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A Study on Main Actor for Sustainable Forest Management in Korea

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According to the establishment period (1998 to 2007) for sustainable forest management, the forest basic plan in Korea indicated that a long–term forest management is required to realize the sustainable forest management. In this condition, most of private forest owners have abandoned or ignored to do the individual management of their forests even though the private forests occupied 70% of total forest land areas, which mean is that the private forest can be the most important main actor for forest management; thus adequate forest management by the private forest owners might not be expected. Therefore, new main actor for the forest management is required to replace the private forest owners who have performed as a main actor for the forest management so far. With this reason, various main actors for the forest management, such as Association, Business Corporation, Forest Owner's Association, Local Public Enterprise, and Logging Contractor, were introduced. In conclusion, the forest owner's association is the most adequate main actor for the forest management as a new because it is a forestry business corporation that has conducted the works and guidance related to the private forest, and also it prepared sufficient conditions for the forest management, such as forest management experts, forestry technicians, capital, technology, and equipment. However, even if various main actors for the forest management can be created to replace the forestry cooperative, the separation of forest ownership and management should be performed to realize the sustainable forest management.

INTRODUCTION

The traditional function of forest was to produce a certain amount of timber and forest by–products, which was a major meaning of its function based on economic aspect. However, other important functions of forest have been reconsidered, and various plans of useful application for forest have been also actively discussed because global environmental problems, such as the destructions of ozone area and tropic forests and the global warming, have been occurred due to rapid industrial development and population increase. Based on a concept of socially, economically, ecologically, and environmentally continuous development, a basic principle of forest management were adopted at the United Nations Conference on Environment and Development (UNCED), Rio de Janeiro, Brazil, in 1992 (International Forest Cooperation Study Group, 1996; Kim and Choi, 1995; Ozawa, 1996). This type of efforts and activities for the forest has carried the sustainable

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forest management with a harmony between the traditional and multi-public functions of forest (Park and Chung, 2000).

Social demands for the forest management had been continuously changing, but forest resources in Korea was extremely forest denudation during the Japanese colonial periods and the Korean War. Therefore, Korean government took the first and second 10 year (Year 1973 to 1987) long-term plans for forest conservation and afforestation, and then the plan for the reforestation of all possible lands in the country was successfully completed (Park *et al.*, 1995). Also, to maintain the forest resources in fair condition, Korean government focused on the long-term management of forest resources and the public function of forest, and keep encouraged private forest owners and managers with supporting the various forest and public funds for reforestation. At the same time, the d management of artificial forest resources with the continuous activities for forest production have been induced. However, the long-term management of forest is still necessary to bring the sustainable forest management, because most of current forest resources in Korea are composed of young trees in less than 30 year old. In particular, 70% of the forests in Korea are private, which are almost never managed because of the small-scale owner, increase in wage, lack of labor, and unprofitable forest products (Chang *et al.*, 1997; Jang and Chang, 1998).

In these conditions, nevertheless, the importance of forests is recently reconsidered in Korea, because Koreans are greatly interested in the public functions of forests, such as the functions of land conservation and water resource development, due to the global environmental problems. Therefore, the public forest functions generated by the sustainable forest management as well as the function of timber production are greatly required. Also, the forest management is tended not to depend on the private forest owners only, but whole social community is in the responsibility for the forest management.

Objectives of this study are to investigate the developing processes of forest resources, the present condition of forest and forestry, and the activity of forest management to continuously manage the forests in Korea and to discuss about main actors charged for the sustainable forest management to demonstrate the various public functions as well as future timber production.

DEVELOPING PROCESSES OF FOREST MANAGEMENT RESOURCES IN KOREA

Rehabilitation Period of Mountainous Region (Just after Korean War to Year 1972)

In Korea, wood fuel was traditionally used for house heating during the last several centuries, which was a custom of long standing for Koreans. After the Korean War, the forests in Korea were extremely destroyed by the secret felling of trees for the forestry fuel collection because this period was socially and politically in chaos (Jeong, 1981). Therefore, the main forest policy after the Korean War was recovery reforestation, forest conservation, and development of fuel forestation for the areas in forest denudation.

In 1961, Korean government had begun to establish the forest law. The government enacted the basic law systems related to forestry, such as the law of forestry product collection and the law of erosion control works, which supported the rehabilitation of damaged mountainous regions in Korea.

In 1962, a project for the forest conservation and afforestation as a fundamental preparation for the Korean economic development was included in the first five year term (Year 1962–1966) of the economic development plan, and then the forestry conservation and afforestation became a major goal of the forest policy (Korea Forest Service, 1998). Such forest rehabilitation was aggressively conducted with the strong supports from the officials and the people as well as international institutes. With these efforts, the reforested areas in Korea were 16,000 ha for national forests, 439,000 ha for public forests and 455,000 ha in total, which was the largest reforestation record in Korean history.

