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<https://doi.org/10.5109/1801788>

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出版情報 : 九州大学大学院農学研究院紀要. 62 (1), pp.225-235, 2017-02-24. Faculty of Agriculture, Kyushu University

バージョン :

権利関係 :

## Change and Development Plan of Mountain Village in North Jeolla Province, South Korea: Results Comparison Based on 1<sup>ST</sup> and 2<sup>ND</sup> Survey of Mountain Village

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(Received October 24, 2016 and accepted November 4, 2016)

Mountain villages in South Korea display social, cultural, and economic severe environments due to unfavorable geographical conditions. However, mountain village development and promotion projects have been implemented by the Korean government since 1995, because these villages have played important roles, such as safe land conservation, balanced land development, and preserving existing forests and traditions in Korea. Mountain village development projects were considered insufficient according to the long-term development plan, while top–down government–led business promotion, insufficient mountain village special development, and facilities’ operation deficit and mismanagement after the completion of the project were deemed as problems. Moreover, expansion of the mountain village promotion fund, actively engaging local residents, and expanded use of forest products to increase income were proposed as tasks. As a result, Korea conducted a survey on mountain villages in 2003 and in 2014 in order to secure the basic data for the effective promotion of these villages based on the planned promotion policy. The purpose of this study is to comparatively analyze studies on the changes and characteristics of mountain villages and find ways for promoting these villages in the North Jeolla province. Return migration and multicultural settlement increased in the mountain villages of North Jeolla, and considered as a new source of labor, but forest ownership scale and management land size were poor economic conditions. Therefore, it needed to heal the mind and body utilizing abundant forest resources in mountain villages, as to derive leisure activities for citizens, seek utilization of various products (wild herbs, nuts, mushrooms) directly harvested from forests. In addition, it needed to improve the living environment in areas such as education, healthcare, and welfare facilities through the expansion of government support, and, finally, expand local businesses. Additionally, local systematic forest management for IV–V grade timber would improve public interest and also be a very important resource for the future promotion of mountain villages in North Jeolla.

**Key words:** survey based on mountain village, urban–rural exchanges, mountain village economy, mountain village promotion

### INTRODUCTION

South Korea’s mountain villages take around 50% of its land area, but experience severe social, cultural, and economic environments due to unfavorable geographical conditions. Particularly, low agricultural productivity and absolute labor shortage are determining the difficult mountain village economic environment. Additionally, due to labor shortages because of aging, rising wages, and low forestry productivity, forests do not contribute significantly to increasing household incomes in mountain villages (Korea Forest Service, 2014a). However, mountain villages carry weight in land conservation, thus improving the national economy through stable agricultural and forestry production, and play an important role in environment maintenance, balanced land development, forest culture, and tradition succession (Korea Forest Service, 2014a). Therefore, South Korea initiated

a mountain village development project in 1995 with one town to promote mountain villages. Four regional characteristics were considered in the project: recreation interaction, forest income type, agriculture and forestry complex, and comprehensive development. The benefits from these development projects were income increase, population growth, improved living conditions, and a scheme for the stable promotion of mountain village development projects. However, insufficient natural resources investigation and long–term development plans, promoting top–down government–led businesses, insufficient specific mountain village product development and branding, facilities operating and mismanagement after project completion, and lack of additional support were identified as problems, while the expansion of the mountain villages’ promotion fund, inducing active participation of the local population, projects for mountain village characteristics, expanding the use of forest products to increase incomes, were proposed as tasks (Gyeonggi–do Forest Environment Research Institute, 2007).

On the other hand, recent studies were performed about mountain eco–villages’ activation plan (Kim *et al.*, 2013b; Chang *et al.*, 2014; Kim and Seo, 2014a) and urban–rural exchanges of mountain eco–village enabled

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operational program development (Seo and Lee, 2010; Kim and Seo, 2013; Seo *et al.*, 2015). In addition, studies on motivation and life satisfaction factor analysis of mountain villages' return migration (Roh *et al.*, 2013; Kim *et al.*, 2013a; Min and Kim, 2014; Kim and Seo, 2014b) and Korean forest carbon cycling town planning typology model development (Seo *et al.*, 2011; Kwak and Seo, 2012) were performed. Moreover, study on local forest management for forestry workers (Jeong *et al.*, 2010; Kim *et al.*, 2010) was carried out for the specific development projects in these mountain villages. However, comparing past and present mountain village development projects, the analysis and policy suggestions for promoting mountain village research are still limited. Therefore, this study comparatively analyzes, based on surveys on mountain village changes and features of the North Jeolla province and considering the promotion measures presented for mountain villages, how to provide basic data for the formulation of development action plans and effectively promote North Jeolla province.

## MATERIALS AND METHODS

In South Korea, the mountain village defined as a low population area located in the mountainous back-country with a high forestland occupancy rate, low incomes, and alienated from society, economy, and cultural benefits with industry-based vulnerability and low maintenance level of living conditions. Enacting the Forestry Basic Law in 2001, mountain village had classified with town/township forest area ratio of 70% or more, and with less than average population density of the national town/township, thus creating an indicator for mountain villages as delimited areas of less than the average administrative areas (Korea Forest Service, 2015b). In 2014, these account for 8.0% of the area in North Jeolla, at 8,066 km<sup>2</sup>, and administrative districts consist of 14 cities (241 towns/townships). However, mountain villages are composed of 46 towns/townships in 10 cities and counties (Korea Forest Service, 2014b).

