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# A Study on Farmhouses Cultivating and Producing Edible Shoots of Fatsia in Korea

## Centering Centering on Gapyeong–gun and Yeoncheon–gun in Gyeonggi–do and Gokseong–gun in Jeollanam–do

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The edible shoots of fatsia (*Aralia elata Seem*) are popular as high–end wild edible greens, and are recommended as a major income crop for farming villages and mountain villages in Korea. The demand for fatsia shoots is increase, along with increases in the national income. Because they require less work than other crops, and because farmers can make profits in a short period of time using the off season, some local self–governments are expanding their support for fatsia shoot cultivation. However, it involves many issues, such as the decrease of the price of fatsia shoots, the increase of imported rootstocks, difficulties in finding markets, and the weakening of manpower in farming and mountain villages. Domestic studies relating to fatsia shoot cultivating households only went so far as to examine the cultivation methods and provided quite fragmentary case studies. Therefore, this study examined the production, sales, and distribution structure of fatsia shoots with fatsia shoot producing households in Gapyeong–gun and Yeoncheon–gun in Gyeonggi–do, and Gokseong–gun in Jeollanam–do to determine ways for farm households to increase their income with fatsia shoots. As a result, Gapyeong–gun, Gyeonggi–do was found to require the cultivation of domestic rootstocks on a large scale in order to replace rootstocks imported from China, and to improve the distribution structure by securing a number of markets. Yeoncheon–gun was found to desperately need to secure various markets to handle the increases of production in the future, and Gokseong–gun, Jeollanam–do required a fatsia shoot cultivation and production structure centering on the households with small cultivated land, occupied in large number by people in their 50s and 60s, with a low possibility of losing manpower to other industries.

## INTRODUCTION

Although the history of fatsia shoot cultivation is short, fatsia shoots are recommended as one of the crops that can yield profits in a short period of time, because they can be planted widely, from flat plains to alpine regions. The shoots have a unique scent as well as a great taste, and their nutrients are renowned for having a number of medicinal properties. However, there has been an insufficient level of manpower for collecting naturally grown fatsia shoots, and the supply system has turned primarily to artificial cultivation, with cultivation areas continuing to increase. Also, due to the open policy for agriculture products, preserved fatsia shoots are now being imported from China, with import quantities rapidly increasing. However, it appears that the domestic market will not be largely affected by this, as the value of fatsia shoots as fresh spring vegetables is highly recognized. However, due to the weakening and the feminization of the workforce, along with the decrease of the population in agricultural and mountain villages, the production of fatsia shoots is becoming more difficult. Added to this are the increased costs of labor, the devastation of mountain and forest areas due to reckless cutting and collecting practices, and the destruction of colonies (Jeon, 1997; Mun, 2007).

On the other hand, the production quantity and amount has increased every year. The production quantity and amount in 2001 were 1,644,961 kg and 10.8 billion won, respectively, and they increased up to 2,852,870 kg and 22.6 billion won in 2005. Production was highest in Chungcheongnam–do, followed by Gangwon–do, Gyeonggi–do, and Jeju Island. The price of fatsia shoots was 6,400 won per kilogram in 2003, and 8,000 won in 2004 and 2005 (Korea Forest Service, 2006). As a crop that can create profits over a short period of time, as compared with other crops, and as it requires less work, can be harvested in the off–season, and given increasing demand with rising income levels, some local self–governments are expanding their support measures. Although there are many problems, such as the decrease of the price due to an increase in production, an increase of the price of imported rootstocks, difficulties in finding markets, and the weakening of manpower in agricultural and mountain villages, there have been an insufficient number of studies in fatsia cultivating farm households (Lee *et al*., 2007). Under these circumstances, this study is examining problems in cultivating fatsia shoots and the direction of development in the future, through empirical surveys on fatsia shoot cultivating farm households (Table 1).

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**Table 1.** Fatsia Shoot Production by Year · Region

| Division | | Production (kg) | Amount (1 Million Won) |
|---|---|---|---|
| Year | 2001 | 1,644,961 | 10,771 |
| | 2002 | 1,823,480 | 12,747 |
| | 2003 | 1,870,278 | 14,200 |
| | 2004 | 2,175,370 | 16,685 |
| | 2005 | 2,852,870 | 22,634 |
| Region | Chungcheongnam–do | 741,391(26.0) | 4,490 |
| | Gangwon–do | 448,012(15.7) | 4,059 |
| | Gyeonggi–do | 416,673(14.6) | 4,108 |
| | Jeju Island | 399,070(14.0) | 4,093 |
| | Gyeongsangnam–do | 262,690(9.2) | 1,648 |
| | Jeollanam–do | 220,234(7.7) | 1,449 |
| | Gyeongsangbuk–do | 167,110(5.9) | 1,428 |
| | Jeollabuk–do | 101,648(3.6) | 740 |
| | Chungcheongbuk–do | 87,007 | 545 |
| | Others | 9,035 | 74 |

Note: Value inside ( ) indicates the distribution ratio (%).
Source: Korea Forest Service. 2006 Statistical Yearbook of Forestry.

## METHODS OF STUDY

Eight households in Gapyeong–gun and ten households in Yeoncheon–gun in Gyeonggi–do, as well as 16 households in Gokseong–gun, Jeollanam–do were surveyed. The survey was performed through direct interviews over a one–month period from the beginning of February to the beginning of March in 2007 on reproduction status issues, such as the composition of manpower, employment status, the breakdown of income, the status of cultivated land, and forest management status, as well as the fatsia shoot cultivation scale, fatsia shoot production status, and the fatsia shoot sale and distribution status. The survey data were analyzed by region, age, fatsia shoot cultivation scale, forest land area, and cultivated land area.

