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<https://doi.org/10.5109/1543427>

出版情報：九州大学大学院農学研究院紀要. 60 (2), pp.553-561, 2015-09-18. Faculty of
Agriculture, Kyushu University

バージョン：

権利関係：



A Study of the Schisandra Production Structure in Korea

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(Received May 8, 2015 and accepted May 19, 2015)

According to the analysis of the schisandra production structure of 48 farms in Jangsu-gun in Jeollabuk-do, a typical schisandra producing center of Korea, the average size of the farmland was 1.1ha and the schisandra cultivation scale was 0.5ha. The gross income of farms was 36.03 million won, and the gross income from schisandra was 14.96 million won, accounting for 42% of the gross income of farms. For the major income source for the household economy, 24 out of 48 chose schisandra, and for the scale of schisandra cultivation, 17 out of 29 farms chose to maintain or expand their current scale. However, most schisandra farms cited the dropping price of schisandra and the decrease in income due to the nationwide expansion of cultivation areas, unsold fresh fruits resulting from the lack of markets, and a lack of manpower as future issues. Respondents demanded the purchase of schisandra of local governments for the stabilization of the selling price and increased income, the opening up of the market through connections with pharmaceutical companies and food companies capable of mass selling, the expansion of public relations for Jangsu-gun schisandra, the expansion of processing facilities (syrup, dry schisandra, other processed goods, etc.), the installation of an auction market and a union market, the installation of washers, and the development of packing box design. The study reached the conclusion that farms should consider various ways to secure a stable production of schisandra and expand farm income, such as unifying Jangsu-gun schisandra related organizations, using the Geographical Indication System of the Korea Forest Service, expanding the urban-rural exchange and sales and public relations in connection with local festivals, and developing processed goods that can increase added value compared with the fresh fruit.

Key words: schisandra, production structure, income, Korea

INTRODUCTION

Schisandra (*Schisandra chinensis* Baillon) is rich in protein, calcium, phosphorus, iron, and vitamin C and has five tastes: sourness, sweetness, spiciness, bitterness, and saltiness. Traditionally, schisandra has been a common herb used to treat coughs and phlegm, as it is known to supplement moisture and strengthen the lungs and also enhance cardiovascular health and aid in recovery from fatigue. It is also simply taken every day by modern people because of its great taste. Schisandra has been used quite widely as both food and medicine, and its demand and production have been greatly increasing as the national interest in health began to rise over the past decade, following the increase in the national income level and thus, schisandra in mountain villages has contributed to greatly to the regions in terms of income increase as forestry product of a special use. As of 2013, schisandra accounts for 45%, the largest portion, of the total production of 10 or more key medicinal herbs, such as wood-cultivated ginseng and *Cornus officinalis* Siebold et Zucc. The production output and production amount of schisandra in 2010 were 3,538,000 kg and 95,346 million won, respectively, and in 2013, they were 9,677,000 kg and 119,287 million won, demonstrating a near threefold

increase compared with 2010 levels. However, output dropped from 27,000 won/kg down to 12,000 won/kg, showing more than a twofold drop (Korea Forest Service, 2006; 2011; 2012; 2013; 2014). The reason for such a drop is deemed to be the increase of imports from China and other countries (Korea Forest Service, 2015) and the increase of production due to the expansion of cultivation scale in Korea (Park *et al.*, 2010). However, schisandra has been contributing to the increase of household incomes of farmers, as it requires less manpower compared with other crops and can be managed intensively. Schisandra related studies have mainly focused on the chemical components and medicinal effects of schisandra, its use as a food additive, and the method of drying and storing schisandra (Jung *et al.*, 1998; Park *et al.*, 2010; Lee *et al.*, 2013). There are only a handful of studies that have empirically and specifically looked at the cultivation and production structure of schisandra, such as schisandra's influence on the farm household economy. Therefore, this study intended to analyze problems related with the production and sales of schisandra to find a solution for revitalizing the production and sales of the crop, centering on schisandra farms that bear high potential for stagnation due to the price falls following the increase of Chinese imports and domestic cultivation scale.