Meanwhile, South Korea's mountain villages (nationally: 109 cities/counties and 466 towns/townships, North Jeolla province: 10 cities/counties) are categorized based on surveys conducted every 10 years and were prescribed to establish the mountain village development plan, which was carried out in 2003 (based on the 2001 policy) and 2014 (based on the 2012 policy). The contents of the first mountain village basic survey were forest distribution and use, land distribution and use, village distribution and population trend, green tourism and eco-tourism resources, agricultural and forestry production infrastructure, medical and educational facilities, and living facilities and other details. The added contents of the second mountain village basic survey were mountain village income, labor force (return migration and multicultural settlers), and urban-rural exchange (Korea Forest Service, 2014a; 2014c; 2014d).

Consequently, this study analyzes trend changes of forest resource distribution and use, population changes

in mountain villages, mountain village economies, exchanges between mountain villages and cities, green tourism and eco-tourism resources, and the requirement for basic planning to promote mountain villages based on the basic survey results implemented in 2003 and 2014 in North Jeolla province.

## RESULTS AND DISCUSSIONS

### Situation of Mountain Villages in South Korea and North Jeolla Province

Out of a total of 1,413 towns and townships in South Korea, there are 466 mountain villages, accounting for 33.0%. From 10,028,395 ha total area, mountain villages occupy 4,364,418 ha, thus accounting for 43.5%. From 6,368,843 ha of national forest area, 3,529,401 ha (55.4%) are occupied by mountain villages. Of these, mountain villages in the North Jeolla province account for 28.9% of total towns and townships, 42.8% of total area, and 61.6% of total forest area of North Jeolla province. On the other hand, the situation of mountain villages in North Jeolla is similar to that of the entire South Korea (Korea Forest Service, 2014a; Korea Forest Service, 2015a; Table 1).

### Distribution and Use of Forest Resources in North Jeolla's Mountain Villages

Regarding land use, the total area of North Jeolla's Province showed a slight increase from 805,007 ha in 2001 to 806,659 ha in 2012, land and forest areas having though decreased slightly in 2012 compared to 2001. The total area of mountain villages decreased by 29,449 ha, from 374,810 ha in 2001 to 345,361 ha in 2012, by 12.0% to 79.7% in 2012 compared to land and forest areas in 2001, respectively. Orchard areas increased from 290 ha in 2001 to 488 ha in 2012. Mountain village area in North Jeolla province decreased by 3.8% p in total area from 46.6% in 2001 to 42.8% in 2012, while land and forest areas respectively decreased by 22.3% and 63.9% to 18.9% and 61.1% in 2012 (Table 2). Total area seems to have increased due to reclaimed lands, while reductions of farmland and forests are attributable to the construction of roads, factories, military facilities, and communication and electric facilities.

The forest area in North Jeolla by ownership was slightly reduced from 450,953 ha in 2001 to 446,516 ha in 2012, national forests accounting for 17.0% in 2001, public forests for 6.4%, and private forests for 76.6%. However, in 2012, due to aggressive private forest purchases and government exchanges, the proportion of national forests increased by 3.4% p, etc. The forest area of the mountain villages decreased by 16,986 ha, from 292,122 ha in 2001 to 275,136 ha in 2012, but the national forest area increased by 6.9% p (15,649 ha) in 2012, compared to 2001. The forest area of mountain villages in North Jeolla decreased by 3.2% p, from 64.8% in 2001 to 61.6% in 2012. Overall, national and public forests both increased, while private forests decreased (Fig. 1). An increase in national forests in South Korea, including North Jeolla province, was caused by the pro-

**Table 1.** Mountain villages by city and province in South Korea

City/province	Town•township (n)			Land area (ha)			Forest area (ha)		
	Nation (A)	Mountain village (B)	B/A (%)	Nation (A)	Mountain village (B)	B/A (%)	Nation (A)	Mountain village (B)	B/A (%)
Total	1,413 (100.0)	466 (100.0)	33.0	10,028,395 (100.0)	4,364,418 (100.0)	43.5	6,368,843 (100.01)	3,529,401 (100.0)	55.4
Daegu metropolitan city	9 (0.6)	2 (0.4)	22.2	88,354 (0.9)	16,856 (0.4)	19.1	48,974 (0.8)	13,533 (0.4)	27.6
Incheon metropolitan city	20 (1.4)	3 (0.6)	15.0	104,760 (1.0)	6,986 (0.2)	6.7	40,427 (0.6)	6,053 (0.2)	15.0
Ulsan metropolitan city	12 (0.8)	4 (0.9)	33.3	106,075 (1.1)	30,185 (0.7)	28.5	68,917 (1.1)	25,535 (0.7)	37.1
Gyeonggi province	141 (10.0)	18 (3.9)	12.8	1,017,269 (10.1)	167,183 (3.8)	16.4	526,985 (8.3)	131,969 (3.7)	25.0
Gangwon province	119 (8.4)	93 (20.0)	78.2	1,682,558 (16.8)	1,414,548 (32.4)	84.1	1,368,571 (21.5)	1,189,654 (33.7)	86.9
North Chungcheong province	102 (7.2)	43 (9.2)	42.2	740,713 (7.4)	370,819 (8.5)	50.1	495,806 (7.8)	290,942 (8.2)	58.7
South Chungcheong province	161 (11.4)	19 (4.1)	11.8	821,368 (8.2)	133,239 (3.1)	16.2	437,851 (6.9)	103,425 (2.9)	23.6
North Jeolla province	159 (11.3)	46 (9.9)	28.9	806,725 (8.0)	345,361 (7.9)	42.8	446,516 (7.0)	275,136 (7.8)	61.6
South Jeolla Province	229 (16.2)	53 (11.4)	23.1	1,230,903 (12.3)	310,114 (7.1)	25.2	694,787 (10.9)	240,546 (6.8)	34.6
North Gyeongsang province	238 (16.8)	114 (24.5)	47.9	1,902,930 (19.0)	1,120,926 (25.7)	58.9	1,342,798 (21.1)	900,173 (25.5)	67.0
South Gyeongsang province	196 (13.9)	71 (15.2)	36.2	1,053,797 (10.5)	448,201 (10.3)	42.5	706,990 (11.1)	352,435 (10.0)	49.9
Others	27 (1.9)	-	-	472,944 (4.7)	-	-	190,221 (3.0)	-	-

Values in parentheses indicate percentage compositions.