Period (Year 1973–1987) of forest conservation and afforestation

Forest conservation and afforestation during the first 10 year term (1973–1978)

During the first 10 year term of the forest conservation and afforestation plan, the basic system of forest policy was established. At this time, Korean government had basically focused on an establishment of foothold, so-called the early afforestation for the national lands. To begin with, Korea Forest Service was transferred to the Ministry of Home Affairs in 1973 because it had belonged to the Ministry of Agriculture and Forestry as one of outside branch offices in the Ministry. The forest rehabilitation plan was closely connected with the Saemaul (New Community) Movement begun in 1970's to efficiently conduct the forestry conservation and afforestation. Main forest policy was also reorganized for forestry conservation, country plan for fuel source in rural area, steady supply and demand for timbers, mandatory reforestation, and afforestation for erosion control (Korea Forest Service, 1998).

The plan was provided to reforest 1.0 million ha of mountainous areas in Korea during the 10 years (1973–1982). The reforestation plan included the national campaign for tree-planting, the intensification of mandatory reforestation, the completion of reforestation for wood fuel, the reforestation with proper trees in suitable lands, the forestation first and timbering later, and the creation of economic forest. Tree species planted for the forestation were 70% of short growing period species and 30% of economic

Table 1. Reforestation results of the resources of forest management.

(Unit: 1,000ha)

Period of plans	Reforestation policy	Reforestation area on tree species				
		Total	Long-term growth trees	Short-term growth trees	Fruit trees	Fuel forests
1962–72	· Reforestation in large complex · Creation of forest fuel	1,649	696	118	222	613
1978–78	· Reforestation by national people · Reforestation with short-term growth trees	1,080	358	360	154	208
1979–87	· Completion stage of afforestation · Creation of economic forest in large complex	966	501	437	28	–
1988–97	· Maximization of mountainous land efficiency · Creation of economic forest	366	295	54	17	–

Source: Korea Forest Service. 1998 *Korea forest policy in 50 year history*

purpose species. Because of the forestation with short growing period species, this plan was successfully finished with reforesting 1,080,000 ha in 1978 which is 4 years earlier than the expected year 1982 (Park *et al.*, 1997) (Table 1).

Forest conservation and afforestation during the second 10 year term (1979–1987)

The second 10 year plan for the forest conservation and afforestation was started in 1979 because the first 10 year plan had been done by 1978. The second 10 year plan focused mainly on the establishment of foothold to create forest resources. Detailed plans were provided for the utilization of mountainous areas, the buildup of forest stocks, and the long–term plan of timber supply and demand.

Also, reforestation was still emphasized to bring the afforestation of national land during the second 10 year term; thus a plan for 1.5 million ha reforestation was established in 1979. However, during the reforestation period, the target size of reforestation area had been changed to 1.15 million ha with decreasing rural labor power, increasing wage, and decreasing the planned areas for reforestation. Thus, at the time for completing the second 10 year plan in 1987, the 94% (1.08 million ha) of total target areas were afforested, and the national land afforestation plan was also completed with the result (Park *et al.*, 1997). Also, a plan for 400,000 ha reforestation in 80 large locations was established to create economic purpose forests and to achieve the creation of forest resources. The plan was almost completed with 370,000 ha reforestation at the last year (1987) of the second 10 year term.

Creation period (Year 1988–1997) of mountainous land resources

The creation of forest resources was established during the third 10 year term. It was not for simple afforestation and reforestation, but for forest management. During the period of forest conservation and afforestation, more than 100,000 ha of national land were forested in every year. However, during the creation period of mountainous land resources, 320,000 ha of the area were forested, which was only one–third of the area forested as comparing with those in the previous period. For supporting the creation of forest resources, the areas damaged by forest fire and forest disease and insect pest were protected first, and then the conversion of tree species was selectively conducted. Also, the tree species for forestation were diversified with planting the right tree species in suitable areas. At the same time, 3.03 million ha of trees planted were managed by these types of efforts (Korea Forest Service, 1997).

On the other hand, the mountainous lands were classified as 1) the production area, 2) the public area, and 3) the semi–conservation area of forests to help the rationalization of mountainous land uses. Also, governmental supports, such as expanding the cooperated management of private forest, collectivizing forest lands, planning multi–purpose production, and designating forced areas for the forest development, were intensively performed for the expansion of forest management foothold. The importance of forest and forestry with drawing up budgets after 1970's are presented in Table 2. The budget indicated that forest rehabilitation and resource creation, so–called rehabilitation and afforestation, were conducted during the period of forest conservation and afforestation (Year 1973–1987), whereas during the creation period of mountainous land resources (Year 1988–1997), the forest policy focused on forest management, such as forest

protection, the expansion of forest management foothold, the improvement of forest public function, and the creation of incomings in rural and mountainous areas (Table 2).

