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Structures of Felling and Reforestation of Private Forests in Korea

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Korea is now promoting the 4th basic forestry plan for continuous forest management based on the success of the 1st–2nd erosion controls and greening projects, and the forest materialization project started in 1973. However, the management conditions of private forests, which occupy 71% of all forest land, are gradually getting worse due to small-scale possession, the uprising of pay, the deficiency of labor and the increase of non-resident forest owners. Hence, forest owners are avoiding the investment of labor forces and funds, and most of plantation forests, which occupy over 30% of Korea forest land, is not conserved. Thus, this study was carried out to find a way which forest owners can participate in forest management more actively than ever through the comprehension of the structure of felling and reforestation. As a result, the felling and reforestation structure of the private forests of Suncheon city of Chonnam province and Changsu county of Chonbuk province feature a different use of form. And we also have come to the conclusion that the felled trees distribution structure and the tree market development figures throughout Chonnam and Chonbuk provinces require broader study, as well as the object area of this investigation, to clarify the use of felled trees and sale structures.

INTRODUCTION

Korea relied on the 3rd basic forestry plan (1988~1997) for the purpose of maximization of forest efficiency through at the 1st erosion control and greening project, which focused on using fast-growing trees for fuel; and the 2nd erosion control and greening project placed great importance on the establishment of economical trees. And now in 2000, the 4th basic forestry plan (1998~2007) being promoted aims at the construction of a management base as well as an administration system and the realization of the need for continuous forest management.

However, looking at the government's estimation of toward the 3rd basic forestry plan, completed in 1997, one sees that they indicated that forest owners had a tendency to avoid investment in reforestation, owing to the price tie-up of indigenous timber and the deficiency of labor force in rural mountain villages. The 'silviculture and thinning

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project' bore no fruit from the failure of reforestation land because of the indifference of forest owners and low rates of assistance (Forestry Administration, 1997b).

The government has a plan to secure sufficient forestry labor through the cultivation of forest craft workers and reduction of burden on forest owners by magnifying assistance funds. The negligence towards plantation forests, however, is on the increase because of no earnings from thinning (Kang, 1994).

However, in this situation the number of possible pulpwood and general timber supplies is increase, but the rate of self-sufficiency is still decreasing every year. It especially seems difficult to achieve a timber self-sufficiency rate of 60% by 2040, to which government plan aims based on factors, such as the demand decrease of mine-props trees of indigenous timber, the structure of wood consumption dependent on foreign one, and the uprising expenses of indigenous timber production (Chang and Seok, 1992).

Therefore, reforestation and the magnification of economical wood species of inferior forest areas are strongly recommended, but an active participation of forest owners is the most important ingredient required to realize this goal.

Therefore, the objective of this study is to find a way forest owners can actively participate in forest management through understanding the structure of felling and reforestations which applies to private forests of two areas: Suncheon city in Chonnam and Changsu county in Chonbuk province.

MATERIALS AND METHODS

1. Investigation Areas

Two investigation areas were selected: Suncheon city in Chonnam province mixed district with urban and rural features which magnify the planting of trees for nuts and fruits, and Changsu county in Chonbuk province, which is a rural mountain district where trees for timber production are being planted continuously.

First, Suncheon city in Chonnam province is situated in the southwestern part of Korea. It has a mild climate and also has many kinds of fruit trees, such as persimmons, chestnuts, strawberries, peaches, flowering plants, and decorative plants which are widely cultivated. Since 1995, due to an integration with Sungju county, we have called Suncheon city an urban-rural mixed region, one with a population of 270,000. The forest size is 64,000 ha, which occupies 9% of all Chonnam province forest lands, and 711,000 ha, which both make up the and broadest region among 22 other cities and counties in Chonnam province.

Changsu county in Chonbuk province is situated about 100 kilometers away from Suncheon city toward the north. It is 430 meters above sea level, so high-cold land vegetables, such as Chinese cabbages, radishes, tobaccos, ginseng, and apples are widely cultivated in that region. It is a rural mountain area that has a population of 30,000 under the state of depopulation. The forest size is 41,000 ha, which occupies 9% of Chonbuk province forest lands of 456,000 ha, and is a little broader than the average size of 14 other cities and counties of 33,000 ha. Major species reforested artificially are larches, pitch pines, Korean nut pines, and the growing stock account for 13%, 15% and 20% of the total stock, respectively.