Source: Korea Forest Service. 2014 National surveys on mountain villages: North Jeolla province, Korea Forest Service. 2015 statistical yearbook of forestry

**Table 2.** Land use statistics

(Unit: ha, %)

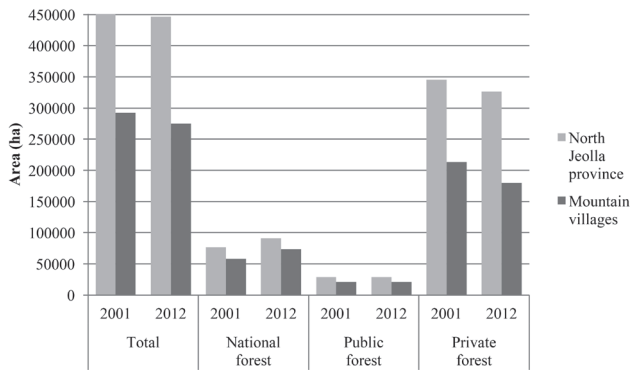
Category		Agriculture			Forest	Orchard	Pasture	Other	Total area
		Field	Paddy	Subtotal					
North Jeolla province (A)	2001	67,630 (8.4)	161,749 (20.1)	229,379 (28.5)	460,026 (57.1)	661 (0.1)	2,974 (0.4)	111,967 (13.9)	805,007 (100.0)
	2012	64,673 (8.0)	154,852 (18.2)	219,525 (27.2)	450,634 (55.9)	1,159 (0.1)	3,967 (0.5)	131,374 (16.3)	806,659 (100.0)
Mountain villages (B)	2001	21,409 (5.7)	29,738 (7.9)	51,147 (13.6)	293,759 (78.4)	290 (0.1)	1,164 (0.3)	28,450 (7.6)	374,810 (100.0)
	2012	18,518 (5.4)	22,875 (6.6)	41,393 (12.0)	275,136 (79.7)	488 (0.1)	1,147 (0.3)	27,197 (7.9)	345,361 (100.0)
B/A	2001	31.7	18.4	22.3	63.9	43.9	39.1	25.4	46.6
	2012	28.6	14.8	18.9	61.1	42.1	28.9	20.7	42.8

Source: Korea Forest Service. 2014 National surveys on mountain villages: North Jeolla province

active purchase of private forests through a national forest expansion policy by the Korea Forest Service since 1997. For purchasing private forests, the Korea Forest Service established and promoted policies for expanding national forests. For example, the Korea Forest Service improved the system to a batch appraisal and assessment of lands and trees for forest purchase, and consigned purchase of private forests to professional institu-

tions, such as the National Forestry Cooperative Federation. Additionally, the National Forests Act was introduced in August 2006. As for the performance to date, 6,366 ha of private forests were purchased in 1997, and 157,175 ha as of 2014 (Jeong, 2016).

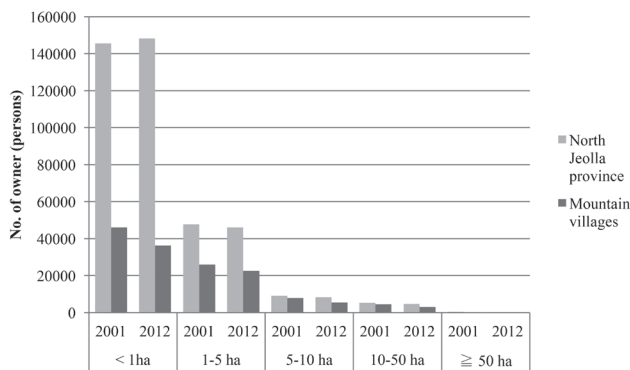
The total number of forest owners in North Jeolla showed no significant change, but, in 2012, the number of forestland owners owing less than 1 ha of forestland



Note: Public forest is the forest owned by local government.  
Source: Korea Forest Service. 2014 National surveys on mountain villages: North Jeolla province

**Fig. 1.** Forestland area by ownership.

increased by 2,592. In the case of mountain villages, these were reduced from 84,984 in 2001 to 67,795 in 2012, representing a reduction of 17,189; they showed a decrease of 9,794 in owing less than 1 ha. The proportion of forest owners in mountain villages occupied by North Jeolla province was reduced from 40.8% in 2001 to 32.7% in 2012, because it was thought that reducing the number of forest owners in the recent 10 years (2001–2012) would reduce private forest aggressive purchases (117,680 ha) (Korea Forest Service, 2014e). In 2012, the percentage of forest owners owing less than 5 ha of forestland, i.e. ‘small-scale owner’, was as high as 87% (Fig. 2).