Table 2. The importance of forest and forestry in budget distribution.

	Application	1970's	1980's	The first half of the 1990's	The second half of the 1990's
Creation of resources	· Reforestation	○	○	○	○
	· Taking cars of trees	○	○	○	◎
	· Public works for making forest	×	×	×	◎
Forest protection	· Prevention against forest disease and insect pest	○	○	○	◎
	· Precaution against forest fire	▲	○	○	◎
Expansion of management foothold	· Creation of forestry labor power	▲	○	⊙	○
	· Cooperated management	×	▲	○	○
	· Improvement of forest product marketing structure		▲	○	○
	· Construction of forestry load	▲	○	○	◎
Promotion of public function	· Creation of natural recreation forest	×	×	▲	○
	· Management of forest ecology	×	×	▲	○
	· Erosion control	○	○	○	○
Income business for rural and mountainous region	· Comprehensive development of mountainous region	×	×	▲	○
	· Increase of income with forestry products	▲	○	○	◎

Source: Choi, S. I. 2003 *A Study on Wood Use in Housing and the Prolonged Retention of Warming Gas in the South Korea.* Ph. D. thesis. Kyushu University, Japan

Note: ×(Unimportant), ▲(A little important), ○(Important), ◎(Very important)

Period (Year 1998–2007) of foothold establishment for the sustainable forest management

Goal of forest policy in the fourth 10 year (Year 1998–2007) plan was to establish foothold for the sustainable forest management, which was 1) to create more valuable forest resources, 2) to bring up competitive forest business, and 3) to establish the development plan for the healthy and clean forest environment. The plan was fully dependent upon the basis of forest resources established by afforestation and forest management.

Also, detailed 8 projects to promote the goal of policy were established as follows: 1) the settlement of forest management system, 2) the acceleration of forest management policy and the bringing up of forestry people, 3) the promotion of forest resources to be economic forests and the establishment of management system, 4) the buildup of competitive forest business, 5) the reinforcement for the conservation and management of forest bio–resources, 6) the prevention of forest disasters and the expansion of urban forest, 7) the development and improvement of forest recreation and culture, and 8) the expansion of international forest cooperation.

Table 3 shows the amount of investment for main projects in the fourth 10 year term. The potions of investment was 29.3% for the promotion of forest resources to the eco-

nomic forest and the establishment of management system, and followed by 22.7% for the prevention of forest disasters and the expansion of urban forest, and 21.0% for the buildup of competitive forest business. Therefore, during the period of the fourth term, the forest policy might mainly focus on the expansion of forest resources and the sustainable forest management (Table 3).

Table 3. Amount invested during the creation period of sustainable forest management.

(Unit: Million won, %)

Main project	Amount invested	Investment ratio
· Establishment of mountainous land management system	3,850	0.03
· Promotion of forestry management policy and upbringing of forestry people	1,094,219	8.6
· Promotion of forest resources to economic forest and establishment of management foothold	3,733,733	29.3
· Increasing of forestry competitive power	2,667,637	21.0
· Increasing the prevention and management of forest bi0–resources	439,984	3.5
· Prevention of forest disasters and expansion of urban forest	2,892,553	22.7
· Promotion of forest recreation and cultures and comprehensive development of mountainous region	858,102	6.7
· Improvement of international forest cooperation	1,038,859	8.2

Source: Korea Forest Service. *1997 The Fourth National Forest Plan (1998–2007)*

THE CIRCUMSTANCE OF FOREST MANAGEMENT AND THE PRESIDENT CONDITION FOREST MANAGEMENT RELATED TO OWNERSHIIP IN KOREA

The existing state of forest resources

Composition of forest resources

Forest land area in Korea was 6.41 million ha at the end of 2002, which was 64% of total national land (9.94 million ha). The forest land area was comprised of 1.45 million ha (23%) of national forest, 0.49 million ha of public forest, and 4.473 million ha of private forest. The potion of the private forest was 70% of total forest land area in Korea (Table 4). The forest land area was filled with 65.4% (4.19 million ha) of less than 30 year–old trees and only 9% of more than 40 year–old trees that are relatively matured. The potion of relatively matured (more than 40 year–old) trees was 26% in the national forest, but only 4% in the private forest area because the national forest has been in relatively intensive management (Korea Forest Service, 2001a).