## RESULTS AND DISCUSSION

### Fatsia Shoot Cultivation and Production Status in the Target Area

*Gapyeong–gun · Yeoncheon–gun*

In Gapyeong–gun, the total production quantity and amount of fatsia shoots in 2005 were 245,763 kg and 2.2 billion won, respectively. 61,760 kg, (25%), were naturally grown fatsia shoots. 184,000 kg was produced through forcing culture in plastic greenhouses by 63 households. The cultivation area was 9,800 $m^2$ and the average income per household was 26.30 million won. The total production quantity and amount increased largely in 2006, up to 353,000 kg and 3.5 billion won, respectively, with naturally grown fatsia shoots weighing 209,000 kg (59%). 144,000 kg of this was produced through forcing culture, and the number of households that used this method of production fell to 50, 13 less than in 2005. The cultivation area was 13,850 $m^2$, and the average household income was 28.8 million won (Gapyeong–gun, 2007). In Yeoncheon–gun, the members of the fatsia shoot research society and non–members, about 100 people in total, were cultivating fatsia shoots. However, their production numbers were excluded from survey results of related organizations. A 13 ha large fatsia shoot cultivation complex was developed with approximately 500 million won invested over two years from 2004 to 2005. The complex currently has ten employees. This complex produced 3,000 kg of fatsia shoots, and earned 34.5 million won in 2004, then producing 2,500 kg and making 27.5 million won of income in 2005 (Yeoncheon–gun, 2007).

*Gokseong–bun, Jeollanam–do*

In Gokseong–gun, Jeollanam–do, the current cultivation area is 72 ha, and 96 farm households are participating in cultivation. Gokseong–gun developed the fatsia shoot cultivation complex by investing 1.25 billion won over nine years, from 1996 to 2004 as part of the Special Program for County Development. As a result, the production quantity and amount of fatsia shoots in 2005 reached 14,972 kg and 130 million won, however the average production per household was only 1.35 million won. It was found to be difficult to maintain environmentally friendly production techniques, as some farmers were negligent in managing the cultivation, extensively using weed killers to remove scrubs and weeds. There were also a number of other issues, such as the income yielded from fatsia shoot production being small, at only 290,000 won per 1,000 $m^2$, compared with other crops. Some farmers avoided cultivating fatsia shoots due to the development of cultivation complexes for lacquer trees, wild–field berries, green tea, and fernbrake. Under these circumstances, the corresponding local self–government was supporting fatsia shoot cultivation in a way that centered on households that cultivated fatsia shoots on a large scale, and that developed environmentally friendly fatsia shoot cultivation and production methods, as well as small packaging design. The program was intended to maximize the income of farm households (Gokseong–gun, 2007).

**Case Study of Fatsia Shoot Cultivating Farmhouses**

*Reproduction Structure of the Cultivating Farmhouse*

a) Constitution of Labor

In all 34 households that participated in the survey, 90 people were 20 or older, and the average number of people in each household was 2.6. In Gapyeong–gun, Gyeonggi–do, the average number of people in each household was 3.0 people, and the average age of the head of the household was 46. In Yeoncheon–gun, the corresponding figures were 3.1 people and 58, and the figures for Gokseong–gun, Jeollanam–do were 2.2 people and 62, making the average number of people per household smaller, whereas the average age of the head of the household was higher (Table 2).

Concerning age groups, people in their 40s and 70s constituted the largest percentage of the population, at 42% and 21%, respectively, in Gapyeong–gun, and people in their 50s and 60s in Yeongcheon–gun represented 29% and 23% of the population, respectively. In Gokseong–gun, Jeollanam–do, people in their 50s and 70s constituted 37% and 26% of the population, meaning people aged in their 50s in Gokseong–gun represented a greater percentage of the population than in the two counties in Gyeonggi–do. On the other hand, among the 35 respondents in Gokseong–gun, one of 24 people in Gapyeong–gun and four of 31 people in Yeoncheon–gun were engaged in stationary wage labor, while three people were engaged in stationary wage labor, with one person self–employed.

b) Status of Farmland

A total of 34 households were surveyed, and one household in Gapyeong–gun and three households in Gokseong–gun did not own their land, while the size of the total land owned by the 31 households was 88.4 ha. The average size of the land managed by each household was 0.7 ha in Gapyeong–gun, 3.4 ha in Yeoncheon–gun, and 2.1 ha in Gokseong–gun, while the average size of the land owned by the six households among the 14 that owned land was 3.7 ha. The reason the average size of the land managed by each household in Yeoncheon–gun was larger than that in the two other counties was that two households in Yeoncheon–gun owned 12 ha and 20 ha of cultivated land, respectively (Table 3).

c) Forest Management Status

Among the 34 households, four households in Gapyeong–gun, three households in Yeoncheon–gun, and one household in Gokseong–gun did not own any forest area. The total forest area managed by 26 households in three areas was 91 ha. However 36% of it, or 32 ha, was leased from others. The average forest area managed by each household was 2.5 ha in Gapyeong–gun, and 2.2 ha in Yeoncheon–gun. However, the corresponding figure in Gokseong–gun was 4.3 ha – roughly twice as large as that in the other counties studied (Table 4).

Concerning the forest management status, the entire forest area in Gapyeong–gun was constituted with pine nuts, that in Yeoncheon–gun were 58% fatsia and 43% natural forest. However, the forest in Gokseong–gun was used for various purposes: 36% was used for culti-

**Table 2.** Organization of Manpower per Household (Unit: Persons)

| Division | Total | | | 20s | 30s | 40s | 50s | 60s | 70s or Older |
|---|---|---|---|---|---|---|---|---|---|
| | Total | Male | Female | | | | | | |
| Total (34 Households) | 90 | 44 | 46 | 6 (6.7) | 6 (6.7) | 20 (22.2) | 24 (26.7) | 16 (17.8) | 18 (20.0) |
| Gapyeong–gun (8 Households) | 24 | 12 | 12 | 1 (4.2) | 3 (12.5) | 10 (41.7) | 2 (8.3) | 3 (12.5) | 5 (20.8) |
| Yeoncheon–gun (10 Households) | 31 | 16 | 15 | 4 (12.9) | 3 (9.7) | 4 (12.9) | 9 (29.0) | 7 (22.6) | 4 (12.9) |
| Gokseong–gun (16 Households) | 35 | 16 | 19 | 1 (2.9) | | 6 (17.1) | 13 (37.1) | 6 (17.1) | 9 (25.7) |

Note: 1) Value inside ( ) indicates the distribution ratio (%).
2) People under the age of 20 were excluded.