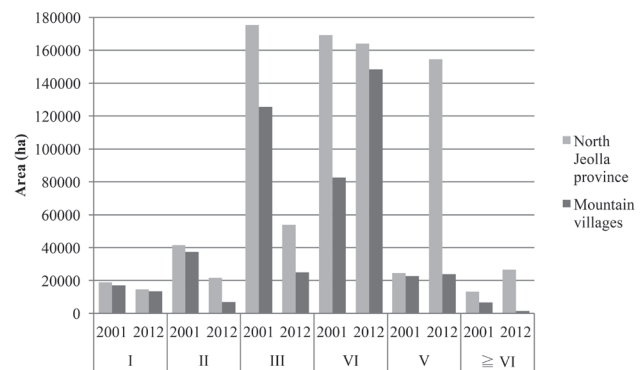


Source: Korea Forest Service. 2014 National surveys on mountain villages: North Jeolla province

**Fig. 2.** Number of private forest owners by property size.

Forest trees per the age group in North Jeolla accounted for age groups III and VI, with respectively 39.6% and 38.2% in 2001; however, VI and V age groups increased to 35.5% and 37.7%, respectively, in 2012. Age groups III and VI accounted for 28.3% and 43.0% in mountain villages in 2001, respectively; in 2012, VI age group accounted for 67.8%. In 2012, the ratio IV age group in mountain villages was 30.1% p higher than the 37.7% in North Jeolla province (Fig. 3). Therefore, mountain villages would be seeking active utilization of forest trees, such that deforestation resulted in thinning,

and demand produced by forests and their products was to require a thorough preparation of management and economic species for future final cutting. The proportion of forest trees per age group in mountain villages accounted for 66.0% in 2001 in North Jeolla, and decreased by 15.6% p to 50.4% in 2012. Except I and IV age groups, the remaining groups decreased; however, I and IV age groups accounted for 92.0% and 90.6%, respectively, thus representing high shares (Fig. 3).



Notice: Age class I: 1–10 years, age class II: 11–20 years, age class III: 21–30 years, age class IV: 31–40 years, age class V: 41–50 years, and age class VI: 51–60 years

Source: Korea Forest Service. 2014 National surveys on mountain villages: North Jeolla province

**Fig. 3.** Forestland area by age class.

Forest business performance was in 2001 in North Jeolla 15,597 ha, and forest tending, harvesting, and afforestation were 62.2%, 25.1%, and 12.7%, respectively. Forest business performance in mountain villages was 5,079 ha, and forest tending, harvesting, and afforestation were 50.7%, 27.7%, and 21.6%, respectively, while forestry business performance was 32.6%, the lower proportion of 64.8% in comparison with the forest area of mountain village in North Jeolla (Fig. 1). In 2012, forest business performance was 41,572 ha, showing a 266.5% increase compared to 2001, forest tending 57.3%, harvesting 37.7%, in the order such as afforestation 4.9%, domestic timbers in accordance with the distribution policy to expand and deforestation has been greatly increased. In 2012, the total forest business performance of mountain village increased by 178.6% compared to the 9,072 ha in 2001. Forest business performance was low level of 59.5% forest tending, 27.8% harvesting, and 12.7% afforestation, compared to 21.8% in North Jeolla province. On the other hand, regarding forest roads, in 2001, North Jeolla built 63 km, where mountain villages represented 88.9% of these, thus accounting for 56 km. However, in 2012, North Jeolla built 33 km of roads, while mountain villages accounted for 14 km forest roads, representing 42.4% (Table 3).

In 2012, forest resource utilization in North Jeolla comprised 16,680 households, and utilized forest resources of fruit trees, timber, wild greens, as 46.1%, 19.1%, 10.4%, respectively. On the other hand, demand for medicinal plants increased as national income

**Table 3.** Changes of area implemented forest management operation

	Category	2001 (a)	2012 (b)	b/a
Total <sup>c</sup> (ha, %)	North Jeolla province (A)	15,597 (100.0)	41,572 (100.0)	266.5
	Mountain villages (B)	5,079 (100.0)	9,072 (100.0)	178.6
	B/A	32.6	21.8	–
Afforestation (ha, %)	North Jeolla province (A)	1,982 (12.7)	2,054 (4.9)	103.6
	Mountain villages (B)	1,098 (21.6)	1,155 (12.7)	105.2
	B/A	55.4	56.2	–
Forest tending (ha, %)	North Jeolla province (A)	9,702 (62.2)	23,835 (57.3)	245.7
	Mountain villages (B)	2,575 (50.7)	5,396 (59.5)	209.6
	B/A	26.5	22.6	–
Harvesting (ha, %)	North Jeolla province (A)	3,913 (25.1)	15,683 (37.7)	400.8
	Mountain villages (B)	1,406 (27.7)	2,521 (27.8)	179.3
	B/A	35.9	16.1	–
Forest road construction (km, %)	North Jeolla province (A)	63	33	52.4
	Mountain villages (B)	56	14	25.0
	B/A	88.9	42.4	–

<sup>c</sup> Forest road construction is excluded from the total.

Source: Korea Forest Service. 2014 National surveys on mountain villages: North Jeolla province

**Table 4.** Number of households that use commercialized forest resources and their average annual sales

(Unit: households, %, thousand KRW)

Category		Fruits	Wild greens	Landscape trees	Harvest	Medicinal plants	Wild forest mushrooms	Sap	Cultivated mountain ginseng	Other
North Jeolla province (A)	2001	1,412 (10.3)	1,091 (8.0)	917 (6.7)	6,527 (47.7)	725 (5.3)	792 (5.8)	338 (2.5)	100 (0.7)	1,783 (13.0)
	2012	3,194 (19.1)	1,734 (10.4)	1,595 (9.6)	7,683 (46.1)	1,324 (7.9)	383 (2.3)	317 (1.9)	317 (1.9)	133 (0.8)
Mountain villages (B)	2001	1,295 (25.4)	753 (14.7)	57 (1.1)	632 (12.4)	598 (11.7)	753 (14.7)	340 (6.7)	43 (0.8)	637 (12.5)
	2012	2,526 (39.6)	1,282 (20.1)	744 (11.7)	626 (9.8)	432 (6.8)	350 (5.5)	246 (3.9)	116 (1.8)	60 (0.9)
B/A	2001	91.7	69.0	6.2	9.7	82.5	95.1	100.6	43.0	35.7
	2012	79.1	73.9	46.6	8.1	32.6	91.4	77.6	36.6	45.1