Growing stock was markedly increased from 6.40 million m^3 in 1960 and 150 million m^3 in 1980 to 450 million m^3 in 2002 because the first and second 10 year (Year 1973–1987) plans for the forest conservation and afforestation and the third 10 year (Year 1988–1997) plan for the creation for mountainous land resources were successively completed (Figure 1). However, the amount of average growing stock per 1.0 ha that represents a standard log productivity of the forest management was 69.9 m^3 at the end of 2002, which was only 48% of Japan's (145 m^3); thus the productivity of forest resources is still very

Table 4. Forest land area and growing stock by ownership, 2000.

Ownership	Forest land area (1,000 ha)	Ratio of forest	Growing stock (1,000 m³)	Ratio of growing stock
Total	4,422	100.0	407,576	100.0
National forest	1,433	22.3	125,989	30.9
Public forest	493	7.7	31,148	7.7
Private forest	4,496	70.0	250,439	61.4

Source: Korea Forest Service. 2003 *Statistical yearbook of forestry*

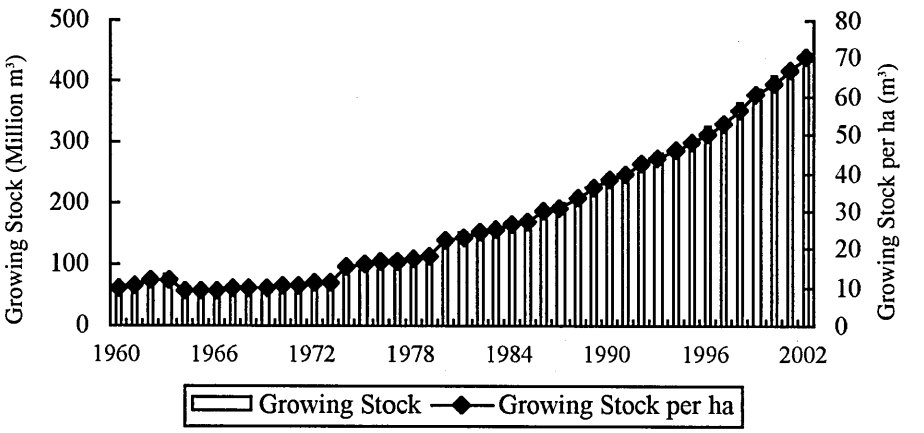

Fig. 1. Forest growing stock by year, 1960–2002.

Source: Korea Forest Service. 2003 *Statistical yearbook of forestry*

low. As measuring the amount of average growing stock per 1.0 ha classified by forest ownerships, it was 94.2, 70.1, and 62.1 m³ in national, public, and private forests, respectively, which indicated that the average growing stock in national forests was much higher than that in the private forests. Also, as evaluating the average growing stock by tree age groups, younger than 30 year–old trees that may not be useful as a timber were 57% of total trees, especially the private forests contained only 7.1% of relatively matured (older than 40 years) trees, so that timber production can not be expected for a while. Therefore, the forest resource that is a foothold of forest and forestry management is in a limited condition.

Comparisons of forest resources between Korea and forestry leading countries

Table 5 presents selected data for the forest resources between Korea and some of forestry leading countries (FAO, 2001). Forest ratio in Korea was 65%, which ranked in the fourth as comparing with other forestry leading countries, Finland (72%), Japan

Table 5. Comparison of forest resources in Korea and some of forestry leading countries, 2000.

Country	Forest land area (1,000 ha)	Growing stock (m^3)	Ratio of forest	m^3/ha
Korea	6,422	4	65	64
Japan	24,081	35	67	145
America	225,993	307	24.7	136
Canada	244,571	293	26.5	120
Australia	3,886	11	47	286
Russia	851,392	894	50.4	105
Sweden	27,134	29	65.9	107
Finland	21,935	20	72	89
Brazil	543,905	713	64.3	131
Germany	10,740	29	30.4	268
New Zealand	7,946	10	29.7	125

Source: FAO. 2001 *State of the world's forests*. Roma, Italy

(67%), and Sweden (66%) (Table 5). However, average forest land area per each person was 0.1 ha, which is less than one–fourth of the world average (0.6 ha). Also, average growing stock per 1.0 ha that represents the rate of forest thickness was 64 m^3, which was much less than the values in Japan, Germany, and world average that were145, 268, and 100 m^3, respectively, even though it was increased 5.8 times as comparing with the value (11 m^3) before starting the forest basic plan in 1972. According to this tendency, the average growing stock per 1.0 ha in Korea will be possibly reached similar value as that in Japan around 2020. Thus, the expansion of forest resource and the forest management are continuously required.