2. Investigation methods

The investigation was performed for three months from January to March in 1999. Forty people at Suncheon city in Chonnam and 32 people at Changsu county in Chonbuk provinces were investigated via an interview among resident forest owners, who obtained permission for clear cutting for 4 years from 1995 to 1998.

Investigation substance contains labor force constituent, forest possession structure, felling labor force, the uses of funds and felled trees, reforestation labor force and funds, species of reforestation, and forestry incomes as well as forest management plan.

RESULTS AND DISCUSSION

1. General Situation of Forest Growing Stock and Supply & Demand in Korea

National forests and public forests each takes 22% and 8% of all Korean total forest

Table 1. Status of national forest land area and growing stock

Area (1,000 ha)				Growing stock (1,000 m ³)			
Total	National forest	Public forest	Private forest	Total	National forest	Public forest	Private forest
6,451 (100.0)	1,419 (22.0)	487 (7.5)	4,545 (70.5)	363,561 (100.0)	115,878 (31.9)	27,321 (7.5)	220,362 (60.6)

Sources: Forestry Administration. 1999. Statistical yearbook of forestry. 26-27 pp.

Note: Numerical Values of inside in the parentheses are percent of composition.

Table 2. Accomplishment of reforestation

	Total (1,000 ha)	Long rotation species	Fast rotation species	Fruit nut species	Fuel species	others
Total	2,398 (100.0)	1,133 (47.2)	830 (34.6)	199 (8.3)	208 (8.7)	28 (1.2)
1st periods of erosion control and greening project (1973~1978)	1,080 (100.0)	358 (33.1)	360 (33.3)	154 (14.3)	208 (19.3)	
2ed periods of erosion control and greening project (1979~1988)	997 (100.0)	531 (53.3)	437 (43.8)	29 (2.9)		
3rd basic forestry plan (1988~1997)	321 (100.0)	244 (76.0)	33 (10.3)	16 (5.0)		28 (8.7)

Sources: 1) Forestry Administration. 1996. A propulsion plan of principle forest policy.

2) Forestry Administration. 1997. History of 50 years of forest policy in Korea.

3) Forestry Administration. 1999. Statistical yearbook of forestry.

Note: 1) Fruit nut species: chestnut, persimmon trees etc.

Fast growing species: Italian poplar, paulownia etc.

Long rotation species: Korean white pine, larch etc.

Fuel species: False acacia, alder etc.

Others: Lacquer tree etc.

2) Numerical Values of inside in the parentheses are percent of composition.

land, but private forests account for 71%. The growing stock per hectare of national forests are 82 m³, public forests 56 m³ and private forest 48 m³, respectively, private forest are the lowest (Table1).

The forest growing stock has increased from a total of 72,696,000 m³ (11 m³/ha) in 1972 to 363,561,000 m³ (56 m³/ha) in 1999. The government has set a goal for long term reforestation to increase plantation forests and timber self-supply rates which stood at 32% and 13%, respectively, in 1996 and should increase to 50% and 60% by 2040 (Table 2) (Forestry Administration, 1996; 1997a; 1997b; 1998).

However, forestry production which occupied 1.8% (\$ 851,300,000) of the GNP decreased to 0.2% (\$ 752,600,000) in 1998. Also, in spite of timber demand continuously on the increase, the self-supply rate of indigenous timber has been no more than 13% for the past 9 years from 1990 to 1998 (Forestry Administration, 1999). More than half the number of indigenous timber is used as low value usage, such as mine-props trees or pulpwood, and in the case of general wood, they are mostly used as packing wood rather than interior wood for construction.

Table 3. Forest products and timber demand and supply by year

	Forest products (Billion won)		Timber demand and supply (1,000 m ³)						
	GNP	Forestry	Origin			Domestic			
			Total	Domestic	Import	Total	Pit prop	Pulp wood	General wood
1990 ~ 1998	3,070,038	8,330	80,102 (100.0)	10,644 (13.3)	69,458 (86.7)	10,644 (100.0)	2,185 (20.5)	3,552 (33.4)	4,907 (46.1)
1990	263,952	1,165	9,423	1,138	8,285	1,138	512	410	216
1993	321,267	874	8,832	1,184	7,648	1,184	227	346	611
1995	376,316	853	9,284	1,055	8,229	1,055	139	405	511
1998	370,862	824	5,798	1,428	4,370	1,428	110	406	912

Sources: Forestry Administration. 1999. Statistical yearbook of forestry. 246–337 pp.