Source: Korea Forest Service. 2014 National surveys on mountain villages: North Jeolla province

increased. The mountain villages accounted for 38.3% of households, that is, 6,382 households, and fruit trees for 39.6%, wild greens 20.1%, landscape trees 11.7%, and timber 9.8%. In the case of mountain villages, wild forest mushrooms accounted for 91.4% in North Jeolla, fruit trees 79.1%, sap (*Acer pictum* subsp. *mono*) 77.6%, wild greens 73.9%, landscape trees 46.6% (Table 4). Therefore, mountain villages use mostly forest resources, and although the use of forestry, such as

mushrooms, sap, wild greens could improve, in contrast to the entire North Jeolla province and considering the mountain village population of 7.6% (Table 4), forest resource utilization was very high.

#### Population Trends in Mountain Villages

In 2001, the population in North Jeolla was 1,999,255, decreasing by 233,210 to 1,766,045 people in 2012. In 2001, the age group ratios were 25.8% for the

15–29 age group, 20.0% for 0–14, and 15.5% for 30–39. In 2012, the 15–29 age group comprised 18.9%, 18.7% for 50–64 years, and 16.8% for 65 years and over, the proportion of the elderly (40–64) increased by 5.6% p and of the elderly over 65 by 6.5% p compared to 2001. The mountain village population was 172,716 in 2001, decreasing to 134,386 in 2012 (22.2% or 38,330 decrease), and depopulation was being conducted. The 65 and older age group accounted for 29.7% in 2001, 50–64 years for 19.4%, 15–29 years for 18.5%, etc. In 2012, those over 65 represented 29.6%, 50–64 24.1%, 40–49 13.3%, while the proportion of the elderly (40–64 years) increased by 7.5% p, compared to 2001; this shows that North Jeolla's mountain villages suffer from rapid aging. Population change ratio of mountain village in North Jeolla province decreased by 1.0% p from 8.6% in 2001 to 7.6% in 2012. In 2012, farming households occupying in mountain villages of North Jeolla province was 31.1% against 8.2% of households. Farming households were in charge of important roles in agriculture and forestry production base (Table 5).

As shown in Fig. 4, return migration and population change from 2010 to 2012 in North Jeolla province reflected in 3,406 households and 6,736 persons, a number increasing every year. Additionally, the households and population of mountain village increased as well. The return migration proportion for mountain villages in North Jeolla accounted for a fairly high rate of 74.3% of households and 84.6% of population. The return migra-

tion population of 5,700 persons during above three years accounted for 4.2% of the 134,386 inhabitants of mountain villages in 2012 (Table 5). However, they would expect their role as a new source of labor, since with labor shortages and an aging population, depopulation is rapid.

The multicultural settlers are those who settled in South Korea and acquire foreign citizenship. In 2012, the multicultural population and number of households in mountain villages were 8,834 households and 27,370 persons, respectively. Compared to North Jeolla, the ratio of households and population in mountain village were only 12.2% and 3.9%, respectively (Table 6). However, 1,079 multicultural settlers in mountain villages accounted for approximately 20.0% of the 5,700 return migrants (Fig. 4). They would be an important source of labor for agricultural and forestry production and forest management in these mountain villages. On the other hand, women accounted for 99.9% of the multicultural settlers in mountain villages, most of them being married to South Korean men and migrants from Southeast Asian countries, such as Vietnam or Cambodia (Table 6).

### Mountain Village Economy

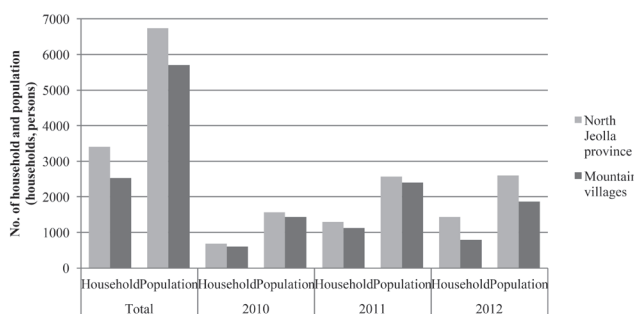
The number of land owning farmers in North Jeolla decreased by 23.1%, from 136,283 households in 2001 to 104,794 households in 2012, with less than 0.5 ha average size and management for 1–3 ha, accounting for

**Table 5.** Population composition by household and age in 2001 and 2012

(Unit: households, persons, %)

Category		Households	Farming households	Youth			Middle age		Old age	Total
				0–14	15–29	30–39	40–49	50–64	≥ 65	
North Jeolla province (A)	2001	645,798 (100.0)	137,417 (21.3)	399,142 (20.0)	516,334 (25.8)	309,391 (15.5)	267,442 (13.4)	301,047 (15.1)	205,899 (10.3)	1,999,255 (100.0)
	2012	760,189 (100.0)	105,759 (13.9)	293,162 (16.6)	333,998 (18.9)	240,630 (13.6)	272,198 (15.4)	329,550 (18.7)	296,507 (16.8)	1,766,045 (100.0)
Mountain villages (B)	2001	62,517 (100.0)	37,930 (60.7)	21,758 (12.6)	31,946 (18.5)	16,033 (9.3)	18,178 (10.5)	33,471 (19.4)	51,330 (29.7)	172,716 (100.0)
	2012	61,969 (100.0)	32,890 (53.1)	14,260 (10.6)	17,454 (13.0)	12,640 (9.4)	17,840 (13.3)	32,451 (24.1)	39,741 (29.6)	134,386 (100.0)

Source: Korea Forest Service. 2014 National surveys on mountain villages: North Jeolla province



