How Introducing a Tree Monitoring System Improved Forest Rehabilitation in Korea (1973–1987)

REPUBLIC OF KOREA

KDI SCHOOL
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PROJECT DATA

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Abstract

This case study examines adaptations in the Republic of Korea's reforestation policy between 1973 and 1987, with a focus on the introduction of the tree monitoring system (Geommok, 검목, 檢木). The tree monitoring system is one of a number of policies that contributed to successful forest reclamation projects, and has been evaluated as improving the survival rate of seedlings in plantations and increasing the responsibility and morale of forestry officers. This study analyzes the background, objectives, implementation processes, results, effects, and success factors of this system based on principles of the science of delivery.

The tree monitoring system specified practices for checking the survival rate of the seedlings in plantations and ensuring that seedlings were raised successfully, using the annual plans in the tree nurseries as a reference. The government established this monitoring system in 1973 to conduct monitoring transparently and objectively, thereby excluding any indication of favoritism. The first phase of tree monitoring was conducted under the supervision of a provincial governor by exchanging the tree monitoring inspectors among different counties or cities within a given province. The second phase of plantation tree monitoring was conducted under the supervision of Forest Service by exchanging the tree monitoring inspectors among different provinces throughout the country. The tree monitoring inspectors were trained in the Geonmok system by the Forest

Service before beginning their assignments to ensure the quality of project.

The survival rate of the trees in plantations in their second year was low—around 80 percent before 1973—but the national average in 1974 increased to 86.6 percent after the introduction of plantation tree monitoring system. The survival rate continued to increase, reaching 93.8 percent by 1985. This contributed significantly to successful forest reclamation. In addition, the identification of the number of seedlings surviving in the tree nurseries allowed the Forest Service to formulate more accurate planting plans for the following year.

Executive Summary

In 1973, after the transfer of the Forest Service from the Ministry of Agriculture and Forestry to the Ministry of Home Affairs, the Korean government announced the First Ten-Year Forest Rehabilitation Plan. This marked a milestone in reforestation projects. The plan was ambitious, aiming to plant 2.1 billion trees over one million hectares (ha). The project goals were exceeded—planting a total of 2.9 billion trees in 1.08 million ha, and was completed six months ahead of schedule.

In the 1960s, the government of Korea launched projects to establish fuelwood forests and control erosion, with an eye to reforestation in areas where the land was denuded. These projects were intensively carried out in the 1960s by planting many trees in the narrow spaces including *Lespedeza*, and shrubs. The metrics for success in these projects were relatively inexact, and projects were considered successful if they saw growth of black locusts, alders, and *Lespedeza,* without monitoring the exact number of surviving trees in the plantations. Management of plantations was neglected after planting, and the responsibility of forestry officers was not greatly emphasized.

The Forest Rehabilitation Plan included provisions for new establishment of commercial forests, building on previous establishment of fuel wood forests and erosion control projects. Tall trees like larches, pines, Italian poplars, *Populus alba* x *glandulosa*, and chestnut trees were often planted in orderly formations with wide spaces between them. For these plantings, it was an important issue for successful plantation establishment to know how many trees survived one or two years after planting. The tree monitoring system was introduced

to evaluate tree survival rate in plantations and nurseries with the following objectives: 1) to evaluate the survival rate of the trees planted in the previous year; 2) to verify whether the right number of trees were planted in designated area; 3) to check whether the right trees were planted in the right sites and to identify any problems in the tree planting project; 4) to educate the new nurserymen on planting techniques; 5) to supplement any inadequate measures in planting, weeding, and pest control in the plantations; 6) to check whether enough number of seedlings were produced in the nurseries for the next spring planting season; and 7) to inspire the public's interest in the forest reclamation. The establishment of a robust monitoring system also was meant to promote transparency and eliminate favoritism and other administrative problems.

This tree monitoring system, also called "The plantation tree cross inspection system,"[1] played a decisive role in planting a total of 2.9 billion trees in 1.08 million ha during the course of the First Ten Year Forest Rehabilitation Plan. Matching the number of trees in the tree planting record on paper with the number of trees actually planted in the fields helped enhance the efficiency and transparency of the forest reclamation projects and contributed greatly to increasing the survival rate of the trees planted.

The tree monitoring system was an essential policy of forest reclamation policy in the 1970s and 80s, and presents a case of effective administrative governance, encompassing leak-proof efficiency, transparency, objectivity, and productivity pursued by the science of delivery.

Introduction

Since at least the late 19th Century, Korea has struggled with the problem of deforestation. Increasing population in a small peninsula with considerable demand for timber and fuel, coupled with a lack of proper forest management for over two hundred years, resulted in total devastation of the forests. This in turn led to and exacerbated frequent flooding and drought, threatening stable production of food for the whole nation.

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1   The plantation tree cross inspection system is also known as the tree monitoring system. The system aimed to verify how many trees survived in plantations, by inspecting the plantations and verifying whether the officers in charge had planted the right number of trees on the designated area using the right tree species.

This case study examines the evolution and adaptation of reforestation policy in the Republic of Korea from 1948 to 1987, drawing on historical documents and interviews with some of the key actors, to present how the introduction of tree monitoring systems improved the implementation of reforestation projects.

After the end of the Second World War, the Government of Korea tried to rehabilitate the forest and restore denuded hillsides, launching several ambitious national tree-planting plans. Every reforestation plan was hailed with enthusiasm in the beginning, but careless planting and poor after-planting care repeatedly led to poor survival of seedlings in the plantations, and unimpressive results in restoring the mountains.