Main actor for forest management related to ownership

The forest ownership in Korea is mainly classified as national and private forests. Thus, the responsibility and purpose of forest management are also different between national and private forests.

The purposes of national forest management were in three categories: 1) economic function that is to systematically help the continuous supply of timber and forest products, 2) public functions that are to conserve national land, to build up water resources, to protect natural environment, and to provide forest recreational facilities, and 3) contribution for the development of rural and mountainous area. As focusing on the timber production related to the forest management, the amount of timber production from the national forests was 100,000 m^3 that was only about 12% of total domestic logs even though the national forests contain higher amount of relatively matured trees than the private forests have (Korea Forest Research Institute, 1999). Tree cutting in Korea was performed by 4% of final clearing, 45% of thinning, and 11% of tree species conversion, which was limited in the thinning of damaged trees and the conversion of poor tree species, thus tree cutting for income has almost not been achieved. Therefore, the management of national forest has probably purposed to increase the public functions, such as national land conservation and water resource cultivation.

The private forests in Korea occupy 70% of total forest land area and also 61% of total

growing stocks, thus the private forests can be the most important subject as a main actor for the forest management. However, 21% of total private forest land areas have been assigned as a restricted area against the commencement of forest work, and the growing stock per 1.0 ha is 62.1 m^3 that is lower than total average (69.9 m^3). Also, the average area of the private forest land per each person was 2.0 ha because private forest owners were 2.0 million at the end of 2002 even though the proper size of forest land area is needed to do the sustainable forest management. Also, the private forest land area per a person has be kept in smaller because 305,000 of private forests owners have been increased as comparing with those in 1971 when the basic forest plan was started yet, and then 0.6 ha of privately owned forest land area per a person has been decreased. Therefore, owners who have private forest lands were distributed into 65% with less than 1.0 ha, 91.1% with less than 5.0 ha, and only 0.1% with more than 100 ha (Table 6).

Table 6. Private forest land area by ownership size, 2000.

Ownership size	Owner	%	Area (ha)	%	Lots	%	ha/lots
Total	2,061,502	100.0	4,488,049	100.0	3,617,398	100.0	1.2
1ha under	1,324,123	64.2	342,576	7.6	2,230,028	61.6	0.2
1–5	500,803	26.7	1,273,362	28.4	129,420	12.7	2.8
5–10	112,395	5.5	776,647	19.3	129,133	3.6	6
10–20	48,118	2.3	657,498	14.6	503,044	13.9	1.3
20–30	12,304	0.6	297,146	6.6	99,542	2.8	3
30–50	7,678	0.4	290,416	6.5	69,439	1.9	4.2
50–100	4,006	0.2	272,134	6.1	43,062	1.2	6.3
100–500	1,919	0.1	335,611	7.5	54,496	1.5	6.2
500 ha and over	156	–	242,659	5.4	29,234	0.8	8.3

Source: Korea Forest Service. 2003 *Statistical yearbook of forestry*

Table 7 shows the private forest land areas that are owned by resident and absentee forest owners. The potion of absentee forest owner was 15.6% in 1971, but it was markedly increased to 35.2 and 48.5% in 1987 and 2002, respectively, because the population of rural area was decreased due to urbanization and industrialization. The rate of forest land area was 20.6% in 1971, but it was continuously increased to 42.5% and 52.6% in 1987 and 2002, respectively. Also, lot numbers of forest that belong to the absentee forest owner were 390,000 in 1971, and then they was rapidly increased to 1.2 and 1.8 million in 1987 and 2002, respectively (Table 7). The lot numbers of total private forest owners were increased from 2.5 million in 1971 to 3.9 million in 2002; thus the forest land area per a lot was decreased from 1.9 ha in 1971 to 1.2 ha in 2002. These results indicate that the forest land area has been widely distributed into smaller and smaller areas (Jang and Chang, 1998). Also, we expect that the smaller distribution of forest land area will be continued because of the influences of Korean's inheritance system and funeral and grave culture.

The other hand, according to article 7 of the forest development law and article 6 of an enforcement ordinance in the law, the forms of forest management are classified as part–time, full–time and enterprise forestry. The law provides that a person who is in the part–time managing forestry business should have more than 3.0 ha of forest land or has

Table 7. Private forest land area by ownership type, 1971–2000.