Source: Korea Forest Service. 2014 National surveys on mountain villages: North Jeolla province

**Fig. 4.** Number of return migration.

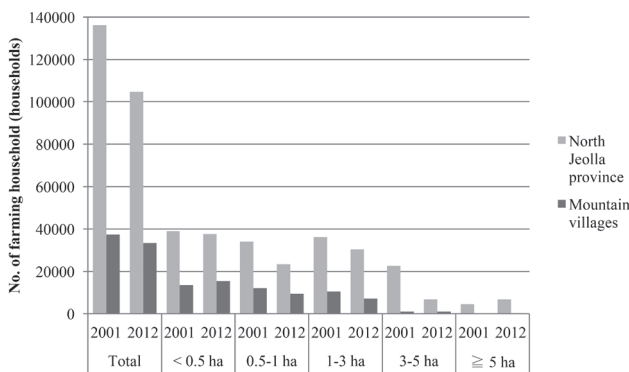
**Table 6.** Multicultural settler statistics by gender

(Unit: households, persons, %)

Category	Households	Population by gender		
		Male	Female	Total
North Jeolla province (A)	8,834	14,073 (51.4)	13,297 (48.6)	27,370 (100.0)
Mountain villages (B)	1,079	1 (0.1)	1,078 (99.9)	1,079 (100.0)
B/A	12.2	0.0	8.1	3.9

Source: Korea Forest Service. 2014 National surveys on mountain villages: North Jeolla province

26.5% and 28.6%, respectively. In 2012, small-scale and progress increased by 9.3% p to 35.8% for less than 0.5 ha. Mountain villages decreased 11.1% from 37,461 households in 2001 to 33,290 households in 2012, and, in 2001, they accounted for less than 0.5 ha and 0.5–1 ha in proportions of 32.3% and 36.1%, respectively. In 2012, less than 0.5 ha increased by 10.2% p, thus increasing mountain villages' small-scale management. The proportion of farmers occupying mountain villages in North Jeolla recorded a slight increase from 27.5% in 2001 to 31.8% in 2012, especially for 3–5 ha, which increased by 9.7% p compared to 2001 (Fig. 5).

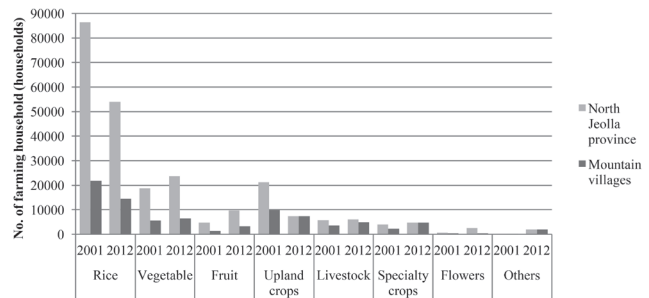


Source: Korea Forest Service. 2014 National surveys on mountain villages: North Jeolla province

Fig. 5. Number of farming households by operation scale.

Farms by management type in North Jeolla decreased from 141,687 households in 2001 to 109,888 households in 2012, which was attributed to death by aging and abandonment of cultivation. Farms by product type, in 2001, rice, upland crops, and vegetables accounted for 61.0%, 14.9%, and 13.2%, respectively. In 2012, rice and vegetables represented 49.1% and 21.5%, respectively. While rice decreased by 11.9% p, vegetables and fruit trees increased by 8.3% p and 5.6% p, respectively. Mountain villages decreased by 2.5% from 44,649 households in 2001 to 43,513 households in 2012, and product types in 2001 were rice, upland crops, and vegetables, which represented 48.6%, 22.1%, and 12.5%, respectively. In 2012, rice, upland crops, and vegetables were 33.3%, 16.8%, and 14.7%,

respectively. While rice and upland crops decreased by 15.3% p and 5.3% p, vegetables increased by 2.2% p. In particular, the decrease in rice product was caused by a decrease in demand for rice derived from a rise in consumption of meats, flours, fruits, and vegetables. The proportion of each type of farm management in mountain villages only decreased for flowers and vegetables in 2012 in comparison with 2001. Meanwhile, upland and specialty crops of mountain villages were increased by 100.0% in comparison with North Jeolla province, where they were only managed in mountain villages. The livestock held a high proportion of 81.2%. It was found that mountain villages contributed to the production and supply of agricultural and livestock products (Fig. 6). On the other hand, representative specialty crops are tobacco (*Nicotiana tabacum*) leaves, Chinese yam (*Dioscorea batatas*), and Job's tears (*Coix lacrym-jobi var. mayuen*), and the cultivation of those crops increased because mountain villages have proper cultivation conditions and the crops were more profitable than others.



Source: Korea Forest Service. 2014 National surveys on mountain villages: North Jeolla province

Fig. 6. Number of farming households by product type.

Average household income in North Jeolla was 25.9 million KRW in 2001, showing an increase of 26.7% to 32.8 million KRW in 2012. The average farm income also increased from 47.7% from 20.9 million KRW in 2001 to 30.9 million KRW in 2012. The average household income of mountain villages increased by 33.0% from 16.9 million KRW in 2001 to 22.4 million KRW in 2012, and the average farm income by 98.5% from

Table 7. Income statistics per household

		(Unit: thousand KRW, %)			
Category		Average income per household (a)	Average income per person	Average income per farming household (b)	b/a
North Jeolla province (A)	2001	25,860	8,682	20,906	80.8
	2012	32,755	13,808	30,869	94.2
Mountain villages (B)	2001	16,852	9,380	11,835	70.2
	2012	22,418	11,498	23,171	103.4
B/A	2001	65.2	108.0	56.6	–
	2012	68.4	83.3	75.1	–

Source: Korea Forest Service. 2014 National surveys on mountain villages: North Jeolla province



11.8 million KRW to 23.1 million KRW. However, average household incomes for mountain increased by 3.2% p, from 65.2% in 2001 to 68.4% in 2012, and average farm income also increased by 18.5% p from 56.6% in 2001 to 75.1% in 2012. However, the mountain village income in comparison with total income in North Jeolla was about two thirds. In 2001, average farm income of mountain villages was about 70% of the average household income, but increased by 33.2% p to 103.4% in 2012, showing that average farm income was greater than average household income in mountain villages (Table 7).