Many trees had been planted by the first Republic of Korea (Syng-Man Rhee, 1948–1960) in order to restore the country's devastated forests following the Second World War. Records show that a total of 2.8 billion trees were planted, covering 1.05 million hectares; this number represents combined statistics for all reforestation projects.

However, government officers neglected post-evaluation, inventory, and identification of the actual number of trees surviving on the plantations. Thus, the credibility of the statistics regarding the total area or number of trees planted was low, and actual numbers of surviving trees in the plantations could not be accurately estimated.

In 1961, with the establishment of Chung-Hee Park's military government, the government started to collect forestry statistics. Accordingly, statistics for forest reclamation in the 1960s and after became fairly credible. Yet survival rates were still low, and forest reclamation efforts were not seen as effective.

To tackle this problem, the tree monitoring system was incorporated. Moreover, this program was incorporated into the work programs of the Saemaul Undong (new Village Movement), a major development program ongoing in the 1970s, and the survival rate in the plantations was made a key indicator to evaluate the performance of Saemaul Undong projects. Villages with good evaluation results were eligible for additional budget allocations and other incentives for Saemual Undong. And special recognitions from the government, including the presidential citation, were added. The plantation tree inspection monitoring system used these incentives to inspire increased responsibility and morale of forestry officers at the same time. In addition, the survival rate of the seedlings in plantations was used as the evaluation criteria for the work performance of the officers, which was reflected in their promotion. In turn, this spurred competition among officers and regions to improve their results. In addition, new techniques were handed down through the field education in the plantations. And plantation tree monitoring checks were conducted publically, with many residents attending, in order to spark interest in forest reclamation.

Development Challenge

For the past two centuries, Korea has had a history of deforestation. This can be ascribed to high population density in a small peninsula and inadequate management of forests by both ordinary people and the government. This loss of forest cover led to frequent natural disasters by the 1950s, such as flooding, drought, and landslides; these disasters caused poor harvest and famine almost every year of that decade. The Korean War (1950–1953) exacerbated the situation, as more forest area was destroyed and the government failed to protect forests from large-scale illegal timber harvest and reckless fuel collection.

Forest rehabilitation from 1945 to early 1970s progressed very slowly due to a low sense of commitment and responsibility of the forest officers for their duty of monitoring trees in the plantations and tree nurseries, resulting in low survival rates of trees in plantations and difficulty in predicting how many seedlings would be produced in tree nurseries for the next planting season. With the low survival rate of the seedlings and low sense of responsibility of the forest officers, it was impossible for the several consecutive reforestations plan to achieve their goals. To remedy this situation, the government launched the ambitious First 10-Year Forest Rehabilitation Plan (1973–1982). The plan included planting large number of timber tree species that required high survival rates for commercial production of high quality wood.

Chung-Hee Park's military regime, which came to power in 1961, tried to rebuild the declining economy. The administration recognized that, without an improved agricultural infrastructure, economic development would not be possible. While farmers represented over 70 percent of the population, they did not produce enough food to feed the entire nation. One of the major obstacles to increasing harvest of rice, the major staple crop in Korea, was shortage of irrigation water from

the mountains that occupy 68 percent of Korea's total land area. To improve enough irrigation water, the government paid much attention to forest reclamation, carried out erosion control projects, and worked to establish fuel wood forests. They increased funding for future reclamation projects, initiating the First and Second Five-Year Economic Development Plans (1962–66 and 1967–1971). Many trees were planted for the establishment of the fuel wood forests. The trees planted for fuel wood forests included *Lespedeza*, a shrub also known as bush clover, which allowed for the planting of some 5,000 to 10,000 trees per hectare. At the time policy makers were satisfied with successful establishment of fuel wood forests or greening of erosion control sites, and did not track how many trees in total were surviving or the survival rate of the trees in the plantations. Therefore, only weeding and fertilization were conducted as follow-ups in the plantations. Ultimately, there may have been many regions whose survival rate of the trees was lower than 60 percent (Forest Service 1989).

Delivery Challenge: Improving Official Commitment, Fostering Transparency and Accountability

The main obstacles to efficient monitoring of trees in both plantations and tree nurseries were traditional favoritism, non-transparent inspection of the planted trees, and a low sense of commitment on the part of forestry officers. In the 1950s and 1960s, monitoring and after-planting confirmation of trees in the plantations were performed by officers in the same department or section, resulting in favoritism and subjective opinions about tree survival; sometimes officers inflated survival numbers in the plantations.

Korea is a traditional Confucian country, with strong notions of hierarchy and respect for elders, which was the cause of favoritism in both public affairs and national projects. Moreover, in Korea, cronyism and favoritism across networks—along lines defined by political party, regionalism, school relations, and kinship—have been historically common, and remain so to some extent. In order to eliminate these practices, a standard tree monitoring system was introduced in the course of forest reclamation.

Tracing the Implementation Process

In 1973 the government initiated the First 10-Year Forest Rehabilitation Plan (1973–1982). This ambitious plan aimed to plant 2.1 billion trees across 1 million ha. The total forest area at the time was 6.7 million ha, which accounted for 67 percent of the total land area of Korea.

One of the early challenges to the effective work of the forestry ministry, in terms of bureaucratic work and structure, was the fact that it was contained within the Ministry of Agriculture and Forestry. The Ministry of Agriculture emphasized the urgent issue of increasing food production, and attempted to solve food shortages by clearing and planting the mountains, which conflicted with goals of the Forest Service. Meanwhile, under the Ministry of Agriculture, the Forest Service had not been in the position to directly supervise the forest reclamation projects launched by the local governments across the country. These projects were under the authority of the Ministry of Home Affairs, which supervised front-line tree planting through officers of city and county governments, making it difficult for the Forest Service to mobilize workers necessary for the reforestation and engage the response of the public.

