The role and contribution of sanlim-kyes during Saemaul Undong in the Republic of Korea in the 1970s

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Introduction

Once touted as a land of beautiful forest scenery, the Republic of Korea (ROK) lost a substantial amount of its native forests following a prolonged period of tumult including Japanese occupation and the Korean War, during which massive illegal logging, pest infestations, disease, and forest fires ravaged the landscape. The value of growing stock in 1953 was only 6 m³/ha, which indicates the extent of deforestation in ROK in comparison to the value of growing stock in 2014: 146 m³/ha (Korea Forest Service 2015). Deforestation caused other environmental concerns such as floods and droughts, and posed a major obstacle to village development and domestic agriculture production (Dept. of Forest Protection, Korea Forest Service 1969).

In the 1950s and 1960s, ROK experienced severe economic hardship. Rapid reforestation would be crucial for the stabilization of the basic economic infrastructure. The Korean government prioritized reforestation projects (Lee 1969). However, considering the time required to plant and grow trees, coupled with the fact that forest land accounted for over 70% of ROK’s total land area, afforestation required multi-level and nationwide cooperation. Village-level sanlim-kyes (voluntary mutual aid associations for the promotion of cooperation between forest owners and villagers) grew under Saemaul Undong (ROK’s “new village movement”), which began in 1971, playing a crucial role in replanting degraded forests during that time. As a result of their establishment of 680,000 ha of fuelwood forests, which contributed not only to forest development but also to a greener energy supply, the organization became a cornerstone for the success of reforestation in Korea. During Saemaul Undong period, reforested property and the sale of tree seedlings became an economic asset as well, providing funds for the construction of bridges, village halls, and other community projects. Sanlim-kyes also contributed to protecting forests from illegal cutting, forest fires, and attack by insect or disease. As bottom-up mutual aid associations, sanlim-kyes should be recognized and evaluated for their contribution to successful reforestation and social development in Korea during Saemaul Undong period in the 1970s.

The objective of this study was to understand the role and contribution of sanlim-kyes (mutual aid associations for village forests) to successful reforestation during Saemaul Undong period in the 1970s. They were first organized in 1951 to facilitate cooperation between forest owners and villagers. Sanlim-kyes grew under Saemaul Undong (ROK’s “new village movement”), which began in 1971, playing a crucial role in replanting degraded forests during that time. As a result of their establishment of 680,000 ha of fuelwood forests, which contributed not only to forest development but also to a greener energy supply, the organization became a cornerstone for the success of reforestation in Korea. During Saemaul Undong period, reforested property and the sale of tree seedlings became an economic asset as well, providing funds for the construction of bridges, village halls, and other community projects. Sanlim-kyes also contributed to protecting forests from illegal cutting, forest fires, and attack by insect or disease. As bottom-up mutual aid associations, sanlim-kyes should be recognized and evaluated for their contribution to successful reforestation and social development in Korea during Saemaul Undong period in the 1970s.

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Sanlim-kyes established and managed village forests, including fuelwood forests. The property accumulated through sanlim-kye activities was used to fund various projects, such as the construction of bridges and town halls, during Saemaul Undong (ROK’s “new village movement”) period in the 1970s. In this way, sanlim-kyes played a pivotal role in ROK’s development (National Forestry Cooperatives Federation 1981). In addition to rallying villagers together, sanlim-kyes served as grassroots for forest recovery and the augmentation of forest income, which were crucial to rural reforms. Thus, sanlim-kyes were a major driving force for Saemaul Undong at the village level (Kim 1972).

Saemaul Undong was a government-initiated, nationwide movement in the 1970s aimed at modernizing rural regions. At that time, sanlim-kyes were already active at the village level. Saemaul Undong included a mental health development campaign to instill what was called the “spirit of Saemaul Undong,” calling for citizens to practice diligence, self-help, and cooperation to improve the overall standard of living conditions. Saemaul Undong gradually took the shape of a mental health revolution campaign, and various Saemaul projects were launched from the bottom-up. Saemaul Undong proved a highly effective method of national development and reform, and consequently many developing countries are studying how Saemaul Undong might foster their own growth. One of Saemaul Undong’s most significant achievements, in cooperation with the sanlim-kyes, was wide-scale reforestation.