Ownership type		1971	1987	1993	2000
Total	Owner (person)	1,760,495	1,979,056	2,048,292	2,203,918
	Area (ha)	4,583,448	4,886,637	4,690,946	4,488,049
	Area/person	2.6	2.5	2.3	2
	No. of lots	2,473,728	3,436,171	3,542,448	3,575,430
	Area/lot	1.9	1.4	1.3	1.3
Resident forest owner	Owner (person)	1,485,537	1,282,660	1,129,237	1,154,653
	Area (ha)	3,641,071	2,811,546	2,153,045	2,171,187
	Area/person	2.5	2.2	1.9	1.9
	No. of lots	2,080,892	2,216,247	1,924.210	1,978,916
	Area/lot	1.8	1.3	1.1	1.1
	Ratio (%)	84.4	64.8	55.1	52.4
Absentee forest owner	Owner (person)	274,958	696,396	919,055	1,049,265
	Area (ha)	942,377	2,075,091	2,537,901	2,316,862
	Area/person	3.4	3	2.8	2.2
	No. of lots	392,836	1,219,924	1,618,238	1,596,514
	Area/lot	2.4	1.7	1.6	1.5
	Ratio (%)	15.6	35.2	44.9	47.6

Source: Korea Forest Service. 2003 *Statistical yearbook of forestry*

Table 8. Status of forest owners by forest management type.

Classification	Part time forestry	Full time forestry	Enterprise forestry
Forest owner area	more than 3 ha	more than 50 ha	more than 500 ha
Forestry production activity days	more than 90 days	more than 200 days	more than 200 days
Forest owner (person)	327,481	6,076	155

Source: Seok *et al.* 2000 *A socioeconomic effect analysis of the private forest investment*, Korea Forest Service

to work more than 90 days per year for forest production activity. Based on the forms of forest management, the land size for forestry business in the possible forest management is more than 50 ha, which is that the person who is in full-time forestry can be properly fitted. However, this type of full-time owners was only 0.3% (6,079 people) of total private forest owners at the end of 2000; thus a few of forest owners can properly do the forest management (Seok *et al.*, 2000) (Table 8). In this condition, the small forest land owners have abandoned or ignored to do the individual management of their forests, so that adequate forest management by the owners can not be possibly expected. The forest management that gradually deepened in problems has brought not only an aggravation of forest environmental function, but also a difficult situation that the forest might not operate the expansion of public functions which is considered by Koreans.

NEW MAIN ACTOR FOR FOREST MANAGEMENT IN KOREA

Public aspects of forest resource management

Recently, Korean's sense of values and living styles have been greatly changed with internationalization as comparing with those in 1990's. Especially, Korean's desire related to forest has been rapidly changed to its diversification and luxuriousness due to the decrease of urban greenbelt resources and the aggravation of natural environment problem. Previous forest functions were to supply timbers and to produce forest products, but the public functions of forest have recently been demanded by Koreans.

Research results of the Office of Forestry (Korea Forest Service, 2001b) indicated that the estimated value of forest public functions was 50 trillion won that was as much as 10% value of the gross national products (GNP) in 2000. According to another report (An investigation report for Korean's thinking about the forest) provided by Korea Forest Service (Korea Forest Service, 2001c), Koreans expect to have the public function, such as the prevention of disasters caused by land slide or flooding (56.2%) and the supply of clean air (52.6%), as the most important forest role, whereas other traditional functions, such as the productions of timber (13.2%) or forestry products (7.6%), are not much expected and the traditional function has been continuously decreased every year (for comparison: in 1991, timber and forest products were 19.9 and 10.5%, respectively). Choi (2003) also reported similar results that the public functions of forests were highly expected by Koreans, which are the roles of the absorption of carbon dioxide and the prevention of global warming (29%), the preservation of health and the supply of recreation (15%), and the timber production (9%). At this viewpoint, Koreans consider to accelerate the forest public functions by a way of the sustainable forest management. The forests are reclaimable, recyclable, and reproducible resources, so that if the forest is well managed, it will provide us to have timber products permanently, and give us public interests.

New main actor for forest management

Separation of forest resource ownership and its management

Although a society is in the private ownership system, the utilization of forest can be somewhat redistricted, and the forest resource ownership and its management also can be separated because the forest resource is more like in public characteristics. That is, the restriction can be controlled under the law or the management authority for national or public forest can be transferred to individuals with an agreement. The former is the restriction of forest utilization, such as the plan of land utilization and the forest preserve system under the forest law within designated area, the latter seems to be a profit–sharing reforestation system (Park *et al.*, 1997). In particular, the system of shared income reforestation for the private forests that is 70% of total forest land area in Korea was operated by separation between ownership and management. The system was established for the improvement of forest public function as well as for the development of forest and forestry by reforestation and the bringing up of forest. However, the system might be useless because of the aggravation of forest investment circumstances, such as a fall in the prices of standing trees, a tie–up of domestic timber price, and the recovery expenses of forest investment in a deficit. Thus, new main actor for the forest manage-

ment should be necessary to be created by the separation between the ownership and the management of forest resources.