The organization of production in North Jeolla province was for 1,696, including corporate farming 73.0%, 19.2%, cooperatives, 4.5% social enterprises, and corporate farming for mountain villages comprised 325 pieces (93.7%). The production scale of mountain villages was 207,804 million KRW, agricultural cooperatives and subsidiaries accounting for 30.0% and 69.4%, respectively. The scale for forest-related production capacity of 927 million KRW represented only 0.4% of the total for mountain villages, including only agricultural companies (Table 8).

### Exchanges between Mountain Villages and Cities

In 2012, the exchange organizations of city and mountain village were operating within 33 villages, 16

being public-private councils and 25 towns' operations managers. It was determined to be a desperate situation commitment to city/agriculture (mountain villages included); exchange agreements in North Jeolla included 965 cases, mountain villages enabled workforce expansion and operating organization agreements, with 41 cases occupying the lower rate of 4.2%, for the development of North Jeolla's mountain villages (Table 9).

### Green Tourism and Eco-tourism Resources

When looking at national parks, green tourism, eco-tourism, and natural forest resources, North Jeolla had 52 in 2001 and 68 in 2012, and its increased number was 16. In 2001, it had 30 leisure sites (57.7%), 12 recreational forests sites (23.1%), and six province/county-owned parks sites (11.5%). In 2012, recreational forests were decreased 3, but wooded campsites, forest spas, and healing forest were increased seven, one, and one, respectively. In 2001, mountain villages had 20 leisure sites (50.0%), 10 recreational forests sites (25.0%), 6 province/county-owned public parks (15.0%), and 4 national parks (10.0%). In 2012, it had 28 leisure sites (51.9%), 9 recreational forests (16.7%), 6 province/county-owned public parks (11.1%), and 5 forest campsites (9.3%), representing an increase of 5 campsites, 1 forest park, and 1 healing forest while decreasing 3 rec-

**Table 8.** Organizations of production management and their scale

		(Unit: n, million KRW, %)						
Category		Crop. farming association	Co-op	Preliminary social enterprise	Social enterprise	Village enterprise	Social co-op	Total
No. of production entity (2012)	North Jeolla province (A)	1,238 (73.0)	325 (19.2)	56 (3.3)	76 (4.5)	0 (0.0)	1 (0.1)	1,696 (100.0)
	Mountain villages (B)	325 (93.7)	6 (1.7)	4 (1.2)	6 (1.7)	6 (1.7)	0 (0.0)	347 (100.0)
	B/A	26.3	1.8	7.1	7.9	–	–	20.5
Production scale (2012) (million KRW)	All Mountain villages	62,369 (30.0)	144,244 (69.4)	0 (0.0)	1,156 (0.6)	35 (0.0)	0 (0.0)	207,804 (100.0)
	Forest-related	927 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	927 (100.0)

Source: Korea Forest Service. 2014 National surveys on mountain villages: North Jeolla province

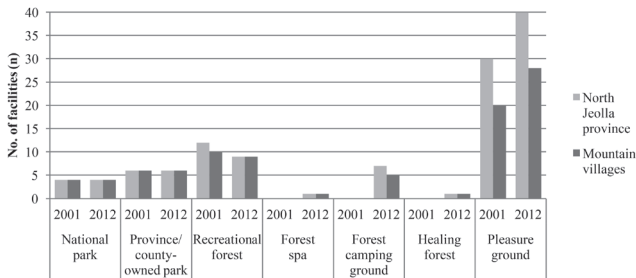
**Table 9.** Number of organization for city-mountain village exchange and city-rural contract state

(Unit: n, %)

Category	City-mountain village exchange operation management				City-rural(including mountain villages) exchange state		
	Village operation organizers	Public-private partnership	Village operation managers	Total	Contract between administrative agencies	Contract between enterprise	Total
North Jeolla province (A)	33	16	25	74	637	328	965
Mountain villages (B)	33	16	25	74	22	19	41
B/A	100.0	100.0	100.0	100.0	3.5	5.8	4.2

Source: Korea Forest Service. 2014 National surveys on mountain villages: North Jeolla province

reational forests sites (Fig. 7). This was because increased demand fueled by a better quality of life and the increased national income, which, in turn, lead to improved health and increased leisure demand.



Source: Korea Forest Service. 2014 National surveys on mountain villages: North Jeolla province

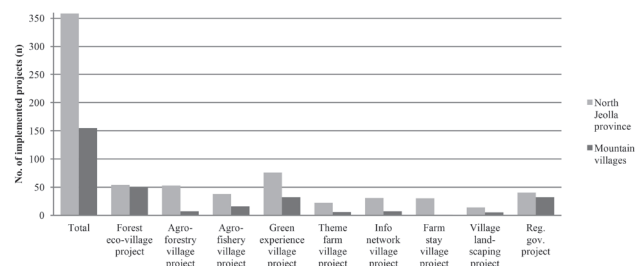
Fig. 7. Number of facilities for green tourism and eco-tourism resources.