Note: Numerical Values of inside in the parentheses are percent of composition.

2. Felling and Reforestation Structure of Investigation Areas

1) The General Situation

The forest size of Sunchon city of Chonnam province is 64,000 ha and private forests account for 88%. Forest growing stock is 44 m³/ha, which is almost the same level as Chonnam province (41 m³/ha). In private forests, residents and non-residents each owned 48% and 52%, and the number of forest owners account for 56% and 44%, respectively. Forest possession scales per one owner are 1.9 ha and 2.6 ha to residents and non-residents, respectively. Clear cutting size per one forest owner is 2.2 ha to residents, 4.3 ha to non-residents in their areas.

The forest size of Changsoo county of Chonbuk province is 41,000 ha, and private forests are 77% of that figure. The forest growing stocks are 57 m³/ha which is almost the same level as Chonbuk province, which amounts to 53 m³/ha. In private forests, residents and non-residents each possessed 48% and 52%, and the number of forest owners

account for 43% and 57%, respectively. The forest possession scales per one owner are 6.8 ha and 6.3 ha for residents and non-residents, respectively. The clear cutting areas for the 4 years from 1995 to 1998 are 976 ha, which account for 3.1% of the total private

Table 4. Status of private forest ownership in investigation areas

	Forest areas (1,000 ha)			Forest owners (1,000 people)		
	Total	Resident	Absentee	Total	Resident	Absentee
Sunchon	56.3 (100.0)	26.9 (47.8)	29.4 (52.2)	25.7 (100.0)	14.5 (56.4)	11.2 (43.6)
Changsu	31.9 (100.0)	14.3 (44.8)	17.6 (55.2)	4.9 (100.0)	2.1 (42.9)	2.8 (57.1)

Sources: Forestry Administration. 1999. Statistical yearbook of forestry. 148-149 pp.

Note: Numerical Values of inside in the parentheses are per-cent of composition.

Table 5. Status of tree cutting in investigation areas (1995~1998)

	Forest/owner	Cutting areas (ha)			Forest owners (people)		
		Total	Resident	Absentee	Total	Resident	Absentee
Sunchon	2.5	1,003 (100.0)	730 (72.8)	273 (27.2)	399 (100.0)	336 (84.2)	63 (15.8)
Changsu	2.9	976 (100.0)	757 (77.6)	219 (22.4)	337 (100.0)	252 (74.8)	85 (25.2)

Note: Numerical Values of inside in the parentheses are percent of composition.

forest areas. The clear cutting size per one forest owner is 3.0 ha for residents, 2.6 ha for non-residents in their areas (Tables 4 and 5) (Forestry Administration, 1999).

2) General Conditions of Interviewee

(1) Components of Labor Force

In the case of Sunchon city, investigation subject, 40 people inhabits 109 households in all, 2.7 persons per house on average. Classified by age, people over fifty and sixty account for 30% and 41%, respectively, therefore, old age groups take the leading role, and the average age of 40 forest owners is 59 years of age.

Below are employment details of the young classes, 31 persons in their twenties thirties: students 11, household workers (agriculture) 11, agriculture workers 4, independent business owners 3 and company employees 2. So the members of households engaging in agriculture is few.

In case of Changsu county, investigation subject, there are 76 people inhabiting 32 households in all, 2.4 person per house on average. These people over fifty or sixty account for 20% and 58%, most of them in the oldest age group and the average age of 32 forest owners is 63 years. And looking at employment details of 17 persons between ages 20 and 40: agriculture workers 4, students 2, forest laborers 1, unknown 2.

(2) Forest Possession Structures

In Sunchon city, the entire forest possession sizes of 40 investigation subjects are 197 ha, and the average possession scale per one forest owner is 4.9 ha. Fifty-four per-

cent and 46% of possession forests are composed of plantation forests and natural forests in sequence, but comparatively small scales of under 3 ha have high rates of plantation forests.