It was easy for the Ministry of Home Affairs to conduct tree planting projects for several reasons:

1. The Ministry of Home Affairs was able to mobilize farmers by connecting reforestation efforts to another major project ongoing at the time, the Saemaul Un-dong (New Village) Movement. This major modern-ization and community development initiative was being implemented nationwide in the 1970s and 1980s by the Ministry of Home Affairs.
2. The Ministry of Home Affairs already had a Forest De-partment, with offices and connections to local gov-ernments (Province, County, City, Township) across the nation. Therefore, the Ministry of Home Affairs could supervise the reforestation projects more effi-ciently through close contact with the Village Forestry Cooperatives in charge of the frontline of the projects.
3. In conjunction with contributions from local govern-ments, the Ministry of Home Affairs would be able to mobilize sufficient budgetary resources to implement the forest reclamation project.

4. The enforcement of forestry offenses, including illegal cutting, were the responsibility of the police force, which was also under the Ministry of Home Affairs.

Therefore, in February 1973 the government transferred the Forest Service to the Ministry of Home Affairs, allowing it to lead forest reclamation projects and enabling successful completion of the project. Mr. Hyun-Ok Kim, Minister of Home Affairs at the time, understood the reasons why the forest reclamation projects had not been performed successfully and had a particular interest in the forest reclamation. He selected the forest reclamation project along with Saemaul (New Village) Movement as the Two National Strategic Programs and did his best to promote these two programs.

Introduction of the Tree Monitoring System

There were two major objectives for the First 10-Year Forest Rehabilitation Plan to be considered successful: 1) increasing the commitment and responsibility of forest officers for their duty of monitoring trees in the plantations and tree nurseries; and 2) by subsequently increasing the tree survival rate in the plantations and the production of the right amount of seedlings needed for the planting next year.

The plantation tree monitoring (and inspection) system aimed to eliminate the issues of favoritism and misreporting, and introduce an objective system of monitoring tree planting and survival in the reforestation projects. As previously mentioned, the Minister of Home Affairs at that time was Mr. Hyun-Ok Kim. He is considered a legendary figure and developed both the method and the name *tree monitoring inspection system* (Geommok, 검목, 檢木). [2] The tree monitoring system aimed to identify two specific data points: 1) how many trees that were planted in spring season in the mountains that survived in the autumn of the second year; 2) and how many seedlings that were planted early in spring in the tree nursery survived in autumn of the same year (in case of fast-growing Italian poplar) or the following year (in case of slow-growing pitch pine). This system has been considered by both past and present forest officers to be a very objective and transparent system, the most exemplary good governance introduced in the area of forestry in the past 40 years.

The plantation tree monitoring system was introduced with the following objectives.

1. To check the survival rate of the trees planted in the previous year;
2. To confirm that the right number of trees were planted on the area planned;
3. To ensure that the right trees were planted in the right sites and to identify any problems of the tree planting project;
4. To educate forest officers and village farmers on new nursery and planting techniques;
5. To improve any inadequate measures in planting, weeding, and pest control in the plantations;
6. To check whether enough seedlings were produced in the nurseries for the next planting season, so that the total number of seedlings in the nurseries matched national government targets for total number of seedling production; and
7. To inspire the public's interest (particularly village farmers) in the forest reclamation.

Embedding the Tree Monitoring System in the First 10-Year Forest Rehabilitation Plan

The First Ten-Year Forest Rehabilitation Plan was launched in March 1973, with implementation carried out by the Saemaul Bureau and the Forest Service, under the Ministry of Home Affairs. It included a system for monitoring inspections of seedlings in the tree nursery and survival confirmation in the plantations two times annually for five years after reforestation.

To eliminate any favoritism and to promote transparency in monitoring the plantations, the tree monitoring system arranged for an exchange of tree monitoring inspectors among different counties or provinces as well as performing the monitoring inspection twice in a series by two different teams (See Annex, Table A1). The first plantation or nursery tree monitoring check was, in order to guarantee transparency, conducted by the tree monitoring inspectors of different cities or counties being

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2　Geommonk does not exist in any dictionaries of Korean, Japanese and Chinese to date; rather, this is a technical term of art used within the Korean Forestry Service.

Photo 1. Forest Service Organized in 1974 a National Education Session Before the Tree Monitoring Inspectors Were Dispatched to Begin their Duty

interchanged with one another within a given province. And the second plantation or nursery tree monitoring check was conducted by tree monitoring inspectors of different provinces being interchanged with one another among different provinces on a national scale under the supervision of Forest Service.

Official tree monitoring system was done twice each year following these steps to get rid of favoritism common to Asian countries and to promote transparency. In the 1970s, tree planting took place from March 21st through April 20th. Before the first official inspection under the new tree monitoring system, each city or county government prepared records in advance, noting the survival of the trees under their own supervision by the end of June after the completion of the spring planting. The number of trees planted and the survival rate along with the reforestation records were reported to the provincial governor. The governor conducted the first official inspection with the forestry officers selected within the province and sent the officers to non-related counties to get rid of favoritism. Results were reported to the Chief of Forest Service by the end of August.

After being notified of the results of the first round of plantation tree monitoring, the Forest Service selected 300–380 forestry officers across the nation, sending them in September of each year to conduct the second monitoring inspection based on the first report from the governors. Tree monitoring inspections were performed every year for every new plantation. And the age of the seedlings in the plantations was always two years old after the initial planting in the mountain. The tree monitoring inspectors selected from eight provinces were sent to provinces other than their own to decrease the possibility of favoritism. The selected inspectors also were called together to receive specialized education to enable them to conduct the plantation tree monitoring

Photo 2. A Tree Inspecting Team from Tongyong and Uljin, Gyeongnam Province Visited in 1976 Bonghwa, Gyeongbuk Province for Cross Plantation Tree Monitoring System and Left a Signature for a Proof of their Visit and Work


system in accordance with a standardized system (see photo 1). The participants were trained in several monitoring indicators, including methods of measuring tree height, criteria for judgement of live or dead trees based on the percentage of live twigs in a given tree, and proper recording of plantation management for weeding, fertilization, and control of insects.