The objective of this study was to describe sanlim-kyes’ role and contribution to reforestation projects including protection of trees planted during Saemaul Undong period in the ROK, especially in the 1970s. Thus far, empirically, many researchers have tried to identify the key factors that affect the likelihood of success of collective action because rational, self-interested individuals do not act to achieve their common or group interests (Feeny et al. 1990; Ostrom 2000). Empirical field research provides certain consistent findings,
namely that when villagers who share a common-pool resource organize themselves to devise and enforce their own basic rules, they can manage the local common-pool resource more sustainably than when rules are externally imposed on them (Ostrom 2000). Thus, this paper describes the role and meanings of sanlim-kyes for the success of reforestation in ROK, focusing on the real-world empirical evidence as an example of successful collective action during Saemaul Undong period based on the social norms of ROK.

Methodology

Data were collected by conducting Q&A sessions with individuals who participated in the reforestation projects of sanlim-kyes and Saemaul Undong in the 1970s, as well as through literature searches of relevant publications including the Journal of Korean Forestry Society and Sanlim-ji, and various government documents, and through field trips to successful sites of reforested forests. The publications and documents were reviewed to understand the role or contribution of sanlim-kyes to reforestation activities, and the names of persons interviewed for this research are listed in Tables 1 and 2. The questions covered seed production, seedling production, fuelwood plantation, Saemaul tree plantation (e.g. fruit tree, fast-growing tree, timber tree, ornamental tree, and village tree, etc.) during Saemaul Undong period and the roles of sanlim-kyes from collecting seeds to planting trees as well as protecting forests from illegal cutting, pest attack, or forest fire.

Results and discussion

The beginning of sanlim-kyes

The formation of agrarian society meant that a different kind of cooperation was necessary, and villagers began to build cooperative bodies bound by common duties, such as kye (communal private organization/fund), dure (farmers’ cooperative group), and pumasi (exchange of labor). Sanlim-kyes originated from the system of hyangyak (an agreement of mutual assistance among local villagers) of the Joseon Dynasty (Kim 1983a, 1983b). Song-kyes – communal groups formed autonomously in each village – carried out forest protection and reforestation activities. For instance, a song-kye from Hadong, Gyeongnam Province, formed towards the end of the 18th century, banned slash-and-burn farming and made it mandatory for villagers to plant pine trees if farmyards were established on hillsides or higher. A song-kye formed by the Park family of Yecheon, Gyeongbuk Province, planted pines, willows, and paulownias in the 19th century (Kim 2011). Based on the social norms of ROK, these historical roots informed the role of sanlim-kyes during Saemaul Undong period and were the reason for the success of national reforestation programs in ROK (National Forestry Cooperatives Federation 2012).

With the enactment of the Temporary Forest Protection Law in 1951, sanlim-kyes were established as public corporations in certain parts of Ri- and Dong-level administrative divisions across the nation. In 1961, Forest Law came into effect and sanlim-kyes were formed in every Ri- and Dong-level division, and a forest cooperative was established in all Si- and Gun-level divisions. From the late 1960s, community-based Ri and Dong development councils were established from village-level project planning commissions, and projects that were originally part of the government-planned Saemaul Undong could be carried out autonomously at the village level.

These village-level development councils were initially designed as comprehensive consulting bodies that would coordinate the projects managed by resident-based organizations and their profits. Saemaul Undong expanded the role of village-level development councils considerably. Each development council consisted of 15 members including the village head, a Saemaul leader, resident representatives, and other council members. Either the village head or the Saemaul leader would be designated as council chief, and the Saemaul leader was to collaborate with the village head in managing the council in case the chief position was held concurrently by the village head. Council members were selected from informal organizations, natural communities within the village, or by villagers’ surnames. Sometimes, a reputable village leader was elected to the council as well. Within the council were affiliate groups – youth groups, housewives’ associations, village associations, and inspection committees. Village associations were tasked with prevention of crime, espionage, arson, and disaster, while inspection committees were responsible for auditing the projects under the jurisdiction of the council. The boards of leaders comprised former Ri–Dong chiefs and village elders, and the development cooperatives managed the finances with respect to the district’s common facilities, donations, government loans, subsidies, and others. As their association with Saemaul Undong increased, village-level sanlim-kyes were subsumed under the control of Ri–Dong development councils and took on some of the movement’s projects (Figure 1).