In Changsu county, the entire forest possession sizes of 32 investigation subjects are 183 ha, and the average possession scale per one forest owner is 5.7 ha. Eighty percent

Table 6. Status of forest ownership of investigation objects (forest owners)

	Owners (people)	Total/ owner(ha)	Total (ha)	Plantation forests			Natural forest	Non-stoc ked
				Sub-total	Existing forest	New forest		
Sunchon	40	4.9	196.5 (100.0)	105.2 (53.5)	48.4 (46.0)*	56.8 (54.0)*	91.1 (46.4)	0.2 (0.1)
Changsu	32	5.7	182.6 (100.0)	145.6 (79.7)	71.1 (38.9)	74.5 (40.8)	32.0 (17.5)	5.0 (2.7)

Note: 1) New plantation forests mean that forests were established in between 1995 and 1998.

2) Numerical Values of inside in the parentheses with star symbol are percent of composition about sub-total of plantation.

3) Numerical Values of inside in the parentheses are percent of com-position.

and 18% of possession forests are composed of plantation forests and natural ones in sequence, but each class has a high rate of plantation forests (Table 6).

(3) Forest Constituent of Plantation Forest

In Sunchon city, chestnut trees and pitch pines account for 71% of its forests and 9%, respectively in 48 ha among whole plantation forests of 105 ha. In newly established plantation forests of 57 ha from 1995 to 1998, chestnut trees and Gorosoi trees (*Acer mono*) account for 41% and 23%, respectively, but there are almost no trees for timber production. And among existed plantation forests, pitch pines for timber production are hardly taken care of. Natural forests with inferior conditions, such as steep slopes, mostly highland, and do not seem to be used actively because of the deficiency of laborers and low profitability.

In Changsu county, among plantation forest of 146 ha there are 48% larches, 24% pitch pines and 23% Korean nut pines in 71 ha. In newly established plantation forests from 1995 to 1998, chestnut trees and larches accounted for 45% and 33%. Meanwhile,

Table 7. Composition of species in plantation

	Total (ha)	Existing plantation(ha)						New plantation(ha)					
		Sub- total	Chest- nut	Larch	Pitch pine	Korean white pine	Others	Sub- total	Chest- nut	Gorosoi	Larch	Korean white pine	Others
Sunchon	105.2	48.4 (100.0)	34.4 (71.1)		9.8 (20.2)		4.2 (8.7)	56.8 (100.0)	23.4 (41.2)	12.8 (22.5)			20.6 (36.2)
Changsu	145.6	71.1 (100.0)		33.9 (47.7)	17.2 (24.2)	16.0 (22.5)	4.0 (5.6)	74.5 (100.0)			24.7 (33.2)	33.2 (44.6)	16.6 (22.3)

Note: Numerical Values of inside in the parentheses are percent of composition.

the reforestation of pitch pines reduced suddenly and reforestation of chestnut trees and larches increased. The reasons for this are that firstly, this region has the appropriate climate to grow larches and Korean nut pine. Secondly, concerning larches, they have a higher price than pitch pines as a whole, and the usage is versatile, such as in the construction of interior wood. It may be considered not only because Korean pine nuts have good quality, but also because foresters can yield pine nuts. Meanwhile, owing to the deficiency of labor force and low economic efficiency, existing plantation forests and natural forests are hardly taken care of through pruning and thinning (Table 7).

3) Felling Structure of Investigation Areas

(1) Felling Forest Trees

The felling size of Suncheon city is 57 ha and an average felling size per one forest owner is 1.4 ha. The felling sizes of species are: pitch pines 56%; pine trees 35%; and chestnut trees and Oak trees 9%. The years of felling in pitch pines and pine trees are mainly 21~30 years old, which accounts for 70% and 79% of pitch pines and pine trees, respectively.

The felling amount those within Changsu county consists of 78 ha, and an average felling size per one forest owner is 2.4 ha. The felling size species are; pitch pines 59%; larches 20%; pine tree 19%. The years of felling in pitch pines are 21~30 and 31~40

Table 8. Status of cutting by species and age class (1995~1999)