It was impossible to check or count every tree in the plantations for survival throughout the country. On being sent to the field, tree inspectors and the government adapted the "sample plot method" to count about 10 percent of total national planting area or 15 percent of the total trees planted each year based on each province or each county. The tree inspectors were sent to each village for 10 days. The tree inspection system was carried out under their real names, with all the documents for review being signed with their affiliation and names by the rubber stamp and seal (signature) (see photos 2 and 3).

This documentation allowed the Ministry of Home Affairs to monitor the progress of monitoring inspections and ensure accountability; it also facilitated research for this case study, as some of the original documents have been preserved[3] (see note on sources/Annex).

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3 The nationwide Forestry Cooperative in each county at the time was directly in charge of the fuel wood forest establishment and it prepared a variety of documents for audit, with all the documents being kept until now in certain locations. The author visited the Forestry Cooperative in Bonghwa County, Gyeongbuk Province, and spotted the documents relevant for the plantation tree monitoring system. A total of 27 document files, including the tree planting record regarding the loan forest of Village Forestry Cooperative, have been stored intact. And the results of the plantation tree monitoring system in the 1970s regarding the fuel wood forest establishments of 101 Village Forestry Cooperatives in Bonghwa County (corresponding to the number of villages in Bonghwa) were recorded in detail and inspected by tree inspectors with stamped signatures. These kinds of historical documents could not be found in the government documents, because all the government documents are subject to mandatory storage of only five years, except for the ones classified as permanent record (examples: tree planting record, and the profit share contracts) (Photos 4 and 5).

Photo 3. A Tree Monitoring Inspection Team from Jinan, Jeonbuk Province Visited Bonghwa, Gyeongbuk Province in 1977 for Cross Plantation Tree Monitoring System and Left a Signature for a Proof of their Visit and Work
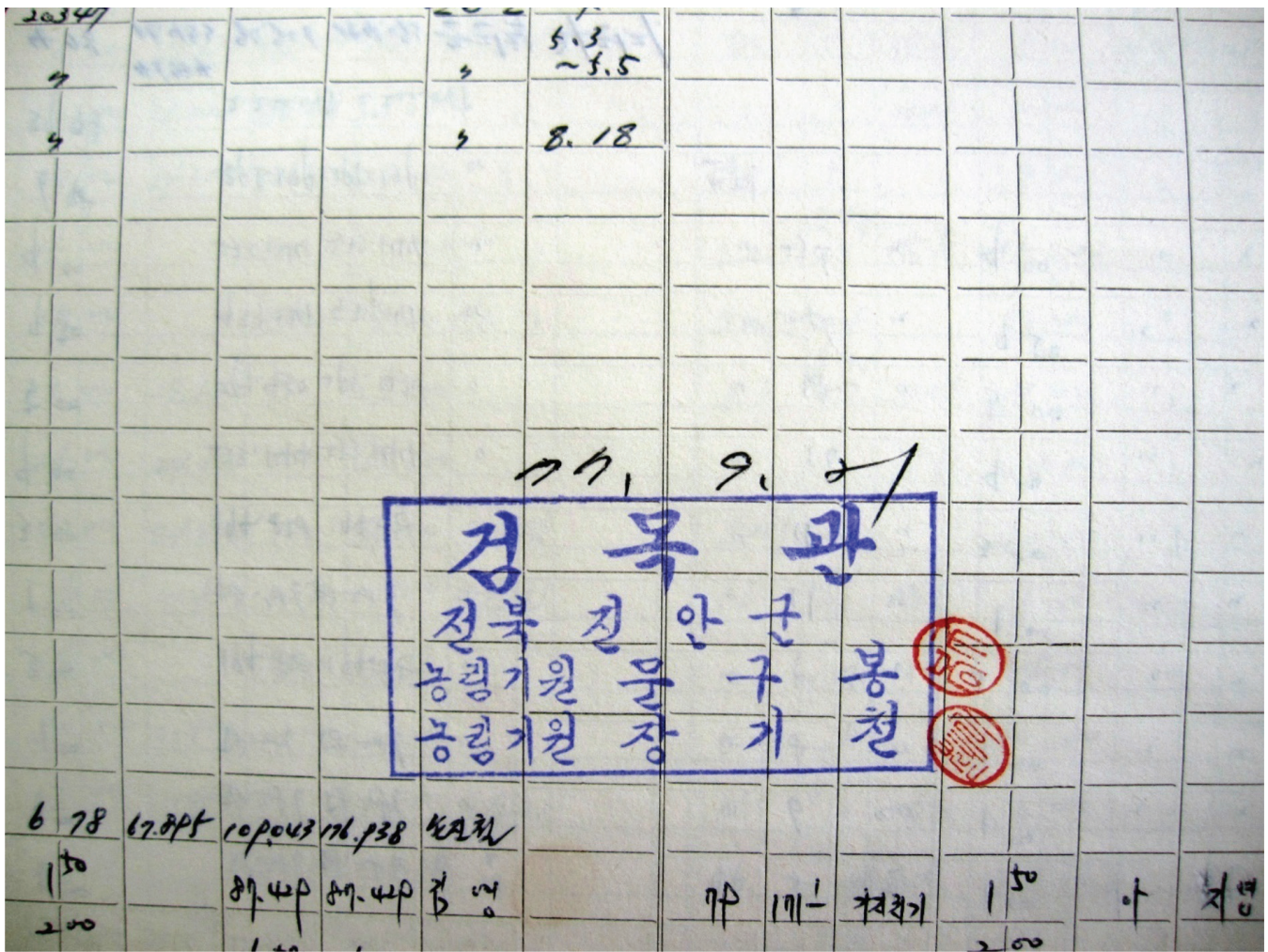
In 1973, Mr. Soo-lk Son, newly appointed chief of Forest Service initiated the Saemaul nursery project, another aspect of the reforestation program. The government made agreements with village leaders to establish nurseries, and loaned out the money necessary for the village nursery operation, including land rent and the costs for seed, fertilizer, pesticides, and farm machinery. The entire quantity of the seedlings produced in accordance with the contract was subsequently purchased by government at the market price, securing the income of the nursery operation. Village farmers provided labor to manage the tree nursery together and to promote the spirit of cooperation, in accordance with the overarching goals of the Saemaul Undong; this spirit of cooperation for the village nursery management dated back to 1960s and became one of the spiritual mottos later in the Saemaul Movement.