**Table 3.** OStatus of Cultivated Land (Unit: ha)

| Division | Total | Household Average | Not Managed | Less than 0.5 ha | 0.5 – 1.0 ha | 1.0 – 1.5 ha | 1.5 – 2.0 ha | 2.0 ha or more |
|---|---|---|---|---|---|---|---|---|
| Total | 88.4 (31) | 2.9 | (3) | 1.5 (5) | 3.0 (5) | 6.3 (5) | 3.2 (2) | 74.4 (14) |
| Gapyeong–gun | 4.7 (7) | 0.7 | (1) | 1.2 (4) | 0.5 (1) | 1.4 (1) | 1.6 (1) | |
| Yeoncheon–gun | 53.8 (10) | 3.4 | | | 0.6 (1) | 1.2 (1) | | 52.0 (8) |
| Gokseong–gun | 29.9 (14) | 2.1 | (2) | 0.3 (1) | 1.9 (3) | 3.7 (3) | 1.6 (1) | 22.4 (6) |

Note: Value inside ( ) indicates the number of households.

vating fatsia; 8% for wild simulated ginseng; 6% for persimmons; and 2% for Siberian ginseng, unlike the two regions in Gyeonggi–do (Table 5).

d) Land Ownership Status

Concerning the purchase and sales of paddy fields, fields, and forests, the land was mostly inherited in Gapyeong–gun, with none being sold. In Yeoncheon–gun, 4.4 ha of land, which represents 24% of the purchased area, was purchased in the 1990s and the 2000s, with 1.7 ha being sold due to submergence caused by dam construction in the 2000s, and damage caused by wild animals. In Gokseong–gun, 11.7 ha of land, approximately 20% of the purchased area, was purchased in the 1990s and the 2000s. However, no land was sold. The purpose of land purchases in Yeoncheon–gun and Gokseong–gun was mainly the stabilization of livelihood, through the expansion of cultivated land and forest (Table 6).

e) Household Income Status

In 2006, the average gross income of each household

**Table 4.** Forest Management Scale (Unit: ha)

| Division | Total | | | Household Average | Not Managed | Less than 1.0 ha | | 1.0–3.0 ha | | | 3.0–5.0 ha | | | 5.0 ha or more | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total | Owned | Leased | | | Subtotal | Leased | Subtotal | Owned | Leased | Subtotal | Owned | Leased | Subtotal | Owned | Leased |
| Total | 90.8 (26) | 58.5 | 32.3 | 3.5 | (8) | 3.1 (7) | 3.1 (7) | 17.4 (10) | 13.8 (7) | 3.6 (3) | 15.4 (4) | 14.0 (4) | 1.0 (1) | 55.3 (5) | 30.7 (3) | 24.6 (2) |
| Gapyeong–gun | 10.0 (4) | 10.0 | | 2.5 | (4) | | | 5.0 (3) | 5.0 (3) | | | | | 5.0 (1) | 5.0 (1) | |
| Yeoncheon–gun | 15.7 (7) | 6.7 | 9.0 | 2.2 | (3) | 2.4 (5) | 2.4 (5) | | | | 15.0 (4) | 14.0 (4) | 1.0 (1) | 13.3 (2) | 6.7 (1) | 6.6 (1) |
| Gokseong–gun | 65.1 (15) | 41.8 | 23.3 | 4.3 | (1) | 0.7 (2) | 0.7 (2) | 12.4 (7) | 8.8 (4) | 3.6 (3) | | | | 37.0 (2) | 19.0 (1) | 18.0 (1) |

Note: Value inside ( ) indicates the number of households.

**Table 5.** Forest Management Status (Unit: ha)

| Division | | Total | Fatsia Shoots | Pine Nuts | Wild Simulated Ginseng | Persimmons | Siberian Ginseng | Lacquer Tree | Green Tea | Oak Mushroom | Landscape Plants | Apricots | Chestnuts | Natural Forest |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gapyeong–gun | Total (4) | 100 (100.0) | | 10.0 (100.0) | | | | | | | | | | |
| | Less than 1–3 ha (3) | 5.0 | | 5.0 | | | | | | | | | | |
| | 5 ha or more (1) | 5.0 | | 5.0 | | | | | | | | | | |
| Yeoncheon–gun | Total (6) | 15.7 (100.0) | 8.9 (56.7) | | | | | | | | | | | 6.8 (43.3) |
| | Less than 1 ha (1) | 2.3 | 2.3 | | | | | | | | | | | |
| | 5 ha or more (5) | 13.4 | 6.6 | | | | | | | | | | | 6.8 |
| Gokseong–gun | Total (15) | 65.1 (100.0) | 23.2 (35.6) | | 5.0 (7.7) | 3.8 (5.8) | 2.0 | 1.5 | 1.3 | 1.0 | 1.0 | 0.5 | 0.5 | 25.3 (38.9) |
| | Less than 1 ha (2) | 0.7 | 0.7 | | | | | | | | | | | |
| | 1–3 ha (7) | 12.4 | 6.2 | | | 1.5 | | | 1.3 | 1.0 | | | | 2.4 |
| | 3–5 ha (4) | 15.4 | 7.3 | | | 2.3 | | 0.5 | | | 1.0 | 0.5 | 0.5 | 2.9 |
| | 5 ha or more (2) | 37.0 | 9.0 | | 5.0 | | 2.0 | 1.0 | | | | | | 20.0 |

Note: 1) Value inside ( ) indicates the distribution ratio (%).
2) Value inside ( ) under 'Division' indicates the number of households.

