success of the First Plan, there was substantial criticism that the outcomes were being judged primarily on the quantitative results of the plantations and nurseries. The first year project assessment team of the First Plan had recommended that policies for establishing plantations and nurseries should concentrate more on quality rather than quantity. The team also recommended that more emphasis be placed on creating lumber resources on plantations, rather than on reforestation around villages. The same ‘quality over quantity’ recommendations were also given for tree nursery establishment. The assessment team argued that if healthy seedling production was the primary goal, both community-based nurseries and agency-based nurseries should be limited to supplying seedlings to nearby areas.

Also, the team recommended that the forestry cooperative-based nursery with more quality control

measures provide seedlings for creating fuelwood plantations and community-based nurseries. Other recommendations included: 1) to facilitate the plantation of timber species, 2) to reconsider 0.3 million ha of chestnut plantation, 3) to avoid plantations mandated by the government, and 4) to encourage forest owners to become the main agents of reforestation (The First Year Project Assessment Team of the 10-Year Forest Rehabilitation Project).

The government at that time did not accept most of these recommendations. Although there was little objection to the ultimate goal of reforestation, the government disagreed with the assessment team as to the means of how to achieve it. The personal conviction of President Park, who had made rapid forest rehabilitation his utmost priority, was reflected in the First Plan. However, the plan neglected forest policies for improving forestry-related technologies and forest owner-centered management strategies.

## Box 2. Forest Rehabilitation Project in Yeongil District

On a flight into the ROK, what people are most likely to see first out of the window is Yeongil district. Until the 1970s, about 4,500 ha of this landscape was eroded to the point where no plants could grow. Shallow granite and sedimentary bedrock made it easy for top soils to be washed away even in moderate rain and breeze. Once deforested, the Yeongil district had slim possibility of rehabilitation.

Pushed by the central government following a presidential visit in 1971, the 5-year erosion control project was initiated in 1973 as a collaborative effort among the KFS, Forestry Experiment Station<sup>8)</sup>, and the government of northern Gyeongsang province. Due to the Yeongil district's severe and harsh conditions, much emphasis was placed on stabilizing erosion so that trees could be planted. During this period, about KRW 3.8 billion (current value of KRW 380 billion) was put into the reforestation project. Roughly 3.6 million people were mobilized annually to plant 24 million seedlings.

8) Forestry Experiment Station was established in 1922 and reorganized/renamed as Korea Forest Research Institute (KFRI) in 1987. KFRI is currently under the Korea Forest Service.

Various factors played in the success of this project, *inter alia*:

- concrete timeline for completion;
- selection of appropriate erosion control strategies and seedlings through a pilot project;
- array of tests conducted by Forestry Experiment Station, including a soli dressing test, forest fertilization test, contour trenching measures test, planting density test of soli-improving trees, estimating size of planting hole, and seeding test; and
- continuous management activities such as establishing an erosion expert network, developing technical personnel, and forest-fertilization.

*Gyeongsangbuk-do, 1977*

The end result of the project turned a bare, denuded area into beautifully restored forest. Since the reforestation effort, the number of droughts and floods in the district has decreased, productivity in farming has increased, and a great deal of forest resources have been provided. The Yeongil Erosion Control Project exemplifies the important role that erosion control played in the National Reforestation Programme.

To commemorate the success, a park was established where visitors can appreciate how millions of people were able to transform a degraded landscape into forest.



Rehabilitation of eroded land in Yeongil district, Cheongjin-ri, Chengha-myeon, Pohang-si  
(Provided by the Korea Forest Service)



### The Second 10-Year Forest Rehabilitation Plan

The Second National Forest Plan was initiated during the Fourth (1977-1981) and Fifth 5-Year Economic Development Plan (1982-1986). This was another time of social and political turmoil that included events such as the oil shock in 1979, the death of the President Park, the Military Coup of December 12<sup>th</sup>, and the democratization movements. At the same time, due to improved national standards of living, there was increased demand from citizens for things like environmental protection and outdoor recreation, which were at odds with the simultaneously rising demands for housing development and paper/wood products. On the other hand, rapid urbanization led to a decrease in the size of the rural labor force, increasing labor costs in these areas. The shortage of a rural labor force, combined with the rising cost of reforestation worsened the economic climate for forest management. There was a general agreement among people that forest rehabilitation had been accomplished successfully, and the forestry sector was no longer a priority in the government budget allocation.

The Second Plan began with the goal of completing reforestation of the degraded forest lands left unfinished by the First Plan. However, the Second Plan was reduced from a ministry-level plan (of MOHA) to an agency-level plan (of Korea Forest Service). Compared to the First Plan, which was a top priority government project, the Second Plan's focus was reduced to specific forestry goals for increasing the income of rural residents from forest resources. During this transition process, the basic goal of the Second Plan was changed from the total greening of the homeland to the creation of forest resources. Due to the transition of goals, the justification for the Second Plan also changed from greening to the creation of commercial forests, from a social movement based on patriotism and social bonding to a technology-oriented utilitarianism, and from mandates and regulation-centered policies to supporting development-centered policies.

The Second Plan also promoted environmental awareness for citizens and encouraged participation in the tree-planting campaigns. At this point the focus shifted towards voluntary participation tree planting, as opposed to forceful mobilization and government

mandates. Furthermore, adaptive planning was initiated to perform reforestation projects without conflicts with various domestic and international climates by allowing reforestation goals to be frequently revised and supplemented as needed during the period that the Plan was implemented.

**(Plantation)** In the Second Plan, the original reforestation goal of 1.5 million ha was reduced to about 1 million ha after being modified twice due to rural labor shortages, increasing labor costs, and decreasing plantation target area. The Plan was completed 1987 (one year early), with the reforestation of 1,075,000 ha, about 94 % of the original goal (1,148,000 ha).

The Second Plan focused more on the quality of reforestation than the quantity. To cultivate forest resource bases, large scale commercial forest complexes were created. The government of the ROK created 80 commercial forest complexes, and initiated reforestation projects focused on growing commercial tree species. Starting in 1981, government researchers conducted informal soil surveys on the target areas for these complexes, analyzing environmental and soils data to choose site-specific species to plant.

**(Tree-tending)** In the Second Plan, tree tending was successfully implemented in about 1 million ha of plantations created during the First Plan. But the quantitative goal of tree-tending was also revised down to 842,000 ha. The government promoted civilian-led projects and took a supporting role. The areas planted were fertilized after three years with a new aerial fertilization technologies and equipment. Overall, the tree-tending projects accomplished over 90% of targeted goals.

The Second 10-Year Forest Rehabilitation Plan was implemented under the military regime of President Park. Although politically this era was full of social unrest caused by the demands for more democratization, the financial and administrative power of Park's government supported the improvement of forest resources, and established a foundation for managing these resources.

## 03 Implementation Process and Tools

**(Reorganization)** The KFS was transferred from the MAF to the MOHA, a government body with more administrative power and police force. The government came to this decision in order to carry out forest administration more effectively, which resulted in the amendment to the Government Organization Act in 1973. It intended to achieve forest rehabilitation in a short period of time by mobilizing central and regional administrative power and police force. Combined with the strong-willed leadership and the clear necessity of reforestation, the newly strengthened KFS quickly reached its quantitative target, afforesting 1 million ha within the first phase.

The reorganization had two significant aspects:

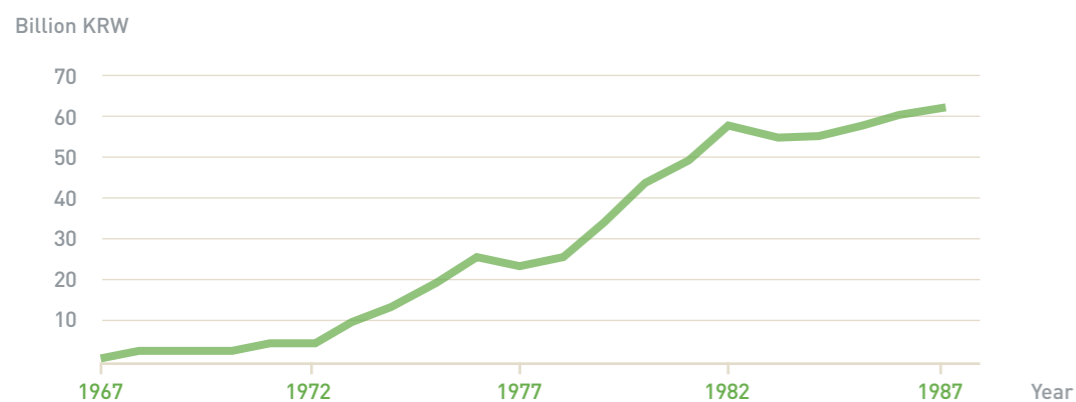
**1. Forest rehabilitation became the top priority of the administration.** Every core project on the government agenda, for example *Saemaul Undong* was handled by the MOHA. By placing the KFS within the Ministry, the issue of forest rehabilitation took priority over others when it came to budgeting and implementing policy. This was especially crucial to the success of the First Plan (Korean Association for Public Administration, 2009).