There were trials and errors in the initial stages of the Saemaul nursery project. There were many failures in nursery operation due to the lack of experience and skills when many villages competitively started the tree nursery in the first year. Successful production of the seedlings in 1974 was 86.8 percent of the goal, which was considered low. The rooted cuttings of Italian poplar and *Populus alba* x *glandulosa* were relatively easy to produce, but the success rate was low. The success rate, however, soared to 98.4 percent by 1977, after villages had benefited from three years of experiences (see Table 1.).

Province	Year of tree inspection at plantation sites									Mean
	1974	1975	1977	1980	1981	1982	1983	1985	1986	
Seoul	84.9	85.2	94.3	93	92	83				88.7
Busan	90.9	90.2	96.0	97	96	94				94.0
Daegu				91	91	84				88.7
Incheon				89	91	87				89.0
Gyeonggi	90.8	92.7	91.6	96	97	94	96	95.9	94.4	94.3
Gangweon	83.3	89.0	90.9	92	93	92	91	93.4	91.8	90.7
Chungbuk	86.6	90.1	90.2	94	95	91	93	92.6	94.2	91.9
Chungnam	87.4	89.5	89.7	93	93	93	95	93	93.2	91.9
Jeonbuk	90.3	91.7	93.4	96	94	96	96	95.9	96	94.4
Jeonnam	87.4	88.5	93.5	90	91	93	93	94.2	93.4	91.6
Gyeongbuk	85.5	87.6	87.7	92	91	85	94	92.2	93.6	89.8
Gyeongnam	85.9	86.5	91.1	94	93	93	96	95.2	93.1	92.0
Jeju	84.3	82.8	90.7	85	82	81	85	89.1	85.1	85.0
Mean	86.6	89.1	90.6	92	92	90	93	93.8	93.3	91.1

Table 1. Summary of Tree Survival Rates in Different Provinces One and Half Years after the Initial Spring Planting from 1974 to 1986 (Unit: %)

(Sources: "Sanrim" (means Forest in Korean) monthly magazine published by Forestry Cooperative Federation)

Consistent with the conditional approach of the Saemaul Undong program, villages with poor results were not allowed to continue the nursery operation, while villages with good results received additional funds to carry out income-generating village projects. This encouraged successful operations and incentivized focus on results, and was seen as supporting the overall goals of the program.

Lessons Learned

The Processes and Outcome of the Tree Monitoring System

The plantation-tree monitoring system led to an increase in tree survival rates, from below 80 percent in the 1960s and early 1970s to over 94 percent in the 1980s. The tree monitoring system contributed greatly to an increase in the survival rates of the trees in plantations and nurseries, and promoted a sense of responsibility on the part of forest officers for their duty of proper planting in plantations and tending seedlings in nurseries.

Incentives were given to forest officers with good results, including promotions and presidential citations for good

work. This is acknowledged as the main reason for the higher tree survival rate in the plantations and greater responsibility of forest officers. In addition, villages with good results were allowed additional Saemaul Movement funds or new village income-generating projects.

The second inspection under the plantation tree monitoring system, the first of these exercises for which detailed figures are available, illustrates how these procedures were carried out and the results they achieved.[4] It was conducted by eight groups made up of 380 tree monitoring inspectors across the nation under the supervision of Forest Service from September 17th to September 26th 1974. The tree monitoring reports had already been completed in August 1974 from the records provided by the governors in each province. The second tree inspection organized by the Forest Service was conducted on 10 percent of the total planting areas nationwide through the sample plot survey, targeting

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4   The only government document relevant to the plantation tree monitoring system that has been left for review today is a statement released to the public by the Forest Service in 1973. But the actual results of the plantation tree monitoring system in 1973 is not available now for review. Instead, the plan and results of the plantation tree monitoring system in 1974 are to be cited here. The plan and the guidelines of the plantation tree monitoring system in 1974 were published in the September edition of "Forest," and the results of the plantation tree monitoring in the October edition of the same magazine.