**Table 6.** Land Ownership Transfer Status (Unit: ha)

| Division | | Total | | | | Sold | | |
|---|---|---|---|---|---|---|---|---|
| | | Tota | Paddy Fiel | Field | Forest Land | Total | Paddy Field | Field |
| Gapyeong–gun | Total (7) | 12.3 | 1.1 | 0.9 | 10.3 | | | |
| | Inherited | 12.0 | 1.1 | 0.9 | 10.0 | | | |
| | 2000s | 0.3 | | | 0.3 | | | |
| Yeoncheon–gun | Total (10) | 18.2 | 5.4 | 6.1 | 6.7 | 1.7 | 0.5 | 1.2 |
| | Inherited | 13.5 | 3.3 | 3.5 | 6.7 | | | |
| | 1980s | 0.3 | | 0.3 | | | | |
| | 1990s | 1.4 | 0.8 | 0.6 | | | | |
| | 2000s | 3.0 | 1.3 | 1.7 | | 1.7 | 0.5 | 1.2 |
| Gokseong–gun | Total (16) | 59.2 | 10.6 | 5.0 | 43.6 | | | |
| | Inherited | 41.1 | 4.4 | 3.7 | 33.3 | | | |
| | 1970s | 0.2 | 0.2 | | | | | |
| | 1980s | 5.9 | 1.9 | | 4.0 | | | |
| | 1990s | 3.2 | 2.5 | 0.7 | | | | |
| | 2000s | 8.5 | 1.6 | 0.6 | 6.3 | | | |

Note: Value inside ( ) indicates the number of households.

in Gapyeong–gun and Yeoncheon–gun were 65 million won and 51 million won, respectively, and that in Gokseong–gun was 31 million won – only 48% of that in Gapyeong–gun, and 61% of that in Yeoncheon–gun. For reference, the national average income of farm households in 2005 was 30 million won, and the national average household income of urban employee–level workers was 39 million won (Ministry of Agriculture and Forestry, 2006). The gross income of the eight households of Gapyeong–gun was constituted with fatsia by 74%, forestry by 12%, and stationary wage labor by 8%, in respective order, and people in their 40s and 30s, in households with 660~990 $m^2$ of land dedicated to fatsia shoot cultivation had the highest gross household income levels. However, there were no differences between groups divided by the scale of cultivated land, the scale of fatsia shoot cultivation, or age. In Yeoncheon–gun, the gross income of households was constituted with agriculture by 56% and other sources by 42%. Those other sources were mostly floriculture. People in their 50s in households of less than 1.0 ha of land dedicated to fatsia shoot cultivation had the highest gross household income levels. However, fatsia shoots took a greater share in the total gross income in households with smaller cultivated land areas, older people, and larger forest areas. In Gokseong–gun, the gross household income was constituted with various items, such as agriculture at 34%, mushrooms at 20%, fatsia shoots at 15%, livestock farming at 14%, and forestry at 7%. People in their 40s in households with more than 5.0 ha of land dedicated to fatsia shoot cultivation had the highest gross household incomes, however fatsia shoots represented a greater share of the total gross income in those households with smaller cultivated land area, larger fatsia shoot cultivation scales, older people, and larger forest areas. On the other hand, the income from forestry included the cultivation of various crops, including persimmons, apricots, chestnuts, painted maple fluid, and fernbrake (Table 7).

f) Agricultural and Forestry Industries Management Plan

Three out of eight households in Gapyeong–gun answered that fatsia shoots were the major source of household income, and two other households answered that it was pine nuts. Concerning the scale of cultivated land, four households were planning to expand and four were planning to maintain their current scale. Of the four households that were planning to expand, those planning to do so for purposes relating to expanding their agricultural business scale were all in their 30s or 40s. With regards to forest management scale, four households were planning to expand, two households were planning to maintain their current scale and one household was planning to reduce their scale. Those households planning to expand listed expansion to cultivate fatsia shoots and fruit bearing trees as the reason, and they were all in their 30s or 40s.

In Yeoncheon, eight out of the ten households answered that agriculture was their major source of household income, and two other households answered that it was floriculture. However, no household answered that it was fatsia shoots. Concerning the scale of the cultivated land, three households were planning to expand and seven were planning to maintain their current scale, with the reasons given for expansion being floriculture, special purpose trees, and the increase of assets. Concerning the forest management scale, three households were planning to expand and seven households were planning to maintain their current scale, with the reasons for expansion being related to fatsia cultivation in all three households.

In Gokseong–gun, six of 16 households answered that agriculture was the major source of household income, three households answered that it was fatsia shoots, two households answered that it was livestock farming, and two more answered that it was pyogo mushrooms. Concerning the scale of the cultivated land, five households were planning to expand and 11 households were planning to maintain their current scale, with