Desire to change main actor for forest management

Main actor for forest management in Japan was largely expended under the basic law of forest and forestry in 2001. The main actor traditionally applied to forest owners and unions, but it largely expanded to forest businesses and logging contractors that highly motivated for the management and maintenance of forests (Forest and Forestry Basic Policy Study Group, 2002). The expansion of main actor subjects was to help the development of forestry and the sustainable management of forest because the people's desire to manage forestry was declined by a drop in the price of timber and an increase of forest management expense.

The basic law of forest in Korea, however, indicated that the main actors for the forest management include sincere forest managers, forestry successors, and forest owner's association. Unfortunately, most of private forest owners give up the management of their forests or just leave the forests without management because they regard their forest just as a property. The private forest regarding as an owner's property does not have the future plan of forest management because it means only the possession or retention of forest, which indicated that there is no planning for the forests, no goal for the forest productivity, or no characteristics to pursuit the forestry profit.

Therefore, Korean government has brought up the private forest with the characteristics of property retention as a forest management main actor established by the training system of the independent managing forestry households (1971), the cooperated management system for the private forests (1974), and a forestry successor upbringing system (1989) (Park *et al.*, 1997). However, the upbringing policy of independent managing forestry households and forestry successors might not be adequate to activate the forest management by the small size forest owners because they occupies almost all forest ownerships even though the policy is basically meaningful to train a few of full–time managing forestry households who are able to independently manage the forests (Jang and Chung, 1998). Also, Seok *et al.* (2000) reported that the effects of upbringing policy are somewhat weak in the efficiency of forest management because the candidates for the independent managing forestry households and forestry successors are only 3.4% of total forest owners, and then just 1.1% of total owners have been selected. Based on the cooperated management system for the private forests, 247 of forest cooperative associations at 45 locations was established by combining the small sized forest owners together to increase economic efficiency in 2000, but almost all of them were not effective to improve the forest management because they were only nominal (Jang, 2000); thus the upbringing policy for the main actor of forest management has almost not been efficient.

Therefore, the creation of new main actor is needed to continuously manage the forests. The management right of private forest owners can be entrusted to the forest cooperative association such as forestry cooperative, which is that the new main actor for forest management can be created by the separation of forest ownership and management. According to the result from "what is the proper program for the forest management?" investigated by the Korea Forest Service, 33.1% of Koreans preferred a proxy management of forests by the forest owner's association, 27.2% of them wanted the sup-

port for forest incoming business to induce the increase of forestry investment, and 25.3% of them focused on national purchase. Only 13.6% of Koreans agreed with self-controlling forest management system (Korea Forest Service, 2001c).

Creation of new main actor for forest management

Forms of new main actor for the forest management are forest businesses, logging contractors, the public corporation of forestry, and forest owner's association. Jang (1998) introduced three types of plan that might be conducted by the new main actors for forest management: 1) Sincere forest manager or forestry successor can first make the organization of producers, and then it establishes the association or company type of forest management group (Association and Business Corporation); 2) The forest owner's association can conduct the function of forest management organism as well as the function of consigned institution for the forest operation what the association currently does; and 3) Each self-governing body can participate in the forest management organization as a type of local public enterprise, such as the public corporation of forest management and maintenance that should have some technologies for the forest management and a certification for the proxy management of forests. However, the Association · Business Corporation is in less confidence and in weak public status to continuously manage and operate the forest resources that is in characteristics of public status even though it can be easily founded and can possibly activate the management of private forest. In contrast, the forest owner's association has conducted the works and guidance related to the private forest. There are 144 of forest owner's association national-wide. The associations possess many forest management experts, forestry technicians, and sufficient conditions for the forest management, such as capital, technology, and equipment. Thus the forest owner's association can be currently a proper system to continuously manage the private forest. The other hand, the establishment of local public enterprise is the most efficient plan to manage the forests in each specific location or region; however, making a new public enterprise is currently difficult because Korean government has been trying to reform the public enterprises to the privates due to some financial and administrative problems.

In case of the establishment of local public enterprise in Japan, under the regulation of article 34 of the civil law, reforestation corporation was founded by the investment of self-governing body. It has worked to replace the role of private forest owner that promotes the conservation of national land and the development of mountainous region as well as the management of forest resources (The Japan Forestry Association, 2001). There are 45 corporations national-wide in Japan. Reforestation and forest management are conducted by the shared income forest system with forest owners. The reforestation corporation reforests and bears the expense, and the association and forest owner share the profits produced by tree cutting. However, reforestation corporation is in huge amount of debt because the source of expense was mostly depended on a loan of money; thus serious financial loss will be expected with a drop of log prices in the long-term periods.