**2. It facilitated policy implementation.** After the reorganization, the KFS was able to mobilize regional administrations and police force to strengthen forest

protection and invest financially in regional forests. Thus, the entire National Reforestation Programme was covered within one ministry. The cooperation among forest protection management, forest control, and technical instruction within the Ministry allowed the KFS to have more practical administrative power. When the Second Plan was completed in 1987, the KFS was transferred back to the MAFF.

**(Government Financing)** The government consistently invested monetary resources in the National Reforestation Programme. In 1967, when the KFS was inaugurated, its budget was KRW 2.1 billion, accounting for only 0.7% of the national budget. However, when the First Plan was set into motion in 1973, the government set aside more than KRW 10 billion (more than 1%) for the KFS. Funding for this programme more than doubled within the next five years. During the Second Plan, the annual budget grew continuously, although it dropped (to 0.3 ~ 0.5%) when considered as a percentage of the national budget (Korean Association for Public Administration, 2009). Against this backdrop, it is clear that the strong financial support from the government helped implement the National Reforestation Programme by enabling projects like tree planting and tending, erosion control, and nursery development.

**Figure 2. Yearly Budget for the KFS (1967 to 1987)**



**(Policy Linkages)** Launched in 1970 by President Park, the integrated rural development programme, *Saemaul Undong* was an effort to modernize rural economies and improve living conditions. Of the forestry-related projects associated with *Saemaul Undong*, developing fuelwood plantations was the most urgent. The first rule of this project was that nobody was allowed to harvest fuelwood until every household had participated in tree-planting. This fostered a sense of community cooperation which was embodied in the movement's slogan: diligence, self-help, collaboration. The national government provided seedlings and fertilizers, and then local governments transported them to each village where everyone volunteered to plant trees. Through *Saemaul Undong* with a credit from International Bank for Reconstruction and Development (IBRD), the goal of developing 0.2 million ha of forest for fuel production forest was accomplished by 1977. The project's success made it an exemplary case of the effectiveness of cooperation among villagers.

The effective linkage between the movement and forest rehabilitation was built upon the *Saemaul* nursery project. When the government initiated the First Plan, it set a target of planting 2.1 billion trees in 1 million ha between 1973 and 1982. In order to cope with the sudden and sharp increase in demand for seedlings, the government came up with a programme called 'Saemaul nursery'. The programme was win-win for both national and local governments. A village would start a nursery with an initial loan from the government. Later, the government would purchase the entire volume at the open market price, ensuring income for the village<sup>9)</sup>. *Saemaul* nursery projects accounted for 34.8% (9.4 million) of total seedlings produced during the First Plan. In 1976, the project produced 6.5 million seedlings, accounting for 43.4% of the total for that year. However, this number plunged during the Second Plan, providing only 8.3% of total seedlings needed (1.5 million out of 1.85 billion seedlings).

The *Saemaul* nursery project led to the *Saemaul* reforestation project. Starting with 12,000 ha in 1973, the project eventually reforested 1.37 billion ha, equating to 60.5% of the national reforestation area (2.25 billion ha) of the First Plan. The project continued into the Second Plan, and developed an additional 0.37 million ha (38.7% of the land reforested in during the Second Plan). *Saemaul* erosion projects also contributed substantially to erosion projects led by the KFS. From 1973 to 1975, *Saemaul* erosion projects completed 70.7% of the projected area (16,238 ha out of 25,061 ha). During the Second Plan, the *Saemaul* erosion projects accomplished 19.5% of the planned 25,061 ha.

In summary, *Saemaul Undong* and the Forest Rehabilitation Plan were closely linked. This is seen in the quantity of money set aside in *Saemaul Undong*'s budget. Beginning in 1971 a total of KRW 10.47 trillion was invested in *Saemaul Undong* over a 17-year period. Of this, KRW 426.9 billion went to the Forest Rehabilitation Plan, constituting 4.1% of the total *Saemaul Undong* budget.



*Saemaul* Nursery Project  
(Provided by the Korea Forest Service)

<sup>9)</sup> From the nursery project, total of KRW 12.3 billion was generated from 1973 to 1979. (40 years of *Saemaul Undong*, 1980)



**(Education and Promotion)** The government led a very active promotional campaign urging people to participate in the National Reforestation Programme. Even before the First Plan was initiated, regulations and propaganda were used as implementation tools. However, these tools were ineffectual under the weak administration due to lack of financial means and executive power.

After the military regime took over the office in 1961, more stringent regulations, mandatory services, recommendations, and guidance began to have a positive effect. Since the inauguration of the KFS, President Park was central to promoting reforestation. His determination and clear vision for a greener Korea changed the perspective of the nation on forest matters, and delivered the message that reforestation was the top priority of his administration. Moreover, the establishment of the KFS kick-started the promotion of the National Reforestation Programme and strengthened the administrative guidance of forest projects. In support, forest related organizations like National Forestry Cooperative Federation, Saemaul Undong communities, and many others provided necessary information about forestry to the public. All these efforts combined with a powerful administration and the successful appeal to citizens resulted in reduction of forest degradation and sharp increase in the volume of reforestation (Korean Association for Public Administration, 2009).

The initiation of the First Plan was nationally promoted by President Park. The President's participation in various reforestation activities was highly publicized, as was his influential speech on National Arbor Day in 1973, and he became the face of the movement. The objectives of the First Plan were implemented in a systematic fashion:

- (a) As an alternative energy source was introduced, rules and regulations for forest degradation became effective.
- (b) The KFS provided education and guidance on forest administration to achieve targets outlined in the Forest Rehabilitation Plan.
- (c) With the aim of implementing the National Reforestation Programme, leaders of forest organizations took initiative at the local level on behalf of the government. Sharing best practices, compensating participants of tree planting activities, comparing and assessing different cooperatives, result-based support system, various slogans and activities related to forests and making more information available were facilitated; and
- (d) More forest related policies were initiated by mass media or relevant organizations.

By the time the Plan reached phase two, nationwide tree planting was well established due to the persistent promotion of reforestation by the government. During the National Tree-planting Month (March 21<sup>st</sup> to April 20<sup>th</sup>), people willingly participated and learned about the importance of tree planting and tending. Specific tasks were assigned to different government agencies and villages to facilitate the planting activities. Additionally, the first Saturday of every November was declared as the National Tree-tending Day. On this day, the entire nation participated in tending activists through villages, schools, workplaces, or forest related organizations. The purpose of this was to raise awareness of the importance of tending as well as planting. During The Second Plan, the government also took a different approach towards engaging its citizenry. Rather than the previous strict rules, regulations, and mandates, they now promoted voluntary participation of the people, appealing to their sense of patriotism.



Promoting Tree-planting  
(Provided by the Korea Forestry Newspaper)

### Box 3. Sustainable Forest Management (SFM)

The KFS successfully implemented sustainable forest management (SFM) by establishing and updating management plans every 10 years. Built on the foundation of the First and Second Forest Rehabilitation Plans which focused on the re-greening of deforested area, more recent decadal plans have focused on SFM.

The Third 10-Year Forest Rehabilitation Plan (1988-1997) was initiated to establish the foundation for sustaining forest land resources upon the forest rehabilitation. Under the Third Plan, relevant targets were set in place to balance the demand for timber (of which 90 % was being imported) and public demand for recreational forests and environmental conservation. During this period, 0.32 million ha of commercially zoned forest were established; the tending project covering 3.03 million ha was also launched. The plan also included promoting mountain village development, expanding recreational forest and cultural facilities, and establishing a forestland utilization system based on its function and purpose. The third plan was the first to go beyond the scope of forest and timber centered policy.

In 1998, the Fourth 10-Year Forest Rehabilitation Plan was implemented to further refine policies and objectives for SFM. From 1998 to 2007, several achievements were made:

- (a) Legislation of the Framework Act on Forestry acknowledged the necessity of SFM. Under this law, forests were categorized into six different functional groups, each with specified management guidelines.
- (b) The national focus was shifted from planting to tending trees. This contributing to rising forest values, and creating jobs through the Forest Tending Project (2.25 million ha).
- (c) A system was established to conserve and manage ecological axis<sup>10)</sup> (for example, Baekdu-Daegan).

Currently, the Fifth 10-Year Forest Rehabilitation Plan (2008-2017) is underway to implement SFM. The primary concern of this plan has been expanding the role of forests as a carbon sink to combat climate change. Moreover, the aging demographic and higher standard of living has spawned a new-found interest in forest recreation among the Korean people. Additional infrastructure and new programmes in forest education, recreation, and therapy are being developed to meet national demand. The ROK is drawing upon its past success to support developing countries with reforestation projects through increased funding to the Official Development Assistance (ODA) programme.