**Table 7.** Household Gross Income Status (Unit: 1 Million Won)

| | Division | | Total | Household Average | Fatsia Shoots | Forestry | Staionary Wage Labor | Mushroom | Agriculture | Temporary Wage Labor | Livestock Farming | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gapyeong–gun | | Total (8) | 521.3 (100.0) | 65.2 | 385.4 (73.9) | 60.3 (11.6) | 40.0 (7.7) | 15.0 (2.9) | 11.7 (2.2) | 9.0 (1.7) | | |
| | Age | 30s (1) | 67.9 | 67.9 | 60.0 (88.4) | 0.3 | 7.5 | | 0.1 | | | |
| | | 40s (6) | 427.5 | 71.2 | 305.4 (71.4) | 60.0 | 32.5 | 15.0 | 11.6 | 3.0 | | |
| | | 50s (1) | 26.0 | 26.0 | 20.0 (76.9) | | | | | 6.0 | | |
| | Fatsia | 330 m² (6) | 364.7 | 60.8 | 275.4 (75.5) | 20.3 | 40.0 | 15.0 | 5.1 | 9.0 | | |
| | | 660 m² (1) | 80.0 | 80.0 | 80.0 (100.0) | | | | | | | |
| | | 990 m² (1) | 76.6 | 76.6 | 30.0 (39.2) | 40.0 | | | 6.6 | | | |
| Yeoncheon–gun | | Total (10) | 508.2 (100.0) | 50.8 | 11.3 (2.2) | 0.1 | | | 282.8 (55.7) | | | 214.0 (42.1) |
| | Age | 40s (1) | 19.0 | 19.0 | 1.0 (5.3) | | | | 18.0 (94.7) | | | |
| | | 50s (4) | 422.4 | 105.6 | 2.4 (0.6) | | | | 209.0 (49.6) | | | 211.0 (50.0) |
| | | 60s (5) | 66.8 | 13.4 | 7.9 (11.8) | 0.1 | | | 55.8 (83.5) | | | 3.0 |
| | Fatsia | Less than 1.0 ha (7) | 449.2 | 64.2 | 3.8 (0.9) | | | | 231.4 (51.5) | | | 214.0 |
| | | 1.0–3.0 ha (2) | 29.0 | 14.5 | 4.0 (13.8) | | | | 25.0 (86.2) | | | |
| | | 5.0 ha or more (1) | 30.0 | 30.0 | 3.5 (11.7) | 0.1 | | | 26.4 (88.0) | | | |
| Gokseong–gun | | Total (15) | 458.2 (100.0) | 30.6 | 68.7 (15.0) | 32.2 (7.0) | 12.4 (2.7) | 92.5 (20.2) | 153.9 (33.6) | 20.5 (4.5) | 65.7 (14.3) | 12.4 (2.7) |
| | Age | 40s (2) | 90.8 | 45.4 | 2.0 (2.2) | | 6.3 | 12.0 | 25.5 (28.0) | | 45.0 | |
| | | 50s (5) | 176.2 | 35.2 | 25.4 (14.4) | 3.5 | | 48.0 (27.2) | 80.9 (45.9) | 16.0 | | 2.4 |
| | | 60s (5) | 144.5 | 28.9 | 31.3 (21.7) | 28.7 | 6.1 | | 45.0 (31.2) | | 18.9 (13.1) | 10.0 |
| | | 70s (3) | 46.7 | 15.6 | 10.0 (21.4) | | | 32.5 (69.6) | 2.4 | | 1.8 | |
| | Fatsia | Less than 1.0 ha (6) | 129.6 | 21.6 | 10.8 (8.3) | 4.3 | 3.0 | 8.0 | 81.2 (62.7) | | 16.8 | |
| | | 1.0–3.0 ha (6) | 201.0 | 33.5 | 20.9 (10.4) | 10.9 | 6.3 | 44.5 (22.1) | 52.2 (25.9) | | 48.9 (24.3) | 2.4 |
| | | 3. –5.0 ha (2) | 77.6 | 38.8 | 27.0 (34.8) | 17.0 (43.8) | 3.1 | | 20.5 | | | 10.0 |
| | | 5.0 ha or more (1) | 50.0 | 50.0 | 10.0 (20.0) | | | 40.0 (80.0) | | | | |

Note: 1) Value inside ( ) indicates the distribution ratio (%).
2) Note: Value inside ( ) under 'Division' indicates the number of households.
3) One Household in Gokseong–gun did not respond and was excluded from the total.

the reasons given for expansion relating to the stabilization of livelihood through the expansion of cultivated land in three households, Codonopsis lanceolata cultivation in one household, and the increase of assets in one household. Concerning the forest management scale, eight households were planning to expand and eight households were planning to maintain their current scale. The reasons given for expansion plans were mostly the cultivation of short–term income crops, such as fatsia shoots and the planting of fruit bearing trees and landscape plants (Table 8).

*Fatsia Shoot Cultivation, Sales, and Distribution Status*

a) Fatsia Shoot Cultivation Status

Considering the fatsia shoot cultivation status, farmers in Gapyeong–gun were engaged in forcing culture from November to April in plastic greenhouses. The average cultivation area for each household was 454 m². The number of fatsia shoots totaled 2.95 million and

**Table 8.** Agro–Forestry Management Plan (Unit: Generations)

| Division | | Cultivated Land Scale | | | Forest Management Scale | | | | Fatsia Shoot Cultivation Scale | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Tota | Expan–ded | Uncha–nged | Tota | Expan–ded | Uncha–nge | Reduc–ed | Tota | Expan–de | Uncha–nge | Reduc–ed |
| Gapyeong –gun | Total (8) | 8 | 4 | 4 | 8 | 4 | 3 | 1 | 8 | 1 | 7 | |
| | 30s (1) | 1 | 1 | | 1 | 1 | | | 1 | | 1 | |
| | 40s (6) | 6 | 3 | 3 | 6 | 3 | 2 | 1 | 6 | 1 | 5 | |
| | 50s (1) | 1 | | 1 | 1 | | 1 | | 1 | | 1 | |
| Yeoncheon –gun | Total (10) | 10 | 3 | 7 | 10 | 3 | 7 | | 10 | 4 | 4 | 2 |
| | 40s (1) | 1 | | 1 | 1 | | 1 | | 1 | 1 | | |
| | 50s (4) | 4 | 2 | 2 | 4 | 2 | 2 | | 4 | 2 | 1 | 2 |
| | 60s (5) | 5 | 1 | 4 | 5 | 1 | 4 | | 5 | 1 | 3 | 2 |
| Gokseong –gun | Total (15) | 16 | | 5 | 11 | 8 | 8 | | 16 | 2 | 14 | |
| | 40s (2) | 2 | | | 2 | 1 | 1 | | 2 | | 2 | |
| | 50s (5) | 6 | | | 2 | 6 | | | 6 | 1 | 5 | |
| | 60s (5) | 5 | | 4 | 4 | 1 | 4 | | 5 | 1 | 4 | |
| | 70s (3) | 3 | | 1 | 3 | | 3 | | 3 | | 3 | |

Note: Value inside ( ) indicates the number of households.