### Mountain Village Promotion Requirements for Master Planning

North Jeolla’s education facilities registered 1,328 facilities in 2001, with 39.5% kindergartens, 31.6% primary schools, and 14.6% junior high schools. In 2012, although, compared to 2001, 1,353 education facilities were registered, the proportion of kindergartens and primary schools decreased, while that of middle schools increased. Mountain villages registered 225 educational facilities in 2001, with 38.2% kindergartens, 36.4% elementary schools, and 18.2% middle schools. In 2012, compared to 2001, educational facilities decreased by 15% to 191 places, with kindergartens, elementary schools, and middle schools decreasing by 29.1%, 15.9%, and 2.4%, respectively, while high schools increased by 33.3% and colleges registered no changes. In 2012, the training facility ratio was 14.1% compared to North Jeolla mountain villages in 2001, with kindergarten, elementary and middle schools decreasing by 4.7% p, 2.8% p, and 1.9% p, respectively (Table 10). As such, it seems that the reduction in education facilities would hamper

the influx of population.

By 2012, the government-sponsored village development projects implemented in North Jeolla reached 358, with green experience village composition representing 21.2%, mountain village ecological town planning 15.1%, rural village comprehensive development 14.8%, municipalities projects 11.2%. In mountain villages, town development was conducted in 155 government supported projects, which accounted for the 2/5 level to 43.3% of North Jeolla’s projects. Town development projects for mountain villages included ecological town planning (31.6%), green town planning and local business experience (20.6%), and rural development (10.3%). The village development expense ratio of North Jeolla against mountain villages for government supported village development projects was 43.3%, with mountain village ecological town planning accounting for 90.7%, local businesses for 80.0%, and rural development and green experience village compositions for 42.1% (Fig. 8).



Source: Korea Forest Service. 2014 National surveys on mountain villages: North Jeolla province

Fig. 8. Number of government-subsidized mountain village development projects.

### CONCLUSION

Citizens of South Korea steadily increased their interest in a pleasant environment, the target being mainly mountain villages. Therefore, return migration

Table 10. Number of educational facilities

							(Unit: n, %)
Category		Kindergarten	Elementary school	Middle school	High school	Community college or higher	Total
North Jeolla province (A)	2001	524 (39.5)	420 (31.6)	194 (14.6)	127 (9.6)	63 (4.7)	1,328 (100.0)
	2012	523 (38.7)	414 (30.6)	208 (15.4)	132 (9.8)	76 (5.6)	1,353 (100.0)
Mountain villages (B)	2001	86 (38.2)	82 (36.4)	41 (18.2)	15 (6.7)	1 (0.4)	225 (100.0)
	2012	61 (31.9)	69 (36.1)	40 (20.9)	20 (10.5)	1 (0.5)	191 (100.0)
B/A	2001	16.4	19.5	21.1	11.8	1.6	16.9
	2012	11.7	16.7	19.2	15.2	1.3	14.1

Source: Korea Forest Service. 2014 National surveys on mountain villages: North Jeolla province

has significantly increased in mountain villages, and its flow is thought to contribute significantly to land environmental conservation and agricultural and forestry production, as well as balanced land development. Additionally, mountain villages are expected to serve as leisure areas and unique cultural spaces. However, depopulation and ageing are progressing simultaneously in these villages, and forest ownership by area is becoming smaller. Moreover, forest road density, a measure of forest management infrastructure, is lower than the average for North Jeolla province, and forestry focuses on higher income activities, such as timber production, including forest tending, while cutting and pest control account for less than half of those in North Jeolla province. Of 134 thousand mountain village households in North Jeolla province, only 6 thousand households use forest resources, corresponding 4.7%. Particularly, proportions of tree cutting that as a major source of income for mountain villages represented 9.7% in 2001 and 8.1% in 2012, showing a low level. For farmlands in mountain villages, 75% of farming households possess less than 1 ha, and the annual average income of households in mountain villages is only at 2/3 of total annual household income in North Jeolla province. Compared to agriculture that is able to cultivate crops during the year and to manage farms intensively, levels of urban-rural exchange and production management organization in mountain villages are poor due to depopulation, poor cultivation condition such as unfavorable climate and geographical features, and limited production. These changes in mountain villages make settlement condition even more difficult.

For the promotion of mountain villages in North Jeolla, the following measures are considered. First, clarifying the nature of mountain village population increases by return migration could contribute to the management and production of forests, public interest functions of forests, and the national economy through agricultural and forestry production. This creates a pleasant land environment through living environment maintenance, mountain village culturally inherited traditions, and determining, developing, and maintaining the extent of the functions and roles for future promotion policies. Second, the expansion of exchange programs between cities and agricultural areas can achieve as farmers' incomes increase and the awareness about the importance of forests rise through city and agricultural area exchanges and experience programs; however, specific operational information on currently conducted experience exchanges in agricultural programs needs to be identified. Third, it is necessary to activate green tourism and eco-tourism. Green tourism and eco-tourism in mountain villages are highly important factors towards increasing farm income and raising awareness of forest environments. Consequently, existing resources need to be reevaluated and new ones developed. Additionally, staying over (accommodation) should be promoted over one day trips through grouping and regionalization of mountain villages from the existing mountain village unit, thus further spreading the impor-

tance of mountain villages. Fourth, funding along with consultation to expand sales and distribution would need to mountain villages that have a steady income by using a production infrastructure that supported mountain village development projects. Fifth, the development of forestry income sources can be achieved by improving health conditions through clean food, hiking, recreation, herbs, and wild plants, which requires actively leasing public forests to expand cultivation and additional support for establishing walking/hiking trails.

#### ACKNOWLEDGEMENTS

This research was carried out under a collaborative research project, "Policy development for improvement of wood self-sufficiency ratio and the socio-economic effects on mountainous areas in East Asia" with financial support from JSPS ((B) 25292090).

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