The National Reforestation Program was a basis not only for maximizing economic and public value of forests, but also promoting SFM. Not to mention that it was a stepping stone for the 'Forest for People' and 'Therapy Forest' policies strongly promoted by the KFS. In this regard, the success of the National Reforestation Programme allowed the KFS to be where it is today.

<sup>10)</sup> a habitat that links areas with ecological importance or in need of preservation with the aim of increasing biodiversity and continuing ecosystem functions within these areas.



Yeouido Park, Seoul  
(Provided by the National Forestry Cooperative Federation)

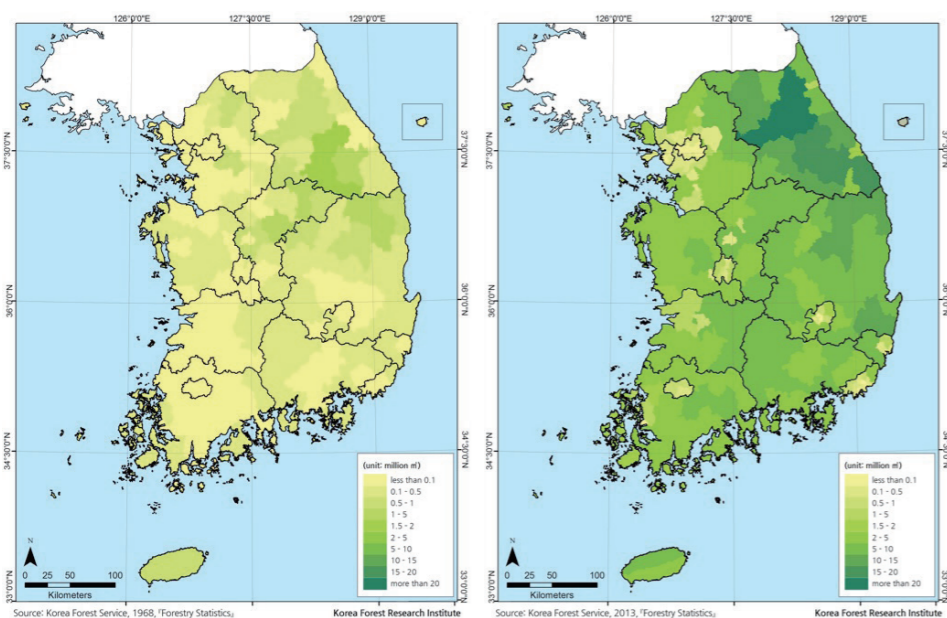
## 04 Outcomes of the National Forest Rehabilitation programme

**(Changes in Forest Resources)** By the early 1970s, the long-lasting forest resource loss had finally turned around and the number of forest resources was rising. During the 14 years of Forest Rehabilitation Plans, the volume of unstocked land was reduced by 77%, while the volume of forest and growing stock were both increased by 9% and 270% respectively. In the longer period between 1952 and 2007, unstocked land dropped from 3.32 million ha to 0.17 million ha, and the growing stock grew to 6.2 million ha from 3.4 million ha. The volume of stocked land has been maintained around 62% since the 1990s after hitting its lowest point of 35% back in the early 1950s. In addition, growing stock per ha jumped about twelve times, from 10.5m<sup>3</sup> in 1952 to 129.6m<sup>3</sup> in 2010.

According to Mather's forest transition theory (1992), the ROK had well passed the minimum stocked land area and showed constant increase in the average growing stock after the 1970s (Bae et al., 2012). From 1990 to 2005, the ROK was categorized as having high forest coverage and low deforestation rates among 56 countries with more than 10 million in population and forest coverage above 10% (Bae, 2009).



**Figure 3.** Change in Forest Cover Map (From 1963 to 2013)



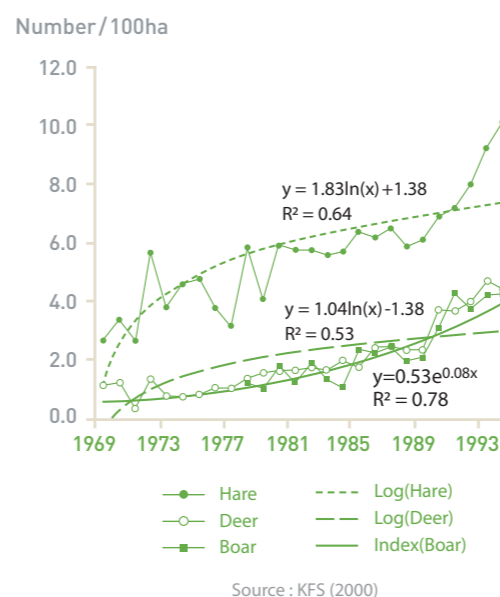
**(Changes in Biodiversity)** Planting a variety of tree species during the Programme laid a foundation for changes in biodiversity. Among others, species like *Alnus hirsuta*, *Alnus hirsute var. sibirica*, *Alnus firma*, *Alnus pendula*, *Lespedeza*, *Pobinia pseudoacacia*, *Pinus densiflora SIEB. et ZUCC.*, *Pinus thunbergii*, *Pinus rigida Mill.*, *Quercus acutissima*, *Amorpha fruticosa*, and *Polulus* were planted for erosion control. They also provided habitat for forest species such as birds and small mammals. Broadleaf forests consisting of *Pobinia pseudoacacia* and *Alnus japonica* were created in the beginning of the Programme, and especially contributed to establishing basic food chains with forest insect, birds, and mammals. Falling leaf litter continues to improve soil development and keeps the forest soil healthy<sup>11)</sup>. Through forestation, there was an increase in the volume of growing stock and soil quality, increasing biodiversity.

As forests developed, the density of mammals like Korean hare, Korean water deer, and wild boar showed a constant increase (Figure 4). This also meant an increase in populations of microorganisms and insects, which indicate an increase in forest biodiversity in general. In addition, the number of bird species increased in these secondary forests (Figure 5).

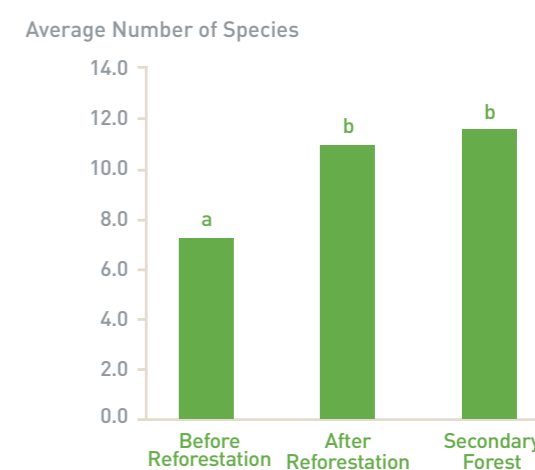
11)

The improved forest environment and healthy soil also facilitated cultivation of forest byproducts. In 2011, KRW 26.9 billion worth of pine mushroom, 57 of wild vegetable, and 43.8 of wood-cultivated ginseng were harvested.

**Figure 4.** The Change in the Density of the Forest Mammals of the ROK (1969~1993)



**Figure 5.** Comparison of Species Richness of the Forest Birds Before/After Reforestation, and in Secondary Forests (average  $\pm$  standard error) ( $p < 0.05$ )



Source  
Lee et al., 2008; Lee et al., 1994; Rhim et al., 2008; Choi et al., 2007

**(Changes in Forest Water Resources)** Forests play an important role in watershed conservation by increasing the base-flow of streams, and decreasing flood-flow during extreme weather. Besides functioning as flood control, forests also play a role in drought mitigation and water purification. Forest soils have a buffering function, controlling water flow. They serve as natural watershed conservation areas. If the surface soil is lost due to forest degradation it leads to loss of watershed function, rapidly increasing flood-flow. Conversely, mountain streams will decrease in size or dry up completely when the rain stops. Moreover, the soil eroded from the forest will decrease watershed storage, and cause eutrophication of streams.

In a properly functioning forest watershed, sediment

discharge per ha in a year is about 0.1 m<sup>3</sup>. With erosion control work as part of forest rehabilitation, the sediment discharge should be about 2.1 m<sup>3</sup>. However, in heavily degraded landscapes, sediment discharge can reach 104.3 m<sup>3</sup> per year (Forestry Experiment Station, 1981).

Thus, in order to improve the function of a degraded watershed, efforts to stabilize surface soil and prevent erosion are required. The reforestation efforts of the ROK in last 50 years has been a major contributor to soil conservation, creating landscapes that are a source of freshwater resources. The Yangju Watershed Experiment Ground in Gyeonggi province – where the hydrological alterations have been observed over the last 30 years – provides an excellent case study. (Box 4).