370,000 for each household, and one fatsia shoot crop was harvested from one rootstock. The experience in cultivation was one to seven years, and the motivation was mostly the increase of income during the off–season. Considering the characteristics of the forcing culture, it required heavy workload activities, such as sorting and eliminating withered rootstocks, maintaining temperature and humidity, managing irrigation and ventilation, and sorting for shipping and packing. In Yeoncheon–gun, the average cultivation area for each household was 1.2 ha, with 77% of the cultivation area being forests and fields. Concerning the experience in cultivation, three out of ten households had ten years of experience, and the other households had three to six years of experience. The motivation for cultivating fatsia shoots was to increase income during the off–season, a recommendation from the Agricultural Technology Center, the relatively light workload, and so forth. Concerning difficulties in cultivation, respondents answered that theft, weeding, the withering of rootstocks due to insect damage, and the decrease of yields were significant.

The average cultivation area for each household in Gokseong–gun was 1.5 ha, and 96% of the cultivation area was forests and fields. The cultivation took place mostly in the process of developing the fatsia shoot cultivation complex as part of the special measures for the advancement of the country between 1996 and 2004. The motivation was assistance schemes, such as the development of the foundation of the fatsia shoot cultivating ground, as well as the low temperature storage facilities, the full–scale utilization of mountains and forests, the recommendations of the Agricultural Technology Center, the high possibilities of planting environmentally friendly crops, a light workload, and the increase of household income during the off–season. Concerning difficulties in cultivation, most respondents answered that the gathering of runners and weeding were significant, while many of them complained that the income was relatively small considering the cultivation area. The harvest took place between mid April and

**Table 9.** Fatsia Shoot Cultivation Status (Unit: $m^2$, ha)

| Division | | Total | Household Average | Field | Paddy Field | Forest |
|---|---|---|---|---|---|---|
| Gapyeong –gun | Total (8) | 2,970 | 454 | 2,970(8) | | |
| | 330 $m^2$ (6) | 1,980 | 330 | 1,980(6) | | |
| | 660 $m^2$ (1) | 660 | 660 | 660(1) | | |
| | 990 $m^2$ (1) | 990 | 990 | 990(1) | | |
| Yeoncheon –gun | Total (10) | 11.5 | 1.2 | 2.6(4) | | 8.9(6) |
| | Less than 0.5 ha (4) | 1.2 | 0.3 | 0.6(2) | | 0.6(2) |
| | 0.5–1.0 ha (3) | 1.7 | 0.6 | | | 1.7(3) |
| | 1.0 ha or more (3) | 8.6 | 2.9 | 2.0(2) | | 6.6(1) |
| Gokseong –gun | Total (16) | 24.1 | 1.5 | 0.6(3) | 0.3(1) | 23.2(15) |
| | Less than 0.5 ha (2) | 0.6 | 0.3 | 0.1(1) | | 0.5(2) |
| | 0.5–1.0 ha (4) | 2.6 | 0.7 | 0.2(1) | 0.3(1) | 2.1(3) |
| | 1.0–1.5 ha (6) | 6.6 | 1.1 | | | 6.6(6) |
| | 1.5 ha or more (4) | 14.3 | 3.6 | 0.3(1) | | 14.0(4) |

Note: 1) The unit for the cultivation area of Gapyeong–gun is $m^2$ and for Yeoncheon–gun and Gokseong–gun, ha.
2) Number inside ( ) refers to the number of households.

**Table 10.** Fatsia Shoot Production Cost (Unit: 10,000 won)

| Division | | | Total | House–hold Avera–ge | Labor Cost | | | | | | Labor Cost | | | | Land Rent |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Subtotal | Weed–ing | Fertil–izing | Harv–es | Pruni–ng | Cultiv–ation Overa–ll | Subtot–al | Rootst–ock | Heatin–g | Other | |
| Gapye–ong –gun | Age | Total (8) | 28,675 (100.0) | 3,584 | 1,200 (4.2) | | | | | 1,200 | 27,251 (95.0) | 25,535 | 572 | 1,144 | 224 (0.8) |
| | | 30s (1) | 2,229 | 2,229 | | | | | | | 2,173 | 1,800 | 80 | 293 | 56 |
| | | 40s (6) | 25,015 | 4,169 | 1,200 | | | | | 1,200 | 23,647 | 22,385 | 429 | 833 | 168 |
| | | 50s (1) | 1,431 | 1,431 | | | | | | | 1,431 | 1,350 | 63 | 18 | |
| | Fatsia Shoot | 330 m² (6) | 19,125 | 3,188 | 1,200 | | | | | 1,200 | 17,813 | 16,375 | 366 | 1,072 | 112 |
| | | 660 m² (1) | 6,757 | 6,757 | | | | | | | 6,645 | 6,460 | 125 | 60 | 112 |
| | | 990 m² (1) | 2,793 | 2,793 | | | | | | | 2,793 | 2,700 | 81 | 12 | |
| Yeonc–heon –gun | Age | Total (10) | 167 (100.0) | 16.7 | 102 (61.1) | 102 | | | | | 25 (15.0) | | | 25 | 40 (24.0) |
| | | 40s (1) | | | | | | | | | | | | | |
| | | 50s (4) | 112 | 28.0 | 102 | 102 | | | | | 10 | | | 10 | |
| | | 60s (5) | 55 | 11.0 | | | | | | | 15 | | | 15 | 40 |
| | Fatsia Shoot | Less than 1.0 ha (7) | 156 | 22.3 | 102 | 102 | | | | | 14 | | | 14 | 40 |
| | | 1.0–3.0 ha (2) | 2 | 1.0 | | | | | | | 2 | | | 2 | |
| | | 5.0 ha or higher (1) | 9 | 9.0 | | | | | | | 9 | | | 9 | |
| Gokse–ong –gun | Age | Total (16) | 896 (100.0) | 56.0 | 465 (51.9) | 364 | 21 | 60 | 20 | | 406 (45.3) | | | 406 | 25 (2.8) |
| | | 40s (2) | 15 | 7.5 | | | | | | | 5 | | | 5 | 10 |
| | | 50s (6) | 342 | 57.0 | 42 | 21 | 21 | | | | 285 | | | 285 | 15 |
| | | 60s (5) | 146 | 29.2 | 35 | 35 | | | | | 111 | | | 111 | |
| | | 70s (3) | 393 | 131.0 | 388 | 308 | | 60 | 20 | | 5 | | | 5 | |
| | Fatsia Shoot | Less than 1.0 ha (6) | 98 | 16.3 | 465 | 364 | 21 | 60 | 20 | | 73 | | | 73 | 25 |
| | | 1.0–3.0 ha (7) | 572 | 81.7 | 364 | 343 | 21 | | | | 208 | | | 208 | |
| | | 3.0–5.0 ha (2) | 133 | 66.5 | 80 | | 60 | 20 | | | 53 | | | 53 | |
| | | 5.0 ha or higher (1) | 93 | 93.0 | 21 | 21 | | | | | 72 | | | 72 | |