Table 2. The Final Results of the 1974 Plantation Tree Monitoring System for the Trees Planted in the Spring of 1973

Classification	Number of trees inspected		Number of trees surviving (million trees)	Percentage of survival (%)
	Number of plantations (1,000 locations)	Number of trees (million trees)		
Nut trees	8	7	6	88.2
Timber trees	10	196	171	87.3
Fuel wood forest	2	42	35	83.2
Fast growing trees	4	25	21	82.3
Erosion control site	1	20	18	90.3
Total or average	25	290	251	86.4

Source: October issue, "Sanrim (Forest)," Forest Cooperative Federation, 1974.

the plantation sites (27,000 sites with 311 million trees) and village tree nurseries (3000 sites with 267 million trees) across the nation that were planted in 1973. It was a large-scale project with a total of 395,178 persons, including 121,747 officers and 273,051 villages farmers attendants. The results of the plantation tree monitoring system were released in a comprehensive evaluation meeting held on October 11, 1974 in the meeting room of the Forest Experiment Station in the presence of the Minister of Home Affairs and 140 officers of the Forest Service, cities, and provinces.

The plantation inspection tree monitoring in 1973 was divided into categories of nut trees, timber trees, fuel wood forests, and the erosion control projects. And the survival rate across the nation was 86.6 percent in 1974, which was similar to 87 percent in 1973. The survival rates in the plantation sites before 1973 without the official statistics cannot be compared to those of later data, but they are reported to be around a little lower 80 percent (based on many interviews by elder foresters). With regard to the village nursery seedling production, 245 million trees survived in 1974, which accounted for 92 percent of the planned amount of production of 1974 (267 million trees). Accordingly, it was found that the amount (the number of total seedlings) was secured so that the reforestation project in 1975 could go off as planned (see table 2 for additional details).

Survival of trees in plantations in the 1970s was at the mercy of the weather conditions due to the lack of irrigation facilities in mountainous sites. The climate in Korea is not favorable for tree planting in spring. Rainfall may be frequent in March and April in some years, while other years might see dry spells in spring and autumn. The rainfalls were, by chance, frequently recorded in the spring of 1974, which may have been helpful to the survival of planted trees (see Table 3).

Table 3. The Production Plan and the Actual Production of Seedlings in the Village Tree Nurseries Based on the 1974 Nursery Tree Monitoring System

Classification	Tree species	Production plan (million trees) (A)	Actual production (million trees) (B)	Percentage of seedling survival (B/A) (%)
Fully grown	Nut trees	5.5	5.1	93
	Fast growing trees	205.0	185.0	90
	Timber trees	13.4	11.9	89
	Landscape trees	1.2	1.2	100
	Sub-total	225.1	203.2	90
First or second-year seedlings		42.4	41.4	98
Total		267.3	244.6	91.5

Source: October issue, "Sanrim (Forest)," Forest Cooperative Federation, 1974.

In general, the survival rate of 92 percent in the nurseries (Table 3) was higher than 86 percent of the plantation sites (Table 2) in the same year of 1974. Multiple factors likely contributed to the increased survival rates of seedlings in the nurseries, one of them the effect of the new plantation tree inspection monitoring system. The system has been evaluated as successful in forming a national consensus by the participation of 395,178 persons including the officers and the village residents plantation areas. In particular, all the Saemaul nurseries that received loans from the government received fervent support due to the possibility of generating additional income for the village. Half of the income from the Saemaul nursery was shared by the participants and the other half was invested in other joint projects of the community or became the seed money for the village fund.

Chestnuts and larches were high in the survival rate, while Italian poplars and Hinoki cypress, which are sensitive to cold temperatures, had lower survival rates. Weather damage accounted for 94 percent of seedling deaths. Ninety-five percent of the total 2,556 villages visited showed good nursery management, while five percent of the total villages (132 villages) showed bad management, and future nursery projects in these areas were cancelled. In addition, the government bestowed a presidential citation or an accolade on person of merit, who could be a leader of a village, and on a village, as a whole after the completion of the plantation tree monitoring system (additional details can be found in Annex A, Table A2).

The Effects of Tree Monitoring System on the Reforestation

The plantation tree monitoring system was initiated by the First Forest Rehabilitation Plan in 1973, and the Second Ten-Year Forest Rehabilitation Plan was used until 1987. The results of the plantation tree monitoring system were obtained every year, but presently there are few documents left. Some of the results were studied by the author based on the sporadic articles in the monthly magazine "Forest" issued by the Forestry Cooperative Federation. A large number of persons and much budget were put into the plantation tree monitoring system from 1973 to 1978 when the First Ten-Year Forest Rehabilitation Plan was executed. But the scale of monitoring system during the Second Ten-Year Forest Rehabilitation Plan (1979 ~ 1987) was gradually reduced to a minimum.

The most significant impact of the plantation and nursery tree monitoring system was to make it possible for the government to identify in advance the exact number of seedlings being raised in the tree nurseries throughout the country to be used for the reforestation plan in the following year. In addition, the survival rate in the plantations in 1973 was found to be 87 percent in national average. This figure of 87 percent was higher than the 82 percent reported in previous years.[5]

Survival rates in the plantations steadily increased, reaching 94 percent in 1987. With the passage of time, the survival rate increased, and a national consensus on the positive effect of forest reclamation gradually emerged, as techniques of reforestation were more widely socialized, the sense of responsibility of the forest officers in charge increased, and the mountains themselves gradually became green. It is partially due to the positive attitude of the forest officers who would expect some incentives and have hope of receiving an award or getting promoted with the good results of the tree monitoring system, as the survival rate was reflected in their work performance. The incentive of additional budget for Saemaul projects was also a crucial factor, as this further encouraged village farmers to actively participate in tree planting.

When the plantation tree monitoring system was first introduced, it was conducted on a very large scale. A total of 381 tree monitoring inspectors were appointed in 1974 and a total of 395,178 officers and village residents participated in the tree monitoring project. However, in 1978 the number of the tree monitoring inspectors was reduced to 144 and the tree monitoring system was conducted in only 956 plantations in five counties. The scale of plantation tree monitoring system was further reduced during the period of the Second Ten-Year Forest Rehabilitation Plan (1979–1987). However, the survival rate of the trees in the plantations continued to increase up to 94 percent, which indicated the same level of the efficiency of the forest reclamation project until 1987.