## Box 4. Forest Watershed Management in the Yangju Watershed Experiment Ground

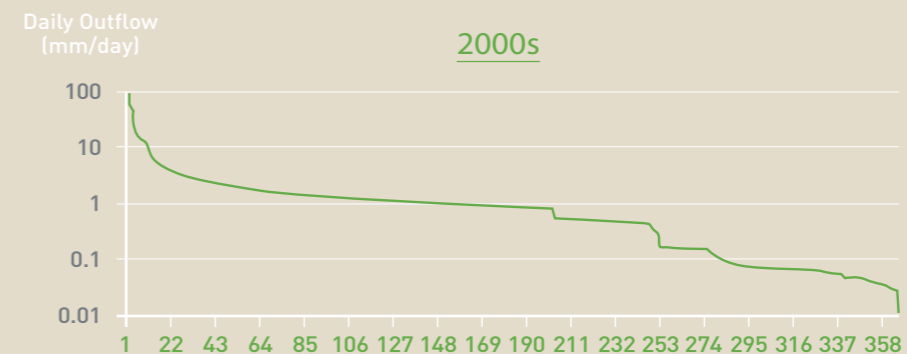
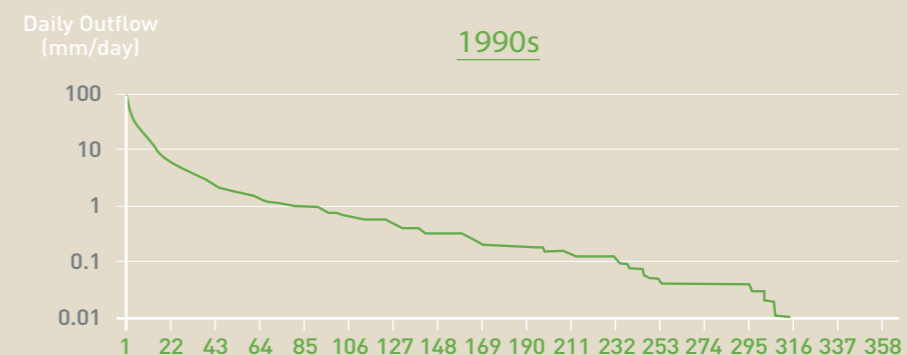
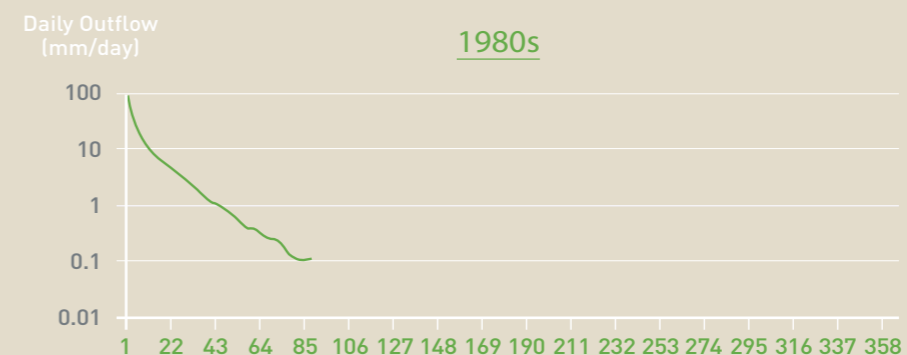
Forest Watershed Management in the Yangju Watershed Experiment Ground of the Korea Forest Research Institute (KFRI) is the only site within the ROK where one can directly observe the hydrologic alterations which have been achieved through forest rehabilitation. The site sits on 5.24 ha of land with loamy sandy clay, underlain by easily weathered granite bedrock. The average slope is 28°, and is 40° at its steepest. Until the early 1970s, due to poor growing conditions for vegetation combined with poor soil physical properties, floods occurred frequently during rainy seasons, and streams dried up during rain-free periods. In 1974, the government implemented terrace cutting and sodding works, sowing *Pobinia pseudoacacia*, *Lespedeza*, and *Arundinella hirta*, then in the spring of 1975 planted *Alnus japonica* Steud and *Pinus rigida*.

The first hydrological observation at Yangju was in 1975 as a part of the UNESCO International Hydrological Programme (IHP). A Parshall flume was installed at the gate of the basin. Since 1978 the facility has been used as a long-term monitoring station for the hydrological alterations within the erosion control forest rehabilitation site of the KFRI (Choi et al., 2011).

In 1994, 20 years after the National Restoration Programme, a vegetation survey revealed a drastic increase in plant species richness. There were 30 overstory species and 32 understory species present. Many of the species present require healthy soil to grow, especially *Quercus mongolica*, *Euonymus japonica* thumb, and *Stephanandra incisa*. This confirmed the improvement in soil and water retention capacity due to reforestation efforts (KFRI, 1994). Currently *Quercus* species such as *Quercus mongolica*, and *Pinus rigida* Mill form healthy mixed stand forests throughout the ROK. These forests are typified by thick crowns in the overstory and rich vegetation in the understory.

When long-term monitoring of the watershed began, the stream flowed only during the three months of summer. This was at the start of the National Reforestation Programme. Thirty years later there was continuous stream flow all year, demonstrating improved watershed function by forest rehabilitation. By the 2000s stream flow during the dry season had increased fourfold compared to the 1990s (KFRI, 2012).

This case study is a good example of how forest rehabilitation and subsequent increases in plant species improve soil physical properties, and demonstrates how increased organic matter enhances forest function by regulating water flow between the wet season and dry season.



Days in descending order

**(Changes in Forest Recreational Resources)** From among the services that forests provide, the public can most directly experience recreational service of forests. Climbing mountains to maintain a healthy body and mind is a popular activity among Koreans. According to a national survey by Gallup Korea, 48.8% of people in the ROK consider forests as place to recreate. The survey also revealed that 81.3% of the population (about 37 million people over the age of 19) go for a hike at least once a year. Forest recreation became popular in the 1980s. It was only after the National Restoration Programme succeeded in its nationwide effort that recreational forests became a part of Korean popular culture.

In 1967, Mount. Jiri (Jirisan) was designated as the ROK's first national park. In 1988, the first recreational forest managed by the KFS was created at Mount Yumyeong (*Yumyeongsan*) near Seoul. Since then a vast infrastructure of both public and private outdoor recreation area has been expanding to meet the growing public demand. As of 2014, the ROK contains:

- Natural parks: total of 74 (21 national, 22 provincial, and 31 regional)
- Recreation Forests: total of 156 (40 national, 98 regional, and 18 private)
- Forest Baths: total of 178
- Arboretums: total of 44 (1 national, 22 regional, and 18 private) (as of 2013)

Recently, the KFS introduced 'the forest welfare services' programme, which targets many different age groups, allowing more people to enjoy the new perks provided by forests. Since the programmes creation in 2007, an annual average of 0.4 million users have trekked forest trails as of 2012 and 0.31 million people visited healing forests annually. Additionally, forest educational programmes reached out to 0.51 million adolescents, and 0.42 million kindergarten children. These figures demonstrate how the various services of recreational forests are becoming a part of the daily lives of ROK citizens.



(Clock-wise) 'Explore Forest' for children, Forest Cycling, Forest Therapy, Family Day in Forests (Provided by the Korea Forest Service)

## PART 4

# Success Factors of the National Reforestation Programme

01. Political/Institutional Perspective

02. Social/Economic Perspective

03. Policy/Legal Perspective



This chapter describes the driving forces behind the success of the National Reforestation Programme of the ROK, from three perspectives: political/institutional, social/economical, and policy/legal. Huge national development projects require large investments, both monetary and in terms of time and public participation. The success of such projects also depends greatly on how this time and money is invested. The well-known development success cases of Israel, Brazil, and Netherlands showed that in order to succeed, a project needs the ① continuous attention of the political community, ② an effective combination of planning and executive power, and ③ close cooperation among the relevant policy measures (Friedmann, 1973). The National Reforestation Program of the ROK combined all of these conditions.

Another circumstance that led to the success of the ROK's National Reforestation Programme was the country's simultaneous modernization due to the Economic Development Plans. The National Reforestation Programme worked in synergy with the Economic Development Plans, and structural changes in industry and increased income per capita enabled the government to directly address the underlying causes of the forest degradation. Forest rehabilitation not only had short-term benefits, but also provided the foundation for future resources, SFM, and forest recreation.

## 01 Political and Institutional Perspective

**(Strong Personal Conviction of the leader)** President Park, leader of the ROK from 1963 to 1979, was devoted to reforesting the denuded landscape, and made forest rehabilitation a top government priority. To achieve this, President Park integrated this goal into other government programmes, such as the 5-Year Economic Development Plan, *Saemaul Undong*, and the National Comprehensive Development Plan.