Note: 1) Value inside ( ) indicates the distribution ratio (%).
2) Note: Value inside ( ) indicates the number of households.

mid May in both Yeoncheon–gun, Gyeonggi–do, and Gokseong–gun, Jeollanam–do (Table 9).

b) Fatsia Shoot Sales and Distribution Status

In Gapyeong–gun, none to ten fatsia shoots (150 g) were wrapped together into each package for shipping, with each pack sold at between 900 to 2,000 won, or 1,300 to 1,400 won on average. Most fatsia shoots were shipped to large wholesale markets in Seoul. However, they were sorted by size rather than by quality for shipping, at the request of the clients, the large wholesale markets. The reason most of the yield was shipped to large wholesale markets was that there were no well–defined places to send large amounts of fatsia shoots, and the farmers who wished to sell fatsia shoots at a higher price through graded packing had to follow the requests of large wholesale markets. In Yeoncheon–gun, the yield

was not large, and it was sold along various routes, including the wholesale market, the local marketplace, personal trade, and event places, at around 10,000–18,000 won per kilogram. In Gokseong–gun, Jeollanam–do, most farmers were shipping their products to large wholesale markets in Seoul through local distributors. Most farmers accepted unsatisfactory prices because they lacked large numbers of consumers nearby. The average price was 4,000–15,000 won for 1 kg, however some farmers living near roads with greater traffic sold them for 30,000 won for 1 kg. On the other hand, Gapyeong–gun did not need the low temperature storage facilities capable of adjusting the shipments and thereby increasing the possibility of finding more markets. Most households in Yeoncheon–gun did not have low temperature storage facilities. Many households in Gokseong–gun had low temperature storage facilities, as they received the support as part of the agricultural assistance program. However, they used the facilities for storing other crops, as the distributors visited them almost every day during the harvest season.

c) Fatsia Shoot Production Costs

In Gapyeong–gun, the cost of the fatsia rootstock imported from China constituted 89% of the gross income of the household on average, and the average cost, 35.84 million won, constituted as much as 93% of the gross household income from fatsia shoots, 38.54 million won. The reason the cost constitutes most of the gross income is suggested as being because some respondents gave more or less smaller figures for their income levels, according to the Gapyeong–gun Office. According to some respondents, when one rootstock was imported at 90 won, the grown product was sold for about 200 won. In Yeoncheon–gun, the labor costs for weeding assumed 61% of the cost and the land rent, 24%. In Gokseong–gun, the labor costs for weeding, fertilization, and harvest represented 52% of the costs, while other costs, including fertilizer and chemicals, represented 45%. However, there was a great difference in the average cost between regions; the average production cost in Gapyeong–gun was 35.84, while only 170,000 won and 560,00 won were spent in Yeoncheon–gun and Gokseong–gun, respectively (Table 10).

d) Fatsia Shoot Management Plan

Concerning the fatsia shoots management plan, only one out of eight households in Gapyeong–gun planned an expansion, and the other seven planned to maintain their current scale. It appeared that there were many reasons for this, such as the increase of the price of the rootstock imported from China, the unstable domestic market prices, the increase of fatsia shoot production in Korea, and the increase of labor costs. However the reason they did not plan to reduce the scale of their cultivation seemed to be the fact that its small–scale cultivation facilities requires a small initial investment level, and because it yields income in the short term, using domestic manpower during the off–season. In Yeoncheon–gun, four households decided to expand cultivation, four households decided to maintain their current scale, and two households decided to reduce their scale. Those in their 40s and 50s tended to prefer expansion than people in other age groups, and most of them hoped to cultivate fatsia shoots using forests and fields. They tended to focus on the fact that fatsia shoots yielded income in the short term, using the off–season, and consuming a relatively light workload. In Gokseong–gun, two households hoped to expand their cultivation and 14 households hoped to maintain their current scale. The reason for the relative disinterest in expansion was that the workforce had decreased due to aging, meaning cultivation would be unable to be managed intensively, thereby yielding less income than expected (Table 8).