MATERIALS AND METHODS

Jangsu-gun in Jeollabuk-do, the subject of the analysis, is the county that collected high quality seed of

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schisandra and succeeded in the artificial cultivation of the crop for the first time in Korea, before distributing the seedlings throughout the country. As of 2015, schisandra is cultivated in 324 ha of land by 705 farming households in Jangsu-gun and the county produces approximately 12% of the national production of schisandra. Its production output and production amount are 806,000 kg and 11 billion won, respectively, accounting for 8% of the entire output and amount (Jangsu County, 2015). For the analysis, overall data in relation to schisandra were analyzed first through visits to a schisandra support related organization (Jangsu-Gun Office) and production related organizations (Forestry Association, Schisandra Federation, and Schisandra Farming Association Corporation). The survey was conducted over 1 month between the beginning of 2015 and the beginning of February through direct interviews with the heads of 48 farming households cultivating schisandra in Jangsu-gun. The survey comprised the constitution of manpower, the current status of cultivated farmlands, cropping status, reproduction structure, (including the constitution of the income of farming households), schisandra production costs, production output, sales method, difficulties, and demand, and the survey data were analyzed by age

and scale of schisandra cultivation, suggesting reasonable cultivation scale and rearing farm classes of schisandra.

RESULTS AND DISCUSSIONS

National Schisandra Production Status

Schisandra Production Status

While the production of most medicinal herbs is

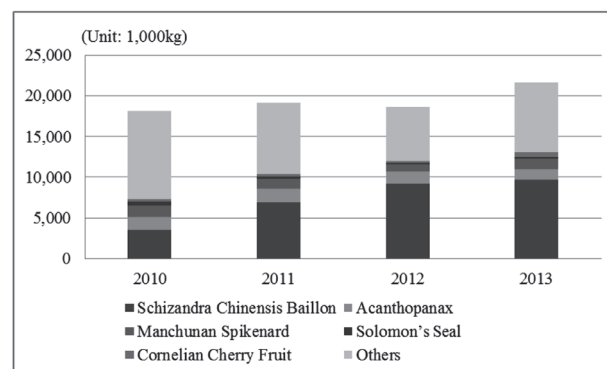


Fig. 1. Actual Output of Forest Products (Medicinal Herb).
Source: Korea Forest Service. 2014 *Statistical Yearbook of Forestry* (44)

Table 1. Schisandra Production by Region

(Unit: 1,000 kg, million won)

Division	Total	Gyeonggi-do	Gangwon-do	Chungcheongbuk-do	Chungcheongnam-do	Jeollabuk-do	Jeollanam-do	Gyeongsangbuk-do	Gyeongsangnam-do	Others	
2005	Output (kg)	420 (100)	2 (1)	18 (4)	17 (4)	5 (1)	49 (12)	0.4 (—)	186 (44)	143 (34)	0.2 (—)
	Amount (1 Million Won)	5,990 (100)	41 (1)	460 (8)	232 (4)	79 (1)	1,385 (23)	1 (—)	2,696 (45)	1,090 (18)	6 (—)
2010	Output (kg)	3,538 (100)	13 (—)	250 (7)	258 (7)	247 (7)	909 (26)	18 (1)	1,199 (34)	639 (18)	5 (—)
	Amount (1 Million Won)	95,346 (100)	361 (—)	4,995 (5)	6,920 (7)	6,795 (7)	25,031 (26)	507 (1)	33,019 (35)	17,592 (19)	126 (—)
2011	Output (kg)	6,874 (100)	27 (—)	420 (6)	496 (7)	119 (2)	743 (11)	22 (—)	4,464 (65)	578 (8)	5 (—)
	Amount (1 Million Won)	273,460 (100)	1,037 (—)	16,688 (6)	19,754 (7)	4,732 (2)	29,532 (11)	861 (—)	177,629 (65)	23,009 (8)	218 (—)
2012	Output (kg)	9,160 (100)	26 (—)	394 (4)	622 (7)	187 (2)	935 (10)	5 (—)	6,264 (68)	674 (7)	53 (—)
	Amount (1 Million Won)	119,302 (100)	360 (—)	5,165 (4)	8,086 (7)	2,433 (2)	12,196 (10)	743 (1)	81,467 (68)	8,773 (7)	79 (—)
2013	Output (kg)	9,677 (100)	46 (—)	485 (5)	514 (5)	140 (1)	1,334 (14)	18 (—)	6,157 (64)	977 (10)	6 (—)
	Amount (1 Million Won)	119,287 (100)	567 (1)	5,985 (5)	6,331 (5)	1,729 (1)	16,448 (14)	233 (—)	75,908 (64)	12,040 (10)	46 (—)