	Total (ha)	Pitch pine	Pine	Larch	Chest- nut	Korean white pine	Oak
Total	57.0 (100.0)	31.8 (100.0)	19.7 (100.0)		2.8 (100.0)		2.7 (100.0)
Below 10years	1.0 (1.8)		1.0 (5.1)				
Sunchon 11~20	8.2 (14.4)	4.0 (12.6)	3.2 (16.2)				1.0 (37.0)
21~30	40.4 (70.9)	22.4 (70.4)	15.5 (78.7)		0.8 (28.6)		1.7 (63.0)
31~40	7.4 (13.0)	5.4 (17.0)			2.0 (71.4)		
Total	77.5 (100.0)	45.4 (100.0)	14.6 (100.0)	15.2 (100.0)	1.0 (100.0)	1.3 (100.0)	
11~20	1.3 (1.7)	0.1 (0.2)	0.1 (0.7)	1.1 (7.2)			
21~30	33.9 (43.7)	20.9 (46.0)	6.5 (44.5)	5.5 (36.2)	1.0 (100.0)		
Changsu 31~40	31.6 (40.8)	24.4 (53.7)	1.8 (12.3)	5.4 (35.5)			
41~50	5.8 (7.5)		3.0 (20.5)	1.5 (9.9)		1.3 (100.0)	
Above 51years	1.5 (1.9)		1.5 (10.3)				
Not identified	3.4 (4.4)		1.7 (11.6)	1.7 (11.2)			

Note: Numerical Values of inside in the parentheses are percent of com-position.

years old to 46% and 54%, respectively. In larches were 21~30 and 31~40 years old to 36% both all.

However, the reasons why pitch pines and larches, called representative artificial reforestation trees, are being felled in the thinning stages of 21–40 years of age are the following: planting for nuts and fruits in Suncheon city; and low profitability and economic circumstances in Changsu county (Table 8).

(2) Felling Labor Force and Funds.

As far as Suncheon city is concerned, the composition of the felling labor force is; wood dealers 43%, owners themselves plus employment 40% and owners themselves 8% in order. But the classes of possession between 3~5 ha and 5~10 ha account for 60% and 71% of owners themselves and the employment, respectively. There were 3 forest owners who felled trees directly and sold them for themselves, or utilized them as fuels against wood dealers, who demanded carrying the felled wood out to roadsides or else proposed low prices for the wood. The reason for felling by the wood dealers is close to half is that the wood that is carried out to the road within the forests, which the wood dealers make, can be used to plant and manage trees for nuts and fruits effectively if the forest owners do not have the proper devices.

So most of the forest owners request positive locations of the roads at the time of construction of them by the wood dealers. The felling funds occupy expenses at the rate of 53% owners themselves by and by the wood dealers for 43%, so defrayal by owners themselves accounts for more than half.

In Changsu county, the felling by the wood dealers amounts to 94%. The reasons for this are; the complex permission procedures for felling, the risks born at the time of felling wood, and difficulty in obtaining a proper labor force. The wood dealers also account for 94% of felling funds because they were assisted with the establishment of timber production trees from government, and the wood dealers were entrusted to work for the forest owners and to take assistance money directly from the government.

(3) The Uses and Earnings of Felling Trees.

The use of felled trees are the following; fuel for heating 25%, the negligence of felling the area 25%, sales by the wood dealers 23% and free concession to the wood dealers 20%. The class of possession under 3 ha accounts for 33% of fuels for heating and sales by the wood dealers, so there was much use of the felled trees in comparison to other classes. However, the felled trees used as fuels for heating were easy to carry off in location, and the usage was also slight. On the other hand, the usage of pitch and pine trees are; pulpwood, fruits and fish boxes, supporting wood in the shape of lavers, sawdust, wrapping and supporting wood for construction and feed. Most of the oak species were used as basic wood for cultivation of oak mushrooms. The entire felling earnings were \$9,435. By the species, pitch pines amount to 70%, oak trees 20%, pine trees 11% in sequence. Earnings per hectare were \$164. The average income of the 18 people who earned money by felling among the investigation pool of 40 persons was \$785.

In Changsu county 94% of the forest owners sold felled trees to the wood dealers, but the usage of pitch pines was same as Suncheon city, and larches were used for engineering and construction decorative wood, sawdust and feed. The felling earnings were \$51,150, and among them pitch pine trees amount to 66%, oak 20%, larches 9% and pine trees 6% by species. The earnings per hectare were \$657 and the average earnings of 23 people

who remembered incomes from felling were \$ 2,228.