Resident-based organizations had different names and carried out unique tasks based on local needs, forming their own business management boards or cooperative units to carry out those tasks. Sanlim-kyes took the lead in carrying out business projects, including reforestation, particularly when the projects focused on the improvement of residents’ income. For seedling nurseries and reforestation, a general village meeting was held, led by the ladies’ group or chestnut tree cooperative within the council in order to discuss project management. Thus sanlim-kyes took the leading role in extensive tree planting and management activities (Figure 2). After reforestation projects were completed and Forest Law

Table 1. Number of surveyed references by source.

| Source        | Research papers | Sanlim-ji | Government documents | Others |
|---------------|-----------------|-----------|----------------------|--------|
| No. of references | 2 | 12 | 3 | 4 |

Table 2. List of interviewees.

| Name         | Previous membership                | Previous position       |
|--------------|-----------------------------------|-------------------------|
| Il-Hwan Chang| National Forestry Cooperative Federation | Chairman               |
| Sung-Cheon Hong | Kyungpook National University | Professor               |
| Min-Sub Chung | Kyungpook National University | Professor               |
| Jae-Woo Hwang | Yeungnam University | Professor               |
| Officers     | Korea Forest Service               | Senior officer          |
| Officers     | Forestry Cooperatives              | Manager                 |
was amended, sanlim-kyes gradually lost their sphere of influence and became forest cooperatives.

The role of sanlim-kyes during Saemaul Undong period

Amidst the social chaos of the mid-20th century, rehabilitating degraded areas through natural restoration was not feasible. Consequently, the objective of sanlim-kyes as stipulated in the Forest Law of 1961 was “to achieve clear and tangible progress in reforestation based on cooperation between forest owners and local villagers,” indicating that forest restoration was a top priority task. In the 1970 amendment, forest management and protection were added to the objectives, thereby strengthening the responsibility of sanlim-kye. Sanlim-kyes consisted of forest owners and heads of households within the designated district, with expenses and labor to be determined by the Articles of association (Article 60 of the Forest Law). In effect, sanlim-kyes played a crucial part in tree planting and forest growth and protection, while leading the forest restoration work at village level (Chang in Table 2). In accordance with Article 58 of the Forest Law, sanlim-kyes carried out tasks specified in the Articles of association, details of which are as follows:

1. Forest protection

The purpose of establishing sanlim-kyes through the 1951 Temporary Forest Protection Law was to encourage forest owners and villagers to work together in protecting local forests. Forestry personnel organized rotational or permanent forest patrol teams to prevent illegal and unrestricted felling of trees and forest fires, to control pests and diseases, or to carry out firefighting operations. In case of a pest outbreak, all personnel were deployed for pest elimination, hence contributing significantly to the protection and growth of forests (Hong in Table 2).

Article 36 of the first amendment to the Forest Law in 1970 dictated that “should the need arise for the protection of state-owned forests, the chief of the Korea Forest Service may, as per presidential decree, designate an area within the affected forest and call for collective protection from the local sanlim-kyes, and a portion of local product may be given as remuneration.” Article 51 of the same law stipulated that
“the Mayor of Seoul-Busan or provincial governors may order relevant forest owners or local sanlim-kyes to take necessary measures if pest infection or disease occurs, or if the likelihood thereof should increase in a forest under state jurisdiction.”

Forest protection activities carried out by the sanlim-kyes in the 1970s are detailed below (Kim 1972; Kim 1984a; Kim 2015). Along with Saemaul Undong, these activities played a key role in stabilizing and improving living conditions, as well as increasing income in rural societies.

a. Rotational and fixed forest patrol teams
   - Crackdown on illegal/unrestricted logging of trees and charging of violators
   - Prevention of, and alert on, forest fires and firefighting duties
   - Outbreak alert and extermination of forest pests
   - Protection of wildlife and charging of poachers
   - Crackdown on, and charging of, illegal land development and damaged forest facilities
b. Improvement of fireplaces and chimneys to save forest fuels
c. Establishment of fuelwood forests to resolve rural energy problems and prevent unrestricted logging in timber forests
d. Providing labor in erosion control projects, protection, and management of facilities to contribute to conservation of national land
e. Collective protection responsibility to local sanlim-kyes in state-owned forests

2. Reforestation and cultivation of forests

Although the contribution of sanlim-kyes to reforestation was relatively weak in the early phases of their establishment, their responsibilities expanded to include cultivating specially designated forests of fruit trees such as chestnut, persimmon, jujube, walnut, and ginkgo trees, in addition to lacquer, tung oil, mulberry, and paulownia trees. Other than to secure extra income for rural households, the reason behind this expansion was to secure forest wood for fuel, farming, timber, and other purposes. In 1958, as part of the Five-Year Plan for fuelwood forest establishment, sanlim-kyes launched a joint project to plant black locust, pitch pine, and alder trees to create fuelwood forests, leading to vast improvement in output (Korea Forest Policy Research Association 1975; Bae et al. 2010).