The ROK's political system during Park's leadership was a centralized presidency, which gave Park a great deal of authority. By prioritizing forest rehabilitation, making personal visits to the fields, and including forest officials in monthly economic briefings, Park's actions had stronger effects than any other institutional strategy.

The president continuously announced in speeches 'cutting trees is evil, and planting trees is patriotism' and the government reinforced this ideology every chance it had. Tree-planting was understood to be the responsibility of the entire country. This included all citizens, not just forest owners. For the most part, the government led efforts to create forest management plans, prevent and suppress fires, and control insect pests and diseases.



President Park planting trees  
(Provided by the Korea Forest Service)

**(Other politically influential champions)** As the First Plan was carried out under the MOHA in 1973, Minister of the MOHA played an important role in its implementation. Then Minister Kim Hyun Ok made *Saemaul Undong* and the National Reforestation Programme the national priorities. Minister Kim showed great interest in reforestation and supported the KFS by providing whatever it required (for example, mobilizing the police force to deal with forest related crimes, recruiting forest personnel, and securing the budget). The MOHA especially concentrated on encouraging rural people to participate in the Programme and advocating conservation of forests to the public. (Lee, 2013)

The man behind the First Plan was then Forest Minister of the KFS, Son Su Ik. The KFS under Forest Minister Son from January 1973 to September 1978 established accurate, efficient rehabilitation plans, achieving the targets set under the First Plan in only 6 years. Forest Minister Son established interlinked-cooperative framework for forest-related policies using his strong leadership. He also ran a very strict supervisory administration with a great deal of field guidance and assessments. However, he always supported forestry officers. He even raised forestry officers' morale by providing new opportunities for them. (Lee, 2013)



**(Establishment of the Organization and System)** Korea's forest administration began as a bureau under the MAF. The KFS was established as a separate organization under the MAF in 1967 with the recognition for stronger administrative power. However, the KFS under MAF had not shown any progress towards reforestation half a decade after its establishment. As a result, President Park reorganized the KFS under the MOHA. By combining the regional administrative power and police force of the MOHA with the technical expertise of the KFS, forest rehabilitation was effectively initiated.

To implement the First Plan, the government mobilized and coordinated the administrative power of every central, province, county/city, and village unit. The 'Forest kye (see page 8 for description)' and forestry cooperatives were organized in every village and region, and supported government policies by undertaking reforestation activities and educating forest owners. The KFS Forestry Experiment Station and Forest Genetics Research Institute<sup>12)</sup> supported the forest rehabilitation policies by offering technical expertise in forestry to local communities. This included selecting tree species for reforestation, developing erosion control technologies, and developing forest resources to increase income of rural villages. At the same time, stricter government policies cracked down on illegal logging and slash-and-burn practices by controlling access to forests and increasing enforcement.

The government has trained many forestry experts and officials for rehabilitation, starting with Seoul National University, which established the Department of Forestry immediately following liberation. Since then, there have been more than 20 forestry departments established at Korean universities, training approximately 1,000 forestry experts each year. The Forest Research Institute, Forest Genetics Research Institute, and Forest Training Institute were established under the KFS for forestry education and research. At the provincial/county-level offices, forestry bureaus and departments were established for administrative purposes. The forest cooperative association placed around 700 forestry experts at the local cooperatives to train citizens on tree-planting and tree-tending techniques.

The Korean government provided promotions to forestry organizations and officers to reward participation in forest rehabilitation projects. Forest divisions of each province were promoted to forest bureaus, forestry department of each county was promoted to forest divisions, and about two hundred forest officers were promoted. These promotions motivated officers to actively participate in the National Reforestation Programme.



<sup>12)</sup> Forest Genetics Research Institute was merged into the KFRI as the Department of Forest Genetic Resources. KFRI is currently under the KFS.

## 02 Social and Economic Perspective

**(Integrated Approach)** The National Reforestation Programme was integrated into multiple government programmes, including the 5-Year Economic Development Plan and National Comprehensive Development Plan. It was also integrated into fuelwood policy measures for rural villages, which was a cross-sectorial programme interconnected with the MHSA<sup>13)</sup>. Inter-agency cooperation was indispensable, and President Park personally oversaw this coordination. At the beginning of the First Plan implementation, he determined the scope of rehabilitation efforts for the year and ordered inter-ministerial coordination during the Saemaul National Cabinet Meeting.

One example of this inter-agency cooperation was the nationwide tree-planting movement. Each agency played a vital role, with the MCE<sup>14)</sup> taking responsibility for the student tree-planting movement, the MOAF for provision of fertilizer, the MND for reforestation on the military bases, and the MCPI<sup>15)</sup> for campaigns of the movement. The KFS was also heavily involved in this project, providing needed materials for tree-planting, planting sites, and technical training. The perception and role of the leader are especially important to developing countries dealing with the natural resources such as forests. In this respect, the strong leadership of the president was an extremely important factor in managing successful reforestation in the ROK at the time.

The officer of the MOHA who took part in the establishment of the First Plan in 1973 recalled that structuring a comprehensive and systematic plan to ensure effective implementation of forest rehabilitation was the main reason behind the Plan's success. He also stated that it was made possible by the president's strong leadership, administrative ability, and technical expertise (Koh, 2010). *Saemaul Undong* had a very important role in forest rehabilitation as well, because a tree-planting project in a rugged mountainous country like the ROK is impossible without the participation of the local population. The rural villages at the time were very poor but had ample labor available. The government was able to succeed in forest rehabilitation through the continuous attention of President Park and the active participation of villagers full of the 'Saemaul spirit.'

President Park, after identifying forest rehabilitation as the top government priority, exercised control over administrative and social organizations to establish rehabilitation projects (The Korean Association for Public Administration, 2009). In this way, the president's strong leadership and ability to coordinate were the main reasons for the success of the comprehensive forest rehabilitation project.

13) Ministry of Health (1948-1955) & Ministry of Social Affairs (1948-1955)  
⇒ Ministry of Health and Social Affairs (1955-1994)  
⇒ Ministry of Health and Welfare (1994-2008)  
⇒ Ministry for Health Welfare and Family Affairs (2008-2010)  
⇒ Ministry of Health and Welfare (2010-present)

14) Ministry of Culture and Education (1948-1990)  
⇒ Ministry of Education (1990-2001)  
⇒ Ministry of Education and Human Resources Development (2001-2008)  
⇒ Ministry of Education and Science Technology (2008-2013)  
⇒ Ministry of Education (2013-present)

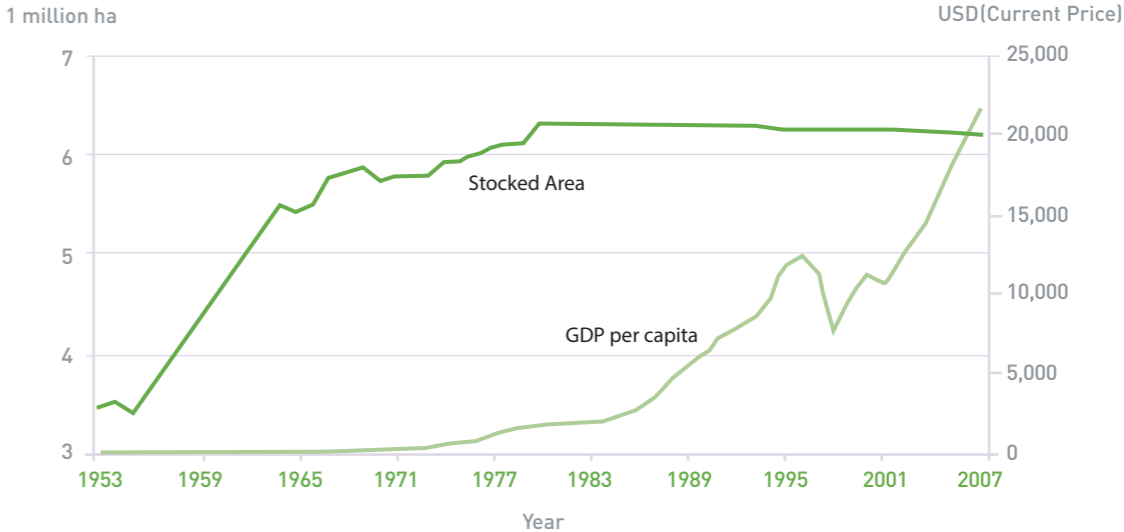
15) Office of Public Information (1948-1961)  
⇒ Department of Public Information (1961-1968)  
⇒ Ministry of Culture and Public Information (1968-1990)  
⇒ Ministry of Culture (1990-1993) ⇒ Ministry of Culture and Sports (1993-1998)  
⇒ Ministry of Culture and Tourism (1998-2008)  
⇒ Ministry of Culture, Sports and Tourism (2008-present)

**(Continuous Economic Growth)** After 1962, the ROK had accomplished continuous and rapid economic growth due to the success of the 5-Year Economic Development Plan (Sakong and Koh, 2011). Compared to a GDP of USD 1.1 billion in 1953, the GDP at the time of the initiation of the First National Forest Plan (1973) was 11 times greater. It was 108 times greater in 1987 when the Second National Forest Plan was completed. As a result of this economic growth, the transition from household fuelwood use (the most direct cause of the forest degradation at the time) to fossil fuel use was possible. People could now afford to purchase briquettes or gas rather than going to the mountains to cut down trees for fuelwood (Oh, 1993). Until the early 1960s, villagers would spend all day cutting trees, but

could only carry home three to four days' worth of fuel. By the 1970s, however, a daily wage could buy twenty-five briquettes, which would be sufficient for a week. In other words, rising income led to a change in fuel use from wood to charcoal.