4) Reforestation Structure

(1) Reforestation Labor Force and Reforestation Funds

The reforestation manpower of Suncheon city accounts for the forest owners themselves plus employment at 61%, the owners themselves 21%, the wood dealers 11% in order, but the classes of those possessing both 3~5 ha and 10 ha account for 90% of the owners themselves plus employment, and a class over 10 ha account for 50% by the wood dealers. However, in the case of reforestation, there were smaller interventions by the wood dealers in comparison to the felling. This is because it does not demand as many devices and it seems like the intention of the forest owners, who want to input a households labor force to the highest degree to save money. The owners themselves 45%, government assistance 45% and the wood dealers 11% supplied reforestation funds, but most of the assistance from the government was money price for seedlings.

In Changsu county, the composition of the forestation labor force was the wood dealers 79%, the owners themselves plus employment 10% and the owners themselves 10%. So the wood dealers perform the highest rate for reforestation. But the execution of reforestation was decided partly by the conference between the forest owners and the wood dealers as conditions of the location of felling expectant sites and of forestry in the level of felling. The felling funds were from the wood dealers and the owners themselves plus employment amount to 83% and 10%, respectively, but in the establishment of the timber production forest there was assistance for felling expenses and free concessions of seedlings by the government.

(2) The Grounds for Selection of Species for Reforestation

In Suncheon city, of the 40 forest owners planted 42% chestnut trees, 32% Gorosoi (*Acer mono*), and 17% persimmon trees. Fifty-nine percent state that the reason for planting chestnut trees is because of fast growth and quick incomes. Eighty-five percent of Gorosoi trees (*Acer mono*) were planted for the same reason.

In Changsu county, of 32 forest owners planted 41% of Korean nut pines, 36% of larches. Solicitation and selection by authorities concerned was the reason for planting, accounted for 35%, 24% as absence of appropriate species to plant, and 24% as harvest for nuts and fruits. Concerning larches, 47% of the amount was due to fast growth and fast incomes, 20% due to solicitation and selection by authorities concerned and 20% due to the absence of suitable species to plant.

However, the forest owners indicated that main problems of the unilateral selection of tree species by authorities were not smoothly supplying seedling.

5) Forestry incomes and Forest Management Plans

In Suncheon city, 18 forest owners among 40 earned \$ 40,902. These forestry incomes are derived from chestnuts 69%, persimmons 20% and apricot trees 11% in sequence, but there were no earnings by timber production. The average earnings per one forest owner are \$ 2,274, and by the possession scales it is \$ 4,567 over 10 ha, \$ 2,137 over 3~5 ha, \$ 2,283 over 5~10 ha and \$ 1,571 under 3 ha of possessions, in that order. The future forest management plan makes schemes of expansion as 25%, maintenance as 70% and reduction as 5%, but the expansion accounts for 40% in the class of over 5 ha of land possession. The purpose of the 10 forest owners hoping for expansion divided into 4 motives: planting trees for nuts and fruits, 3 for producing landscape tree, and 2 for establishing

Table 9. Forestry incomes and forest management plans

		Owners (people)	Forestry incomes (10,000 won)					Forest management scale(people)				
			Total/ owner	Total	Chestnut	Persimmon	Ume	Pine nut	Total	Expansion	Same	Reduction
Sunchon	Total	40	248.8	4,478	3,078	900	500		40	10	28	2
		(18)*		(100.0)	(68.7)	(20.1)	(11.2)		(100.0)	(25.0)	(70.0)	(5.0)
	Below	18	172.0	860	560	300		18	3	15		
	3ha	(5)*		(100.0)	(65.1)	(34.9)		(100.0)	(16.7)	(83.3)		
	3~5	10	233.5	1,868	1,568		300	10	3	7		
		(8)*		(100.0)	(83.9)		(16.1)	(100.0)	(30.0)	(70.0)		
	5~10	7	250.0	750	750			7	3	3	1	
Changsu		(3)*		(100.0)	(100.0)			(100.0)	(42.9)	(42.9)	(14.3)	
	Above	5	500.0	1,000	200	600	200	5	1	3	1	
	10ha	(2)*		(100.0)	(20.0)	(60.0)	(20.0)	(100.0)	(40.0)	(20.0)	(40.0)	
	Total	32	113.0	226	26		200	32	5	26	1	
		(2)*		(100.0)	(11.5)		(88.5)	(100.0)	(15.6)	(81.3)	(3.1)	
	Below	8						8	1	7		
	3ha							(100.0)	(12.5)	(87.5)		
Changsu	3~5	9						9	2	7		
								(100.0)	(22.2)	(77.8)		
	5~10	10						10		9	1	
								(100.0)		(90.0)	(10.0)	
	Above	5	113.0		26		200	5	2	3		
Changsu	10ha	(2)*			(11.5)		(88.5)	(100.0)	(40.0)	(60.0)		

Note: 1) Numerical Values of inside in the parentheses are percent of composition.