Article 37 of the 1970 amendment of the Forest Law dictated that “the chief of Korea Forest Service may, under circumstances deemed necessary for reforestation, lend and permit the use of state-owned forests to Sanlim-kye Forestry Cooperatives and the Association of Forestry Cooperatives,” which served as a channel for members of sanlim-kyes to utilize state-owned forests for financial gain, while also achieving the original goal of restoring forests. By planting and growing more trees on hills and mountains, sanlim-kyes played a substantial part in increasing forestry-related resources and ultimately in increasing income for members of sanlim-kyes. The reforestation and cultivation activities pursued by sanlim-kyes in the 1970s are as follows (Kim 1972):

a. Acquisition of expertise in seedling production, and cultivation via collection and seedbed gardening of trees to be used for reforestation
b. Allocation of timber trees, highly profitable fruit trees, and genetically improved poplars, leading to increased supply of forest resources, base income, and sanlim-kye staff salaries
c. Miscellaneous tending operations in newly formed forests, such as complementary planting, fertilization, weeding, pruning, and thinning, etc.

3. Seedling cultivation and acquisition of seeds

Seedling production and gardening were an important part of sanlim-kye’s acquisition of expertise and in the securing of joint property. The first seedling cultivation conducted by sanlim-kyes dated back to 1954, using black locust and oak, which are comparatively easier to cultivate (Chang in Table 2). In 1960, sanlim-kyes had 3883 nursery fields, 3641 of which were operational, boasting a nursery area of 2,406,000 m² and producing 60,450,000 seedlings (National Forestry Cooperatives Federation 2012).

The government purchased all seedlings produced by sanlim-kye, which they used for the reforestation of fuelwood forests, thereby allowing sanlim-kyes to accrue financial assets and increase villagers’ income. Furthermore, species deemed easier to collect, such as black locust, oak, lespedeza, and pitch pine, were sampled and in turn supplied by sanlim-kyes.

4. Joint projects based on the forest management plan

For rational management and increased forestry income, sanlim-kyes participated in joint projects based on the forest management plan, proxy projects carried out in place of the authorities, forest work commissioned by the Forest Service staff, and activities to promote the common interests of the staff (per Articles 12, 27, and 58 of the Forest Law). The roles of sanlim-kye are as follows (Kim 1972):

a. Common projects mentioned in the forest management plan, including reforestation and the tending, protection, and harvesting of forest products
b. Commissioning, agreement on, and execution of profit distribution for businesses commissioned by the forest service staff and projects ordered by the authorities
c. Increasing byproducts from forests for increased staff income and exports
d. Promoting the common interests of association members by outlining procedures for the gathering of forest products for personal consumption, acquisition of public facilities, and equipment
e. Borrowing of disposable national forest area for reforestation, protection, and management, with possible free transfer of ownership if planned business is completed within a specified timeframe, acquisition of base assets, and increasing the income of association members while gaining expertise in forest management
f. Arranging joint labor tasks for erosion prevention, pest extermination, firefighting, seedbed planting, and other miscellaneous tasks

Saemaul tree planting and Saemaul reforestation

As a part of Saemaul Undong, the Ministry of Home Affairs designated April as a “tree planting month” and commenced tree planting projects in 1972. The aim was to instill a healthy living environment and national sentiments, at the same time
as creating cooperative estates for fruit tree and fuelwood forests in 16,600 villages designated for the Saemaul project to increase income in the long term and to make tree planting a lasting habit. The basic guidelines for tree planting in this era were as follows (National Archives of Korea 1972, Agenda of Cabinet meeting; Tables 3–4):

a. Saemaul tree planting is a self-initiated, self-financed, cooperative project undertaken by villagers as a part of Saemaul Undong

b. Project objectives include planting and protecting trees in neighborhood hill reforestation, empty lot utilization, and beautification of household properties, schools, and workplaces

c. Trees to be used for reforestation were to be clustered according to variety and suitability for the local environment; forming fruit tree, fuelwood, and timber forests to promote efficiency in management

d. Tree planting projects should be developed as part of the detailed implementation of the Saemaul Undong Four-Year Plan, starting in 1972

e. Seedlings supplied for the Saemaul tree planting plan are treated separately from seedlings supplied for the reforestation plan initiated by the Korea Forest Service

f. Financial support for seedlings must be secured according to the proportions proposed in the reforestation plan of Korea Forest Service