Endo (2003) insisted on the establishment of a specific policy in Japan, which is that the forest possession is given priority in the right to the reasonable utilization of forest resources to realize the continuous management of approximately 10 million ha artificial

forest before discussing about the main actor for the forest management. Then, logging contractors can be a main actor for the forest management because they are relative capitalists as comparing with forest owners, and especially they are able to take the responsibility for both market competition and proper forest management by equalizing the activity of forestry and logging contractors. In Korea, there are 421 of logging contractors at the year of 2000, but most of producers are in small business because 90% of them are less than 5,000 m^3 in the log production per year (Choi, 2003). Most of the logging contractors in Korea only conduct cutting work, and they raise the necessary business funds by loan from banks or other enterprises by the type of advance payment from lumbermen. Therefore, it is difficult to qualify the logging contractors as the main actor for the sustainable forest management in Korea.

In addition, whole communities that directly and indirectly received convenience and benefits from the forest resources can be considered as a main actor for the forest management. Recently, the social activities for the management of forest resources has been gradually increased, which is that whole community has tried to share the expense and labor for the forest management, such as reforestation and taking care of trees, with the forest owners. This motivation comes from the campaign of taking care of forest by citizens and the sharing principle of people who received the convenience and benefits from the forest resources. Thus, whole community can be a main actor for the sustainable forest management and a subject of the shared expense. With this social phenomenon, Sakai (2002, 2003) introduced a long–term timber concession system that is a type of the separation of ownership and management to socialize the management of forest resources. The long–term timber concession system is that cutting contractor in the concession system acquires the long–term timber concession of matured forests from the forest owners because the poorly managed forests, such as the delay of thinning, have been continuously increased with decreasing the desire of forest production activities due to long–term drop in the price of logs. The long–term timber concessionaire submits a plan of the forest management to people in regional area, and then discusses about the plan with the regional people. After receiving a mutual agreement for the forest management from the regional people, the concessionaire is authorized by a regional activation center that is an association type of local self–governing bodies. Based on the authorized plan of the forest management, thinning and final clearing can be conducted, and also a payment method for the stocked forest is decided by a contract. The long–term timbers concessionaires reforest the finally cleared area, and take care of trees in the reforested area until the trees are maturely grown enough, then they finally return the mature forest to owner. The regional activation center evaluates the operational progresses of forest management plan conducted by the long–term timber concessionaires. If the evaluation is passed, total expense for the forest management is socially supported. This system is similar to the characteristics of profit–sharing reforestation systems, but the stating point of process is different as comparing with that of other two systems because it is applied to mature forests in the cutting periods for the circular production of domestic timbers. Therefore, this system might not be adequate for Korea forests that needed to be continuously managed.

CONCLUSIONS

A long-term forest management is required to realize the sustainable forest management in Korea because 65% total forest land areas are filled with less than 30 year-old trees and the average growing stock per 1.0 ha is only 69.9 m^3; thus Korean government provided a foothold establishment period (1998 to 2007) for the sustainable forest management. Also, private forests occupied 70% of total forest land areas, so that the private forest can be the most important main actor for forest management. However, most of private forest owners have abandoned or ignored to do the individual management of their forests, so that adequate forest management by the owners might not be expected. In addition, a written assignment for the management plan of public forests was in legal obligation until 1998, but it was changed as a recommendation issue in 1999. After that time, an importance of main actor for the forest management has been reconsidered because the meaning of forest possession was mostly not to pursuit the planning, productivity, and profit from forest.

In this circumstance, new main actor for the forest management is required by Koreans to replace the private forest owners who have performed as a main actor for the forest management so far. In this study, therefore, we introduced various main actors for the forest management, such as Association, Business Corporation, Forest Owner's Association, Local Public Enterprise, and logging contractor. However, we finally concluded that the forest owner' association is the most adequate main actor for the forest management as a new because it is a forestry business corporation that has conducted the works and guidance related to the private forest, and also it prepared sufficient conditions for the forest management, such as forest management experts, forestry technicians, capital, technology, and equipment. The other hand, although various main actors for the forest management can be created to replace the forest owner's association, the restriction and inducement of forest resource possession (socialization of forest possession) should be performed to realize the sustainable forest management. That is, the restriction of private forest ownership is needed for the practical use of forest resources (economic effect) and the forest management in multi-functions (public effect). Therefore, the points at various issues, such as legal characteristics and methods, to separate the ownership and management for the forest resources should be theoretically and practically discussed in the future study.

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