Implementation of the National Reforestation Programme and the clearing project for slash-and-burn fields would not have been possible without national financing. Rapidly increasing domestic timber demands were met with imports under free timber trade and economic growth. In this way, continuous economic growth became the basis for preventing forest degradation (Figure 6).

Figure 6. Changes in Forest Area and GDP per Capita (1953-2007)



Source : Bae et al. (2012)

**(Migration of Rural Population into Cities)** The migration of rural populations into cities also had a positive influence on forest rehabilitation in the ROK. The replacement of fuelwood with coal briquettes in urban households in the 1960s did not directly lead to a decrease in the consumption of fuelwood and charcoal. The population of the ROK increased by 50% from 21.5 million in 1955 to 32.2 million in 1970. During the same period, the urban population rose from 3.5 million to 17.8 million. However, the increase in urban population was not accompanied by a meaningful decrease in the rural population. The rural population had decreased from 16.2 million in 1955 to 14.4 million in 1970. Along with the continuous increase in urban population, the rural population also increased until 1967 before it began to decrease in 1968.

The decreasing consumption of fuelwood and charcoal and increasing trend of average growing stock should be understood in the context of the decreasing

demand for fuelwood in rural areas (Figure 7). The rural population decreased from 14.4 million in 1970 to 10.8 million in 1980, and to 6.7 million in 1990 (Table 2). As a result, the percentage of the total population that lived in rural areas dropped from 44.7% in 1970 to 15.4% in 1990. From 1970 to 1980, the total population rose by 1.82% annually, while the rural population dropped by 2.49%. From 1980 to 1990, total population rose by 1.2% annually, while the rural population fell by 3.7%.

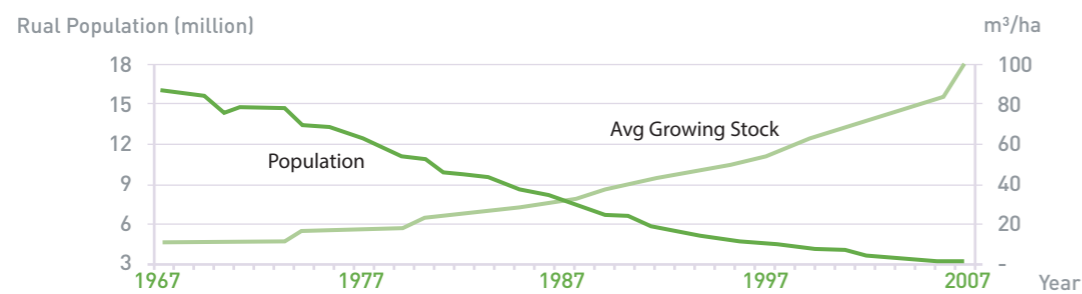
One of the most significant reasons why rural populations migrated into cities was the widening wage gap between the rural and urban workers (Rhee, 1991). Between 1970 and 1990, the wage differences between the workers continued to expand; workers in rural areas earned less than 50% of what they could in cities. Eventually, such wage differences drove the rural population into cities. As a result, the rural population using fuelwood and charcoal decreased, and which greatly influenced the recovery of forests.

**Table 2.** Changes in the Total Population and Rural Population (1970 to 1990)

Year	Total Population (1,000 persons)	Rural Population (1,000 persons)	Rural Population (%)
1970	32,240	14,421	44.7
1980	38,123	10,826	28.4
1990	42,869	6,661	15.4

Source : Statistics korea (www.kosis.kr)

**Figure 7.** Changes in the Rural Population and Average Growing Stock (1967-2007)



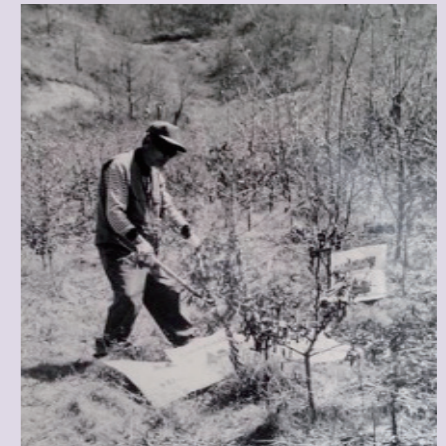
Source : Bae et al. (2012)

## Box 4. Public's love for trees

Along with the government's persistent forestation efforts, many corporations and individuals took part in making the ROK green again.



Better known as 'King of Forests', Jong-guk Im (1915-1987) dedicated his life to reforestation, planting more than 2.79 million trees over 800 ha. His hinoki cypress forest has been well loved and appreciated by the public. (Photo provided by blog, earleshin)



A father and son have been creating a plantation from 1964. Sang-hwan and Eun-jo Jung forested 339 ha. (Photo provided by chosun.com)



He was born as an American but died as a Korean. Min, Byeong-gal (American name is Carl Miller) established the Cheollipo Arboretum which holds the most diverse variety of species in the ROK to this day. (Photo provided by Cheollipo Arboretum)



The most influential forestry corporation, SK forest, began its reforestation project in 1972. It has forested around 4,000 ha and contributed in the development of silviculture industry and forest resources. (Photo provided by SK Forest)

### 03 Policy and Legal Perspective

**(Expansion of the Household Alternative Fuels)** The most significant driver of forest degradation in the ROK was the enormous consumption of fuelwood across the country, which was mainly for household use (FAO, 1982). In 1960, fuelwood and charcoal accounted for 62.5% of the total primary energy sources. If this fuelwood consumption rate of 1955 had continued, most of the forests would have been degraded in less than a decade (Joo et al., 2008). From this perspective, using proactive policies to encourage alternative household fuel use was a major driver of forest reforestation in the ROK.

In 1956, the MTI<sup>16)</sup> increased production of coal briquettes, the major energy source in the ROK, to substitute fuelwood and charcoals with fossil fuels. The MAF also prohibited the flow of fuelwood into urban areas and established fuelwood forests in agricultural and mountainous villages with less pressure for fuels in 1958. With the announcement of plans to expand coal railroad lines such as Yeongam and Taebaek, the production of briquettes sharply increased. Coal briquettes first began to substitute for fuelwood in urban areas where transportation was more convenient and populations were concentrated.

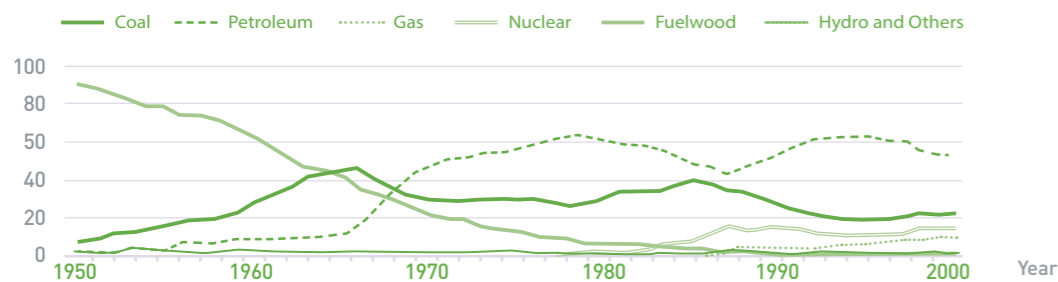
In the 1960s, coal briquettes played a major role in substituting fuelwood in cities. As a result, only 7% of urban areas continued to use fuelwood for household heating and cooking by the 1970s. Rural communities also began to use coal briquettes to substitute for fuelwood in the 1970s. During this time, the government also distributed 9.9 million modified traditional furnaces to rural villages lowering the energy use to 70%. By the 80s, gas and coal were the main energy sources used for cooking and heating respectively (Bae and Lee, 2006). This conversion of energy sources was a major factor contributing to the continuous increase of the forest resources from the 1960s onward<sup>17)</sup>.

As this policy of substituting fuelwood with fossil fuels began to succeed, the traditional policies on resource creation and forest protection also began to bear some fruits. 'Forests became green, as coal briquettes were distributed into agricultural villages as well as into big cities in the 1970s' (Seo, 2006), suggesting that the substitution of fuelwood with the fossil fuel had a significantly positive impact on reforestation.