Individual sanlim-kyes from each Ri-Dong were responsible for the village hill reforestation project (Kim 1984b). The financial support criteria stipulated self-funding by villagers and partial national aid. As bottom-up, self-sustaining organizations, sanlim-kyes played a crucial role in the Saemaul tree planting plan (Chung and Hwang in Table 2).

Saemaul tree planting projects that began in 1972 continued in the form of Saemaul reforestation business

### Table 3. Summary of Saemaul tree plantation plan in 1972. Source: National Archives of Korea 1972.

| 1. Plantation on village hillsides | No. of villages | No. of seedlings (1,000 trees) |
|-----------------------------------|----------------|------------------------------|
| Fruit trees                       | 2,598          | 5,003.1                      |
| Fuelwood                          | 2,528          | 4,041.1                      |
| Sum                               | 5,121          | 9,044.1                      |
| 2. Plantation in villages         |                |                              |
| Fruit trees                       | 5,671          | 1,129.8                      |
| Fuelwood                          | 1,246          | 224.4                        |
| Others                            | 4,425          | 905.6                        |
| Sum                               | 11,342         | 2,259.8                      |
| 3. Plantation in workplaces, houses, and schools | | |
| Schools                           | 4,765          | 595.6                        |
| Workplaces                        | 5,339          | 216.8                        |
| Houses                            | 442,818        | 714.3                        |
| Total                             | 461,191        | 7,659.6                      |

### Table 4. Financial plan of 1972 Saemaul plantation (1000 KRW), Source: National Archives of Korea 1972.

| Year | No of villages | No of seedlings (1,000 trees) |
|------|----------------|------------------------------|
| 1972 | 2,598          | 5,003.1                      |
| 1973 | 112,316        | 11,976                       |
| 1974 | 134,862        | 39,853                       |
| 1975 | 173,650        | 78,881                       |
| 1976 | 203,900        | 83,000                       |
| 1977 | 225,837        | 136,700                      |
| 1978 | 229,208        | 123,400                      |
| 1979 | 189,394        | 105,422                      |
| 1980 | 165,583        | 73,000                       |

The achievement and meaning of sanlim-kyes in the success of reforestation in ROK

Sanlim-kyes’ most notable achievement was the successful reforestation of the Korean landscape, making them a driving factor behind the success of Saemaul Undong. Following 1952, the joint property accumulated by sanlim-kyes formed the financial basis for numerous village construction projects under Saemaul Undong, such as the cases of Yeongdong in Chungbuk-do, Jangsu and Namwon in Jeonbuk-do, and Yecheon in Gyeongbuk-do (National Forestry Cooperatives Federation 1971a, 1971b, 1977, 1981). The establishment of fuelwood forests in total of 680,000 ha (Table 7) provided a foundation for the restoration of degraded areas across the nation. Sanlim-kyes also managed 20,000 ha of private forest, 60,000 ha of state-owned forest, and 590,000 ha of forest designated for profit sharing in 1980 (National Forestry Cooperatives Federation 2012). Forest protection activities were considerably enhanced under the first National Reforestation Plan (1973–1978). All regional projects were subsumed under Saemaul Undong following its initiation in the 1970s. In the area of forestry, programs providing for village forest cultivation, reforestation, erosion prevention, and collection of seedlings were launched (Tables 8–10), in which sanlim-kyes inevitably played a critical part. Furthermore, sanlim-kyes contributed to the prevention of illegal and unrestricted logging and forest fires, as well as pest and disease control (Chang in Table 2).