Unexpected Effects Significance of the Tree Monitoring System

The tree monitoring system was a very important project to promote the high survival rate in both plantations and nurseries to ensure both the success of the plantations

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5 Based on the page 507 in the cabinet meeting report on the Saemaul project at the Blue House in March 1975.

and the acquirement of young seedlings needed for next year planting in the mountains.

The system of incentives embedded in the system for both farmers and forest officers was a stimulant to successful reforestation. The survival rate of the seedlings in the plantations was used as the evaluation criteria for the work performance and future promotion of the officers, sparking healthy competition among the officers and among the different regions. Interviews with many forest officers who were actively involved in the reforestation projects at that time attested to one innovation that occurred at the local level.

Forestry nurseries have a strict standard on the production of healthy and vigorous seedlings. Seedlings which do not reach a certain size (height, root diameter, and root length) were classified as inferior seedlings which failed to pass the planting stock inspection. Inferior seedlings are always produced regardless of the technology or high management standard due to heavy competition among the densely planted seedlings in the nursery. Therefore, officers in charge of reforestation are officially allowed a supply of additional seedlings in excess of the amount of the planned planting. Taking advantage of this point, the officers would save the extra seedlings somewhere for future use. They would replace dead trees with the live ones before the plantation tree monitoring team arrived on the site, to increase the chance of some kind of incentive, such as promotion or citation. This resulted in higher survival rates than ordinary management of the plantations, demonstrating that the system of incentives encouraged creative solutions (i.e., this was not cheating the system).

The plantation tree monitoring inspection system has been called by many previous and current forest officers one of the most meaningful and efficient forest policies conducted during the First and Second Forest Rehabilitation Plan in 1970s and 1980s. This monitoring system significantly contributed to the successful reforestation in South Korea, and may be called a good example of governance in forestry.

Conclusions

The plantation and nursery tree monitoring system ultimately played a key role in eliminating favoritism and promoting transparency during the First and Second Forest Rehabilitation Plans (1973–1987), which increased the survival rate of seedlings in plantations up to 94 percent, and thereby contributed to successful reforestation in Korea. In addition, enabled by transparent monitoring of trees in the plantation monitoring system and the increased accountability that this facilitated, forest officers and villagers were encouraged by the incentive systems to make meaningful contributions to reforestation. The results of the plantation tree monitoring system were used for promotion of forestry officers, which inspired the increase in adherence to responsibility and morale. Additionally, the tree monitoring included participation by many village farmers, which inspired the public's interest in the forest reclamation, solving problems in planting trees, and educating the farmers in planting and tree-raising techniques. The tree monitoring system was conducted transparently and decreased the effects of favoritism, which improved the efficiency of implementing the forest reclamation policies in general. This tree monitoring system would offer a good example of good governance in developing countries.

Photo 4. The Uniform Growth of Pines in Muju and Jangsu, Jeonbuk Province Indicated the Successful Reforestation in 1970s with a Help of the Plantation Tree Monitoring System

Annex: Additional Tables

Table A1. Plans of the 1974 Plantation Tree Monitoring System		
Title	**Content**	**Detailed content**
1. Objectives	Making foundation for forest rehabilitation by increasing survival rate of the plantation trees and monitoring the situation at the plantations	
2. Period	Sep. 17 to 26, 1974 was the second monitoring organized by the Forest Service. The first monitoring was already performed by each province.	
3. Target	Plantations established in the spring 1973, erosion control sites and village tree nurseries for 1974 growing season	• Plantations: 27,000 places, 112.316ha, 311,105,000 seedlings.
4. Tree inspectors	A total of 381men in eight major groups. Supervisors: Deputy Director of Forest Service, Group leaders: Deputy Director of Provincial Forest Bureau. Local inspectors: Eight men from Min. Of Home Affairs, 30 men from Forest Service, 343 men from city forest department.	• One major group for each province and two inspectors for each team for each county or city.
5. Main points	a. Tree inspectors were dispatched to far away provinces from their working places for cross inspection. b. Inspection for the plantations for 1973 planting, and nurseries for 1974 planting. c. Performing education for plantation and nursery management techniques.	• 10 percent of total planted areas nationwide by plot sampling method. • Encouragement of participation of related officers and village residents
6. Detailed works	a. Check survival rates of the planted trees	• 15 percent of total trees planted for each planting site by plot sampling method.
	b. Status of plantation management: replanting, fertilization, weeding, disease, and insect incidences and their control.	• Replanting: causes and number of replanted trees
	c. Growing conditions	• Evaluation grading of excellent, average, or poor.
	d. Profit share contract for proxy planting.	• Classification into land owner unknown, no response, or contract in progress.
	e. Written record for the plantations and nurseries	• Presence of the records and status of recording
	f. Village nursery project: condition of the nurseries, and amount of government loan	• Number of surviving seedlings
	g. Follow up of the 1973 tree inspection results	• Results of the follow up
	h. Photography	• Taking pictures for the detailed works
7. Conclusions	Recording the results of the inspection	• Signature of the tree inspectors
8. Post-evaluation meetings	Evaluation meetings by each village, county, city, province, and national level (National meeting on Oct. 10, 1974)	• Meetings by related officers, Saemaul leaders, Village Forestry Cooperative leaders, and residents
9. Administrative works	a. Prior tree inspector education at 1PM on Sep. 16, 1974 at Daejeon Chamber of Commerce conference room.	• Inspection schedule, details of the inspection processes, key points of the plantation management, and village nurseries
	b. Presentation of certificate of appointment for tree inspectors	• At the site of the pre-education
	c. Declaration of tree inspector's oath	• At the site of the pre-education
10. Report of the tree inspection results	Team leader: within 3 days. Supervisor: within 15 days to Chief of Forest Service and Minister of Home Affairs.	