16) Ministry of Trade and Industry (1948-1993)  
 ⇒ Ministry of Trade, Industry and Energy (1993-1998)  
 ⇒ Ministry of Commerce, Industry and Energy (1998-2008)  
 ⇒ Ministry of Knowledge Economy (2008-2013)  
 ⇒ Ministry of Trade, Industry and Energy (2013-present)

17) New renewable energy including solar energy, biofuel, wind power, hydropower, marine energy, waste to energy, and geothermal energy makes up 3.2% of total supply. From 4.4 million toe in 2003, the quantity doubled to 8.9 million toe in 2012. It is still an insignificant number compared with countries like Germany, France, Spain, and the USA; however, it is growing with continuous investment from the government and also private sectors.

Figure 8. Changes in the Primary Energy Consumption



Source : Bae et al. (2012)

**(The National Slash-and-Burn Clearance Project)**

When the First 10-Year Forest Rehabilitation Plan was implemented in 1973, around 300,000 households were still practicing slash-and-burn agriculture impacting 125,000 ha of forest, which was 1.3% of total forest land. Although the size seemed small, shifting cultivation took up about 13-14% of agricultural activities in the ROK at that time. Slash-and-burn farmers cultivated without applying fertilizers after burning all plants. Such extensive agriculture was a major cause of forest degradation. Moreover, unimaginable damage could be caused if these burns resulted in forest fire. The clearing of the slash-and-burn fields was one of the major goals, along with conversion of household energy sources and large-scale forestation. Despite the intensive clearing project started in Gangwon Province in 1965, the number of slash-and-burn cases continued increasing. People were still practicing it in 1973 when the First 10-Year Forest Rehabilitation Plan was implemented.

This major driver of degradation slowed down from 1974 through 1979 and disappeared entirely thereafter. The main reasons for the decline in slash-and-burn fields were the drastic decrease in rural populations and continuous national support in many forms, including education and promotion. As of 1967, rural population plummeted, making it possible for the government to convert slash-and-burn fields. Since slash-and-burn farmers were forced into this practice due to socio-economic circumstances, clearing slash-and-burn fields could not be easily achieved unless the socio-economic circumstances changed.

The outcomes of the Economic Development Plans initiated in the mid-1960s began to show positive effects by the end of 1960s. The Korean government's

budget and GNP skyrocketed after turning it around in 1967. When the National Slash-and-Burn Clearance Project started in 1974, the budget and GNP were about 25 times greater than in 1960. This provided a suitable environment for the government to successfully convert the slash-and-burn fields. It was undeniable how necessary the project was for social, economic, and forestry reasons; however, without national support for the farmers' livelihoods such a project would have been unsuccessful.

In order to ensure the success of the project, the government had to eliminate the replantation trend. The slash-and-burn farmers were mostly responsible for replantations done at that time. Due to extreme poverty, many farmers migrated from village to village, depending solely on slash-and-burn agriculture. Therefore, it was crucial to provide stable livelihoods for them to minimize replantation practice. Taking this into consideration, it was no surprise that during the National Slash-and-Burn Clearance Project, 38.3% of the total project budget was allocated to 17,643 households, which was only 6.6% of total 267,301 targeted households from 1974-1979.

All targeted households experienced some income cut regardless of amount due to the decrease of farmlands. Without compensating the income losses, the government could not eliminate replantation entirely. This clearly explained why 31.6% of the total project budget was used to support farmers with cattle farms, pig farms, mulberry fields, joint nurseries, wages, employment, farmland and other necessities. Continued support for the farmers prevented re-plantations, making the National Slash-and-Burn Clearance Project a great success (Lee and Bae, 2007).

Converting of Slash-and-Burn Fields (Provided by the Korea Forest Service)





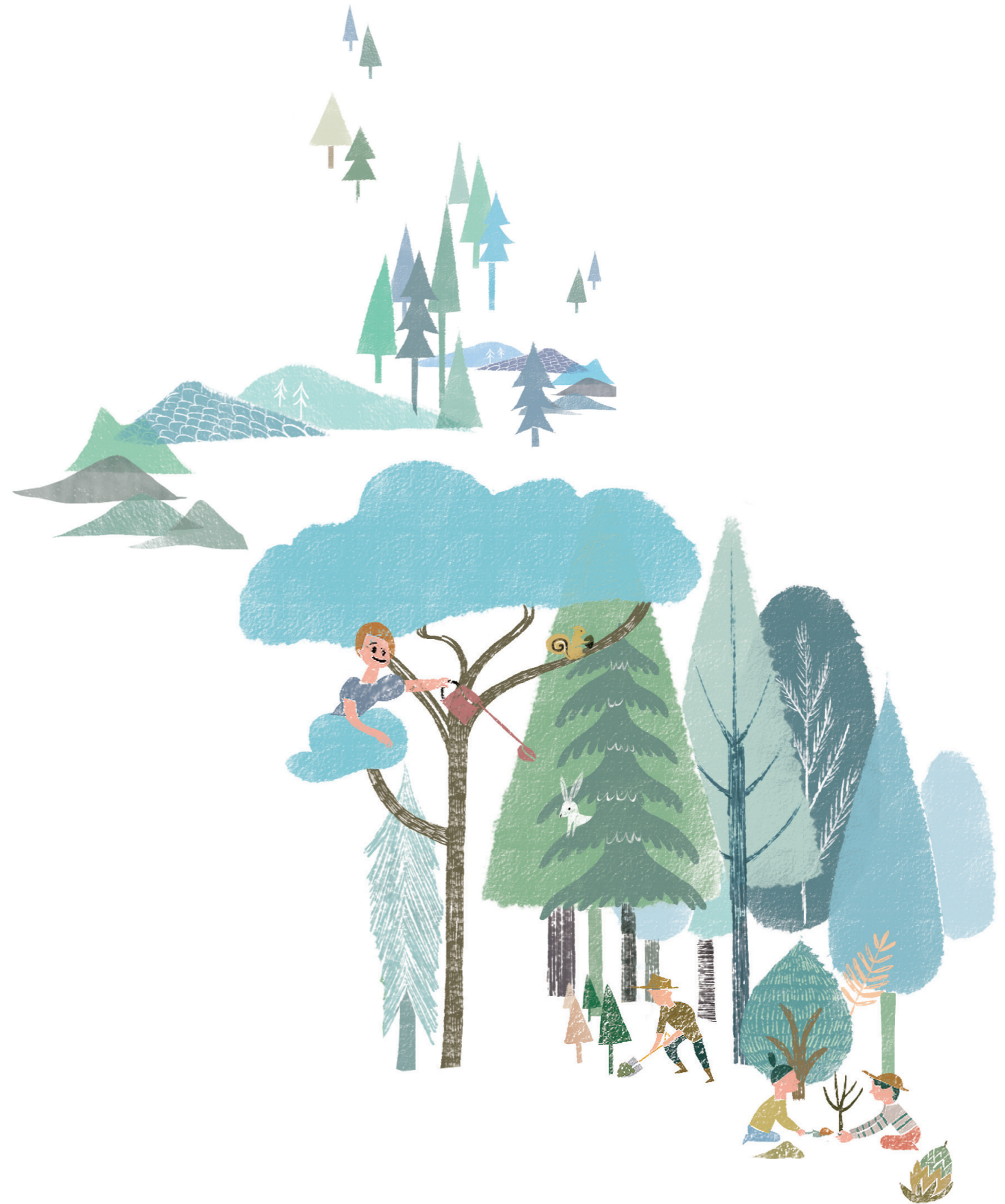
**(Large-Scale Reforestation)** It wasn't until after the underlying problems were addressed that the large-scale reforestation policy began to have effects. Reforestation was essential for successful forest rehabilitation. Reforestation consists of both natural regeneration and artificial planting. In the 1960s artificial planting was emphasized in order to deal with serious forest degradation, rather than relying on natural regeneration to quickly increase forest cover. In 1960 there were 2.8 million ha of unstocked land (approximately 42% of the total forest area) and 0.52 million ha of degraded land (19% of the unstocked land).

Figure 9 shows the planting outcomes from 1946 to 2000. Over 55 years, the Korean government planted an annual average of 97,000 ha, reforesting 5.32 million ha by 2000 (approximately, 83% of the total forest land). About 94% of total plantations were on relatively more degraded private forests. The actual reforested area is smaller than shown in the figure 9 since not every hectare planted becomes a mature stand. Seedling establishment failures, the lack of follow-up and natural disasters can all result in an area requiring replanting. Despite this, there is no doubt that artificial reforestation, especially in the 1960's, had a significant influence on current Korean forests.