Through the process of national reforestation programs in ROK by the successful collective action of sanlim-kyes, we could find that the regimes of sanlim-kyes followed key principles to help sanlim-kyes sustain and build their cooperation for the long period of two National Reforestation Plans (1973–1987), which is consistent with previous findings suggested by Ostrom (2000). First, there existed a boundary rule that helped villagers to know who were in and out of a defined set of relationships in a village. Second, sanlim-kyes developed the local rules-in-use that restricted the amount, timing, and technology of planting trees, and also allocated benefits for villagers. Third, most of villagers affected by the
### Table 6. Status of Saemaul tree plantation area by tree types (ha).

| Year | Fruit trees | Fast-growing trees | Timber trees | Ornamental trees | Village trees | Fuelwood | Total |
|------|-------------|--------------------|--------------|------------------|--------------|----------|-------|
| 1973 | 8,200       | 10,760             |              |                  |              |          | 11,976|
| 1974 | 25,095      | 39,855             |              |                  |              |          | 65,950|
| 1975 | 40,618      | 78,881             |              |                  |              |          | 120,500|
| 1976 | 50,061      | 83,000             |              |                  |              |          | 136,000|
| 1977 | 77,005      | 136,700            |              |                  |              |          | 213,705|
| 1978 | 123,400     |                    |              |                  |              |          | 123,400|
| 1979 | 105,422     |                    |              |                  |              |          | 105,422|
| 1980 | 73,000      |                    |              |                  |              |          | 73,000|

### Table 7. Fuelwood plantation status by year.

| Year | Non-national forest | Government aid in non-national forest | Own account in non-national forest |
|------|---------------------|--------------------------------------|-----------------------------------|
|      | Area (ha)           | No. (1,000 seedlings)                 | Area (ha)                         |
|      |                     |                                      | No. (1,000 seedlings)             |
|      |                     |                                      | Area (ha)                         |
|      |                     |                                      | No. (1,000 seedlings)             |
| 1965 | 48,069              | 188,842                              | 41,724                           |
| 1966 | 51,269              | 169,391                              | 49,727                           |
| 1967 | 364,751             | 1,426,052                            | 1,418,652                         |
| 1968 | 1,000               | 4,000                                | 4,000                             |
| 1969 | 3,800               | 11,772                               | 17,772                            |
| 1970 | 1,500               | 7,500                                | 7,500                             |
| 1971 | 1,140               | 6,452                                | 6,452                             |
| 1972 | 1,000               | 5,000                                | 5,000                             |
| 1973 | 10,037              | 41,967                               | 32,800                            |
| 1974 | 30,095              | 120,739                              | 120,112                           |
| 1975 | 40,630              | 186,417                              | 156,827                           |
| 1976 | 50,061              | 244,423                              | 244,112                           |
| 1977 | 77,005              | 402,410                              | 402,371                           |

Note: National forest is not included in establishment of fuelwood plantation (Korea Forest Service 1980).

### Table 8. Status of seedling production by sanlim-kyes (million seedlings). Source: National Forestry Cooperative Federation 2012.

| Year | Robinia pseudoacacia | Populus alba × P. glandulosa | Populus spp. | Pinus rigida | Alnus spp. | Pinus thunbergii | Castanea crenata | Quercus acutissima | Paulownia coreana | Others |
|------|----------------------|-----------------------------|--------------|--------------|------------|------------------|------------------|-------------------|-------------------|--------|
| 1962 | 450                  | 1                           |              |              |            |                  |                  |                   |                   |        |
| 1963 | 473                  | 4                           |              |              |            |                  |                  |                   |                   |        |
| 1964 | 230                  | 7                           | 37           |              |            |                  |                  |                   |                   |        |
| 1965 | 170                  | 3                           | 33           |              |            |                  |                  |                   |                   |        |
| 1966 | 713                  | 5                           | 92           |              |            |                  |                  |                   |                   |        |
| 1967 | 159                  | 1                           | 95           |              |            |                  |                  |                   |                   |        |
| 1968 | 173                  | 1                           | 120          |              |            |                  |                  |                   |                   |        |
| 1969 | 124                  | 1                           | 3            | 7            | 1          |                  |                  |                   |                   |        |
| 1970 | 83                   | 1                           | 1.5          | 55.5         | 1          |                  |                  |                   |                   | 1      |
| 1971 | 74.4                 | 1.5                         | 0.7          | 57.3         | 1          |                  |                  |                   |                   |        |
| 1972 | 72.5                 | 2.1                         | 0.7          | 47.8         | 0.6        |                  |                  |                   |                   | 0.02   |
| 1973 | 98.9                 | 2.2                         | 1.9          | 40.7         | 7.5        | 1.2              |                  |                   |                   | 1.60   |
| 1974 | 124                  | 2.7                         | 0.3          | 25.3         | 8.2        | 2.0              | 0.8              | 0.8               | 0.2               | 1.8    |
| 1975 | 99                   | 9.2                         | 3            | 1            | 0.04       | 0.6              | 0.1              | 0.7               | 1.5               | 3.8    |
| 1976 | 142                  | 5.5                         | 2.6          | 68.4         | 28.7       | 1.9              | 0.02             |                   |                   |        |