Source: Sanrim. September 1974, Forestry Cooperative Federation.

Table A2. Summary of the 1974 Tree Monitoring System in the Plantations and Nurseries

Title	Contents	Detailed contents
Period	Pre-education: Sep. 16, 1974. Monitoring: Sep. 17 ~ Sep. 26, 1974	
Plans	30,000 sites, 578 million trees	1973 plantations: 27,000 sites, 311million trees
Number of persons involved	Inspecting groups: Eight groups with 380 men	Officers: 121,747persons. Village residents: 273,051persons
Summary of the inspection	Survival rates of plantations established in 1973 (86.6 percent)	Total number of trees planted in spring, 1973 (311million trees), Total number of trees surviving in the fall of 1974 (269million trees)
	Survival rate of seedlings in the village nurseries in 1974 (91.5 percent)	Number of seedling raised in 1974 (267 million trees), Number of seedlings surviving (245 million seedlings)
Plantation monitoring	Survival rates	High: chestnut, larch Low: Italian poplar, Hinoki cypress
	Re-planting sites of below 80 percent survival rates	Climatic damages: 94 percent, Animal damages: 3 percent, Careless planting: 1 percent, Human damages: 1 percent, Forest fire damages: 1 percent
	Post-fertilization	Finished sites: 44 percent, unfinished sites: 56 percent (causes: government fertilizers not delivered to the villages)
	Weeding	320,000ha (100 percent finished) 1973 plantations: 33 percent; 1972, 1974 plantations: 67 percent
Profit share contracts	6,761 cases signed out of total 7,031casesof requirement (96 percent), no contract yet (4 percent)	Causes: land owners not known (40cases), No responses (83 cases), in progress (147cases)
Planting record	Well recorded: 19,777cases (92 percent), No record (8 percent)	Reasons of no record: small sizes of the scattered plantations, or careless records
Village nurseries	Production plan versus actual production	91.5 percent (245million seedlings) of the production plan was successfully raised.
	Management	Good: 2,556 villages (95 percent), Need some improvement: 132 villages (5 percent)
	Participation of village residents	Most villages showed high level of participation. Some villages have special organizations for management. No payment for the village leaders.
Men of merit awards	Presidential Award, Minister of Home Affairs Award, Forest Service Chief Award	Tree inspectors (14 persons), county head (one person), police officers (one person), general civil workers (12 persons), residents (10 persons), Saemaul leaders (five persons), forest owners (two persons).

Source: Sanrim, October 1974, Forestry Cooperative Federation.

GLOBAL DELIVERY INITIATIVE

A List of Interviewees

1. Mr. Soo-Ik Sohn (Chief of Forest Service).
2. Mr. Yeon-Pyo Kim (Deputy Chief of Forest Service).
3. Mr. Sa-Il Kim (Department Head of Forest Research Institute).
4. Mr. Seung-Geol Park (Director of Central Forest Research Institute).
5. Mr. Geun-Yong Ryu (Bureau Head of Forest Service).
6. Mr. Sun-Jo Park (Director of Regional Forest Service).
7. Mr. Min-Hyu Choi (Director of Forest Research Institute).

References

Bae, Jae Soo, Rin Won Joo and Ki Bong Lee. 2010. Causes of Forest Degradation and Drivers of Forest Recovery in South Korea. New Research Report No. 27. Forest Research Institute. Seoul, Korea. 150p.

Chung, Jin Seung. 2008. Forest Rehabilitation Policy in Korea. December 2008. Korea Knowledge Sharing Program. Ministry of Strategy and Finance and School of Public Policy and Management, Korea Development Institute. Seoul, Korea. 126p.

Chung, Kap Jin. 2009. Policy Experience and Its Application of Korea Saemaul Movement in 1970's. Korea Development Institute. Seoul, Korea. 185p.

FAO. 1982. Village Forestry Development in the Republic of Korea. A Case Study. Forestry for local community development programme (GCP/INT/347/SWE). Rome, Italy. 104p.

Forest Service. 1980. History of Slash-and-Burn Regulation. Seoul, Korea. 607p.

Forest Service. 1989. Footprint of Twenty-Year Forest Administration. Seoul, Korea. 934p.

Forest Service. 1996. History of 50-Year Forest Policy in Korea. Korea Forest Policy Society. Seoul, Korea. 1009p.

Kim, Chung-Yum. 2011. From Despair to Hope: Economic Policymaking in Korea 1945–1979. Korea Development Institute, Seoul, Korea. 582p.

Korea Forest Policy Society. 1975. The Thirty-Year History of Forest Rehabilitation in Korea. Seoul, Korea. 717p

Lee, Kyung Joon. 2013. 2012 Modulation of Korea's Development Experience: Saemaul Undong and forest rehabilitation in Korea: Saemaul income boosting project and the role of the Village Forestry Cooperative. Knowledge Sharing Program. p255–413. Ministry of Strategy and Finance, Korea Saemaul Undong Center, and Korea Development Institute, Seoul, Korea.

Lee, Kyung Joon. 2014. Case Studies on Governance. Case III. A Study on Good Governance in Forest Rehabilitation. p223–440. Korea Development Institute. Sejong, Korea.

Lee, Kyung Joon, et al. 2015. The Seventy Years of Reforestation in Korea. The Academy of Korean Studies. Seongnam, Gyeonggido, Korea. 438p.