The outcomes of the National Reforestation Programme could be reviewed in 5-year terms. Between 1966 and 1980, an annual average of 200,000 ha of degraded areas was reforested, with the highest rates occurring

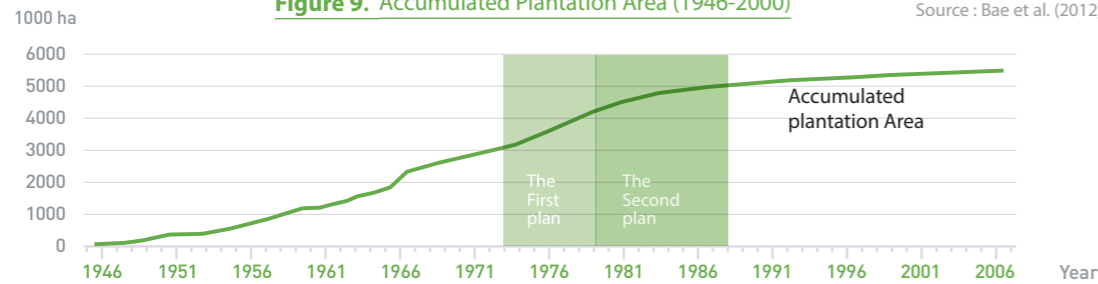
during the First and Second Plans, with the exception of 1967. In 1967, the KFS was established and 450,000 ha were planted, including the establishment of 360,000 ha fuelwood plantations. From 1966 to 1970, an average of 190,000 ha of degraded areas was reforested annually, marking the second highest record since the massive reforestation outcomes in 1967. Reforestation from 1961 to 1970 accounted for 59% of what had been planted during the entire period. Meanwhile, reforestation outcomes from 1971 to 1980 during which time the First Plan was carried out accounted for 31% of the entire period. Since the 1980s, the rate of reforestation has decreased continually because there are less degraded forests due to the conversion of energy sources, the successful clearance of slash-and-burn fields, and previous reforestation efforts. From 1983 to 2000 the average annual reforested area dropped from 100,000 to just 20,000. In this respect, the pinnacle of reforestation occurred from 1973 to 1987 when the National Reforestation Programme was most actively implemented.

In addition, rehabilitating the eroded land in Yeongil district showed the Korean people that reforestation can be achieved in any degraded land. During the First Plan, erosion control was carried out across 42,000 ha, which was only half of the original target. For the ROK however, the achievement in the Yeongil district meant much more than just a target.



**Figure 9. Accumulated Plantation Area (1946-2000)**

Source : Bae et al. (2012)



**(Legislating the Laws)** Before the ROK government began to actually implement forest rehabilitation, it set the necessary laws and regulations. The forest related laws outlined in the 'Temporary Measures for Forest Protection Act' were organized under the Forest Act of 1962. The Forest Act included the regulations on the forest kyes and forest cooperatives to protect what forests were left around villages. A year before, the 'Act on the Control of Forest Resources' was enacted to

systematically implement forest protection policies. In addition, the 1962 'Arrangement of Staff Assigned for Special Forest Protection Act' and 'Erosion Control Work Act' were enacted to acquire necessary administrative personnel and prepare a foundation for erosion control facilitation. In 1966, the 'Clearance of the Slash-and-Burn Fields Act' was legislated to implement the migration and settlement projects which would clear the fields.

## PART 5 Lessons Learned



The ROK successfully implemented the National Reforestation Programme, and restored the forest ecosystem which now occupies 64% of the country's landscape. During the implementation of the First and Second Plans from 1973 to 1987, unstocked area decreased by 77%, forest area increased 9%, and total growing stock increased 270%. One could learn the following lessons from the success of the National Reforestation Programme.

First, the most important factors were the continuous support from the head of the country, and the fact that forest rehabilitation was made the government's top priority. President Park himself led the planning, implementation, and coordination of the Programme. He transferred the KFS to the MOHA for more effective implementation, and coordinated national

finance and administrative power to fully support the Programme. Also, he wove the Programme in with other top priority government projects such as the 5-Year Economic Development Plan, *Saemaul Undong*, and the National Comprehensive Development Plan. Once forest rehabilitation became the top priority government project, national finance could be funneled continuously to the Programme. Additionally, central and regional administrative/technical powers were mobilized for the reforestation, erosion control, and clearing slash-and-burn fields. Police forces were mobilized for forest protection. The case of the ROK suggests that in order for a developing country with low income level to solve forest problems, it requires strong and committed leadership along with efforts to put forest issues in the mainstream.

Second, it is important for the government to diagnose the underlying causes of deforestation, and then to establish a comprehensive plan to address these issues. The Korean government identified direct drivers early on, such as household fuelwood use, illegal logging, and slash-and-burn fields, and understood that the underlying cause for all of these drivers was poverty. The government successfully initiated the 5-Year Economic Development Plan in 1962 to alleviate poverty. With economic growth, fuelwood was no longer the primary energy source for households, and with the rural population migrating to urban areas, pressures on forests causing degradation were decreased. Challenges like the prevention of illegal logging, the clearing of slash-and-burn fields, and creation of forest resources were solved through the establishment of the comprehensive Forest Rehabilitation Programme, as well as with the support of administrative, police and technological power led by the country. The successful case of the ROK shows that even with a low income level and weak governance framework, government efforts can overcome forestry challenges.

Third, with clear policy objectives in the background, continuous promotion is needed to bring out the capacity of the citizens. The ROK at the time had been suffering through natural disasters such as drought, flood, and soil loss every year. With the visible growth in the industrial sector, the denuded forests became the top priority of the government. The government announced its quantitative reforestation goal of one million ha within the First Plan, along with its long-term vision of complete reforestation. Due to awareness raising, the nation acknowledged the necessity and supported the government's decision.

The government emphasized and reinforced the ideology that 'planting a tree is an act of patriotism' with the aim of developing a nationwide tree-planting movement. Every year the government chose a targeted area for planting in January and February. Then in March, it started advocating for the needs of forest rehabilitation and forest protection through each ministry by training local populations and promoting through mass media. This promotion reached its peak every year on April 5, National Arbor Day. In other words, the government needs to present clear policy goals and use a systematic publicity strategy to achieve continuous promotion of the Programme over a long period of time to ensure the support and attention of the nation.

There were unintended consequences of the 1970s National Reforestation Programme. 'The Absolute Greening' summed up the reforestation policies of the period perfectly. As the name implies, during the 1970s, the government and public took the lead in the tree-planting without taking the forest owners preference of tree species into consideration. As a consequence, most forest owners ended up relying on government-led reforestation policies and grants, rather than taking a stance on matters concerning their forests. In later years, establishing cooperative governance between the government-led National Reforestation Programme and stakeholders became one of the programme's top priorities. Moreover, the rapid implementation of 'The Absolute Greening' over a short period of time left the government with little time to study the forest ecosystems they were trying to rehabilitate, which led to a mismatch between tree species and the surrounding environment.

## PART 6 Conclusion



The National Reforestation Programme was implemented from 1973 to 1987, and was primarily responsible for restoring forest ecosystems in the ROK. During this period, not only was the deforested area (26% of the country) restored, but the size of forest and also the growing stock both showed drastic increases. This is clear evidence that the Forest Rehabilitation Plans achieved its goal successfully. Furthermore, the success has spread to several different sectors showing positive outcomes like land restoration, flood prevention, recovery of biodiversity, and an increase in water supply and recreational forests. Forests cover about 64% of the total land area. Given that, it is safe to say forest is the most representative terrestrial ecosystem within the ROK. Against this backdrop, reviving forests meant restoring forest ecosystems. Continuous success with the Forest Rehabilitation Plans became the driving force behind sustainable economic growth and improved quality of life for the nation.

Equally critical is the role of the Forest Rehabilitation Plans in initiating SFM. With restored forest ecosystems, the volume of forest resources grows, and so does the quality of life for wildlife species and humans that rely on forests for their livelihood. Moreover, the success also had positive effects on biodiversity and securing forest water resources. Forests not only offer ample

economic opportunities for people, but provide them with recreational services. The more a society and its economy develop, the more forests become a part of popular culture. These are only examples of the benefits which are provided by forests. In other words, the successful implementation of the Plans was a significant stepping stone for SFM, allowing forests to function ecologically, economically, socially, and culturally.

Thanks to National Reforestation Programme, the ROK achieved successful forest transition. Over time, lost forest fully recovered, and volume grew. In the 1950s, Korean forest coverage hit its lowest, marking up only 35% of the landscape. From that point on, forest coverage only increased, and is currently managed to stay proportionately higher than India, China, and historical Europe. The ROK is not the only such success story. The USA and New Zealand also successfully restored their lost forests. However, considering countries with less than 10% forest cover like Scotland, Denmark, and China, the Korea's case is certainly impressive. No account of Korea's success in forest restoration would be complete without highlighting the role of government leadership. Its experience has provided useful insights to developing countries like China, India, and Vietnam which carried out similar forest transition projects from 1990 to 2005.



(Provided by the Korea Forest Service)

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