### Table 9. Seed production of sanlim-kyes by year (kg). Source: National Forestry Cooperative Federation 2012.

| Year | Robinia pseudoacasia | Pinus rigida | Quercus acutissima | Castanea crenata |
|------|----------------------|--------------|--------------------|------------------|
| 1962 | 131,549              | 131,549      | 10,000             |                  |
| 1963 | 69,615               | 59,615       | 10,000             |                  |
| 1964 | 56,844               | 56,844       | 10,000             |                  |
| 1965 | 175,399              | 164,997      | 10,002             |                  |
| 1966 | 230,047              | 13,467       | 18,534             | 198,046          |
| 1967 | 167,283              | 12,439       | 10,438             | 144,046          |
| 1968 | 46,889               | 6,637        | 7,691              | 32,561           |
| 1969 | 20,356               | 7,229        | 1,091              | 12,036           |
| 1970 | 19,081               | 9,477        | 9,604              |                  |
| 1971 | 24,968               | 9,415        | 5,395              | 10,158           |
| 1972 | 15,766               | 12,551       | 2,781              | 434              |
| 1973 | 12,400               | 12,400       |                   |                  |
Evolution of sanlim-kyes in the post-Saemaul era

Sanlim-kyes were a principle agent in enacting government-initiated forestry policies, and their number increased from 21,628 (86% of 25,020 legally defined Ri- and Dong-level administrative divisions; staff size: 2,241,652) in 1959 to 21,895 (staff size: 2,580,172) in 1965. When Saemaul Undong was at its peak in the 1970s, the number of sanlim-kyes was around 21,000 with an approximate staff size of 2,300,000. This number declined to 20,433 (staff size: 1,991,101) in 1981, and had reached 11,175 (staff size: 97,394) as of March 2016 (Table 11). Currently, most sanlim-kye members are affiliated with forest cooperatives, functioning mainly as collaborative units rather than autonomous organizations.

A new wave of the movement, known as Saemaul Undong 2.0, has been spreading throughout much of the world. Considering the state of degraded forests in many developing countries, it is imperative to impart the knowledge gained during Saemaul Undong and through the involvement of sanlim-kyes for the improvement of the forests, natural environment, and economic conditions of other developing countries.

Conclusion

Formed in 1951 in all Ri- and Dong-administration divisions across the nation in 1951, sanlim-kyes were instrumental in bringing about cooperation between villagers and forest/mountain owners for their mutual benefit, and their function was substantially amplified in the 1970s following the onset of Saemaul Undong. In particular, sanlim-kyes formed the basis of national land restoration and served as a driving force behind the cultivation of local fuelwood forests and accumulating resources to be used for community construction projects. The 680,000 ha of fuelwood forest established in this era is one successful example of a regional forest development project that contributed to the successful restoration of degraded forest ecosystems in ROK under Saemaul Undong.

As a part of Saemaul Undong, the Ministry of Home Affairs designated April as a “tree planting month” and commenced tree planting projects in 1972. Afterwards, such projects were continued under the Saemaul reforestation project and the motto “No barren land in my village” to rehabilitate previously depleted mountains and hills. The Saemaul reforestation project was pivotal in the development of villages and generation of profits that were then used for village development funds and scholarships.

In the 1970s, an era of rapid regional and social development, sanlim-kyes made a critical contribution to preventing illegal and unrestricted felling, forest fires, and pest attacks. The active, bottom-up participation of sanlim-kyes in Saemaul Undong and greenery restoration projects should be recognized in depth in order to assess its importance in the success of Saemaul Undong.