2) Numerical Values of inside in the parentheses with star simbol are number of forest owners who had incomes from forest.

timber production forests. Twenty-eight persons are going to maintain these as they are divided into 10: management of trees for nuts and fruits, 10 as ancestral grave mountains and 6 as property, in sequence, but 2 owners are going to reduce replied economic conditions.

In Changsu county, 2 forest owners among 32 earned \$ 1,826 from pine nuts and \$ 237 from chestnut forestry earnings. Both persons are of the class that owns more than 10 ha. But the damage by animals and the deficiency of labor force were the main reasons to force some forest owners to give up the harvesting of pine nuts. The future forest management plan is expansion at 16%, maintenance at 21% and reduction at 3%. The 40% of the class that owns over 10 ha hoped for expansion. In the case of 5 forest owners hoping for expansion, 2 of them want to plant trees for nuts and fruits, 2 for property, 1 for the establishment of timber production forests. Twenty-six persons who are going to maintain the land as it is will do so for the following reasons: 7 for property, 6 for low profitability, 5 for ancestral grave mountains and 4 due to the deficiency of manpower. But one person is going to reduce due to low profitability (Table 9).

CONCLUSIONS

In the case of Suncheon city in Chonnam province, the felled trees of pitch and pine trees have not been completely transferred into incomes. It has been considered that this is because of low demand for the felled trees and limited assistance from the government toward the planting of trees for nuts and fruits. However, we can evaluate the realization of future earnings derived from the planting of trees for nuts and fruits as the positive use formation of forests in the meaning that they play a role in elevating the possibility of investment, such as the extension of timber production trees.

On the other hand, the trees with nuts and fruits mostly were planted to the best areas among the possessed forest. So, existing plantation forests and natural forests that had bad conditions, like steep slopes or highlands almost are not being conserved on the grounds of the deficiency of manpower and low profitability. Therefore, we need to take care of existing timber production trees positively, and make use of natural forests intensively.

In Changsu county in Chonbuk province, pitch pines and larches in the state of thinning were cut clearly owing to low profitability and economic conditions, but most of the felled trees were sold, and that brought forestry earnings to the forest owners. It may be considered that this is because of governmental assistance toward the establishment of the timber production trees and secure wood demand. And earnings by the forest management result in the active participation of the forest owners, such as the establishment of timber production forests in spite of the intervention of the wood dealers. However, existing plantation forests and natural forests are not being taken care of because of low profitability. Therefore, we need to attend to timber production forests continuously, and make use of natural forests positively.

The exposed problems from the above examination to solve are the followings:

1. Reckless construction of the carrying out roads within forests have a high possibility to bring about difficulty in forest management, such as erosion and collapsing of sites, so they need to magnify forest roads to strengthen the forest management basis. This will lead to the elevation of the various forest use possibilities for the forest owners.
2. In order to minimize the economic damage of the forest owners by the intervention of the wood dealers, it need a more positive activity toward wood distribution, such as entrustment and sales agency of forestry cooperatives composed of the forest owners.
3. The labor force is further weakening because of aging and the desperate deficiency of manpower, so it appears to be difficult for the forest owners to participate in forest project actively. Thus, the secure constitutional forestry labor force like 'forest craft workers' is essential.
4. To take care of and expand the timber production forest continuously, the sustaining assistance of the government is necessary and some amount of reward is also necessary for the forest owners who prolong the periods of cutting.
5. The thinning and reforestation structure of private forests of Suncheon city and Changsu county differ in the use formation of forestry, and especially in clarifying the use of felled trees and sale structures distinctly. It is necessary far broader study about the wood distribution structure and wood market development figures all through the regions.

6. Finally, without the consideration of non-residential possessed forests, which account for half of private forests, it is impossible to appreciate the whole thinning and reforestation structure of private forests. Therefore, broad researches are necessary for that from this time on.

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