## CONCLUSIONS

1. Concerning the distribution of labor in the three target regions, people in their 40s constituted the largest portion of the labor (42%) in Gapyeong–gun, and people in their 50s, in Yeoncheon–gun (29%) and Gokseong–gun (37%). The average farmland area cultivated by each household was the largest in Yeoncheon–gun (3.4 ha), followed by Gokseong–gun (2.1 ha) and Gapyeong–gun (0.7 ha).
2. The average scale of forest management by each household was the largest in Gokseong–gun (4.3 ha), followed by Gapyeong–gun (2.5 ha) and Yeoncheon–gun (2.2 ha). However, farm households in Gokseong–gun mostly cultivated species and crops that could yield income in the short term, such as fatsia shoots, persimmons, wild simulated ginseng, and Siberian ginseng, (in more than 60% of its forest area).
3. The average gross income of households in Gapyeong–gun and Yeoncheon–gun was 65 million won and 51 million won, respectively. However, in Gokseong–gun the average was 31 million won, only 48% of that in Gapyeong–gun and 61% of that in Yeoncheon–gun. The gross income yielded from fatsia shoots represented 74% of the gross income of the entire households in Gapyeong–gun, 2% in Yeoncheon–gun, and 15% in Gokseong–gun.
4. Three households in Gapyeong–gun and three households in Gokseong–gun answered that fatsia shoots were the major source of household income, but not a single household in Yeoncheon–gun answered that fatsia shoots were their major source of household income. Concerning the scale of cultivated land, four households in Gapyeong–gun, three households in Yeoncheon–gun, and five households in Gokseong–gun planned to expand. The reason given pertained primarily to livelihood stabilization. Concerning the forest management, four households in Gapyeong–gun, three households in Yeoncheon–gun, and eight households in Gokseong–gun planned to expand. The reason was mostly to plant crops that yielded income in the short term, including fatsia shoots and fruit bearing trees, in all three provinces.
5. The average scale of fatsia shoot production in each household in Gapyeong–gun was 454 $m^2$, that in Yeoncheon–gun was 1.2 ha, and that in Gokseong–

gun was 1.5 ha. The average gross income from fatsia shoots in each household in Gapyeong–gun in 2006 was 48 million won, that in Yeoncheon–gun was one million won, and that in Gokseong–gun was four million won. However, the percentage of the cost against gross income was 93% in Gapyeong–gun, the percentage of labor costs was 61% in Yeoncheon–gun, and the percentages of labor costs and material costs were 52% and 45%, respectively, in Gokseong–gun.

6. Most fatsia shoots produced in Gapyeong–gun and Gokseong–gun were sold in large wholesale markets in Seoul, while fatsia shoots produced in Yeoncheon–gun were mostly sold in the market near the producing grounds.
7. Concerning future fatsia shoots cultivation plan, one household in Gapyeong–gun, four in Yeoncheon–gun, and two in Gokseong–gun planned to expand, but seven in Gapyeong–gun, four in Yeoncheon–gun, and 14 in Gokseong–gun planned to maintain their current levels.

The implications derived from the considerations listed above are as follows:

1. Concerning Gapyeong–gun, the increase of the price of rootstocks imported in large scales from China, and the decrease of the price of domestic fatsia shoots, due to the increase of production, act as important factors determining the existence of fatsia shoot cultivating farmhouses. Also, unstable prices in the large wholesale market, due to the small number of markets is also making it difficult for farmhouses. While fatsia shoots represented 74% of the gross income of the farmhouses, and 93% of the gross income made from fatsia shoots is taken up as cost, most farmhouses are planning to continue cultivating fatsia shoots. The reason is to increase household income using small land area, an average 0.7 ha for each household, and the domestic labor available in the off–season. However, if the increase of the price of imported rootstocks and the decrease of the price of fatsia shoots in the market continue, it is likely that the young labor force in farm villages, especially those who are in their 40s, will give up fatsia shoots and move to neighboring cities to find jobs. Therefore, Gapyeong–gun will need to develop a way to produce rootstocks domestically in large quantities to replace Chinese imports and improve the distribution structure by securing more markets.
2. In Yeoncheon–gun, Gyeonggi–do, fatsia shoots represented a small share in the domestic economy, however many households were planning to increase the scale of fatsia shoot production in order to increase their household income using the off–season. In particular, Yeonchon–gun is developing a fatsia shoot complex and it is expected to increase fatsia shoot production. Despite this, finding markets appeared to be the prime issue to be resolved. Also, it appears that reviewing the lease of idle land owned by Yeoncheon–gun for fatsia shoot cultivation, the shipping periods, and the support for introducing low temperature storage facilities to maintain freshness all need to be conducted.
3. In Gokseong–gun, the full–scale utilization of forests and fields to overcome the small and limited land areas used for cultivation, along with various income bases such as agriculture, mushroom culture, livestock, and fatsia shoots, was quite impressive. Considering the goal of increasing the household income in farms and mountain villages by developing fatsia shoots into a specialized business area in Gokseong–gun, a fatsia shoot cultivation and production structure, centered on farmers in their 50s and 60s who are otherwise unlikely to move to areas that require heavy work, and that are likely to cultivate fatsia shoots on the side, and on farmers with small land areas who can readily put extra manpower into the cultivation of fatsia shoots, is recommended, rather than providing support programs centering on farm households cultivating fatsia shoots on a large scale.

   Those farmers with smaller land areas to cultivate and smaller fatsia shoot cultivation scales, or older farmers, tended to fully participate in the forestry production areas in which they worked. However, it is necessary to secure a fatsia shoot cultivation ground of a certain scale to fully utilize the unpaid manpower.
4. The forced fatsia shoots produced in facilities such as plastic greenhouses, and wild fatsia shoots collected from forests and fields are shipped all together in a fixed period during periods of, for example, flooding. Therefore, it is necessary to study a way to store fatsia shoots for a long period of time and to develop processed foods with fatsia shoots in order to prevent the depreciation of fatsia shoots, and eliminate the difficulties observed in securing markets.

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