In this study, we found that sanlim-kyes followed the key principles of collective action in order to achieve the success of national reforestation programs. For reforestation, villagers participated in the reforestation project of a village (rule 1). Also, the villagers designed their own rules that were enforced by villagers (rules 2 and 3). The rules assigned costs proportionate to benefits in reforestation programs (rule 4). Villagers rotated into a monitoring position (rule 5). These

Table 10. Joint plantation by sanlim-kyes by year (fuelwood plantations excluded). Source: National Forestry Cooperative Federation 2012.

| Year | Own forestation (ha) | Rental forestation (ha) | Fiduciary plantation (ha) | Forestation by proxy (ha) |
|------|---------------------|------------------------|--------------------------|--------------------------|
| 1962 | 5,120 | 62 | 1,578 |
| 1963 | 3,812 | 28 | 1,476 |
| 1964 | 6,725 | 520 |
| 1965 | 4,364 | 219 |
| 1966 | 4,427 | 1,447 |
| 1967 | 9,958 | 689 |
| 1968 | 6 | 90 | 643 |
| 1969 | 3,998 | 50 | 2,723 |
| 1970 | 4,257 | 39 | 1,807 |
| 1971 | 33 | 7,085 |
| 1972 | 51 | 1,488 | 5 | 2,994 |
| 1973 | 727 | 1,439 |
| 1974 | 147 | 275 | 1,278 |
| 1975 | 165 | 294 | 1,752 |
| 1976 | 218 | 204 | 934 |
| 1977 | 626 | 1,659 | 2,943 |
| 1978 | 204 | 426 | 2,762 |
| 1979 | 628 | 2,515 | 3,359 |
| 1980 | 659 | 1,257 | 6,695 |
| 1981 | 484 | 759 | 4,985 |
| 1982 | 163 | 512 | 3,239 |
| 1983 | 141 | 233 | 1,442 |
| 1984 | 236 | 1,055 | 2,942 |
| 1985 | 146 | 1,090 | 851 |
| 1986 | 137 | 573 | 1,155 |

Table 11. Status of forestry cooperatives and sanlim-kyes by year. Source: National Forestry Cooperative Federation 2012.

| Year | Forestry cooperatives | Sanlim-kye | No. of sanlim-kye members |
|------|----------------------|------------|--------------------------|
| 1962 | 159 | 21,716 | 2,564,610 |
| 1963 | 159 | 21,825 | 2,601,732 |
| 1964 | 158 | 21,893 | 2,580,172 |
| 1965 | 158 | 21,895 | 2,569,749 |
| 1966 | 158 | 21,771 | 2,576,494 |
| 1967 | 158 | 21,735 | 2,566,010 |
| 1968 | 156 | 21,604 | 2,524,749 |
| 1969 | 156 | 21,546 | 2,512,624 |
| 1970 | 153 | 21,511 | 2,498,335 |
| 1971 | 151 | 21,493 | 2,421,448 |
| 1972 | 146 | 21,490 | 2,385,620 |
| 1973 | 142 | 21,423 | 2,354,344 |
| 1974 | 141 | 21,295 | 2,266,284 |
| 1975 | 141 | 21,109 | 2,275,309 |
| 1976 | 141 | 21,109 | 2,269,581 |
| 1977 | 141 | 20,939 | 2,115,378 |
| 1978 | 141 | 20,846 | 2,075,119 |
| 1979 | 141 | 20,453 | 2,019,871 |
| 1980 | 141 | 20,475 | 1,996,676 |
| 1981 | 139 | 20,433 | 1,991,101 |
| 1982 | 140 | 20,392 | 1,986,697 |
| 1983 | 141 | 20,138 | 1,973,809 |
| 1984 | 141 | 20,071 | 1,974,903 |
| 1985 | 141 | 19,940 | 1,963,464 |
| 1986 | 141 | 19,879 | 1,945,374 |
| 1987 | 141 | 19,545 | 1,914,589 |
| 1988 | 140 | 18,741 | 1,600,273 |
| 1989 | 140 | 17,063 | 1,458,807 |
| 1990 | 140 | 17,064 | 1,426,362 |
| 2016 | 142 | 11,175 | 97,394 |
rules helped to maintain the collective action of sanlim-kyes during Saemaul Undong period, resulting in the success of national reforestation programs.

This study was limited by available sources of data and interviewees who participated in Saemaul reforestation works as a member of sanlim-kyes. However, we focused on describing the role and contribution of sanlim-kyes in the process of forest rehabilitation with the historical spectrum of ROK. With empirical data, if possible, further studies are needed to identify key factors that affect the success of reforestation through Saemaul Undong and sanlim-kyes in ROK for potential application to the progress of other developing countries.

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