Source: 1. Korea Forest Service. 2014 *Statistical Yearbook of Forestry* (44)
 2. Korea Forest Service. 2013 *Statistical Yearbook of Forestry* (43)
 3. Korea Forest Service. 2012 *Statistical Yearbook of Forestry* (42)
 4. Korea Forest Service. 2011 *Statistical Yearbook of Forestry* (41)
 5. Korea Forest Service. 2006 *Statistical Yearbook of Forestry* (36)

Note: Number inside () is a component ratio (%)

Table 2. Import and Export Status

(Unit: kg, US \$)

Division		Total		PR China		Hong Kong		Others	
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Import	2012	507,873	1,253,965	507,873	1,253,965	–	–	–	–
	2013	629,878	1,861,453	629,878	1,861,453	–	–	–	–
	2014	302,679	1,154,426	302,679	1,154,426	–	–	–	–
Export	2012	2,311	6,114	–	–	–	–	–	–
	2013	35	341	–	–	–	–	–	–
	2014	342	5,785	–	–	165	1,748	177	4,037

Source: Korea Forest Service. 2015 *Statistics of Forest Product's Trade*

decreasing, the production of schisandra has increased each year and it expanded from 3,538,000 kg in 2010 up to 9,766,000 kg in 2013. The production output of schisandra accounted for 45% of all medicinal herbs, and the production amount reached 24% as of 2013. However, the price per kg has decreased at a fast pace since 2011, from 27,000 won in 2010 down to 40,000 won in 2011, 13,000 won in 2012, and 12,000 won in 2013 (Figure 1).

Regional Schisandra Production Status

According to regional schisandra production status, Gyeongsangbuk-do showed the highest production at 44% as of 2005 and was followed by Gyeongsangnam-do (34%), and Jeollabuk-do (12%). However, as of 2013, production in Gyeongsangbuk-do increased up to 64%, Jeollabukdo 14%, and Gyeongsangbuk-do 10%, respectively, revealing 20% and 2% increases in Gyeongsangbuk-do and Jeollabuk-do, respectively, while Gyeongsangnam-do decreased sharply by 20%. The production of schisandra mostly increased in other regions, and the production amount as of 2013 was 12,000 won/kg (Table 1).

Schisandra Export and Import Status

Regarding the export and import of schisandra, there are only a few records of imports before 2012, and the records of imports for 2012 and 2013 were 510,000 kg and 630,000 kg, respectively. These were 6–7% of domestic production, and the amount of imports in 2013 was 3,000 won/kg, which was about 4 times less than 12,000 won, the price of schisandra produced in Korea. There were also only a few records of exports, indicating that domestically produced schisandra was entirely consumed domestically (Table 2).

Schisandra Production Status in the Surveyed Site *Jangsu-gun, Jeollabuk-do*

Jangsu-gun in Jeollabuk-do, the subject of the analysis, is located approximately 80 km from Jeonju-si where the seat of a provincial government in Jeollabuk-do is. In addition, the time required to Jangsu-gun is approximately one hour and twenty minutes by car. It has an average above sea level of 408 m, and an area of 43,525 ha. Farmlands and forest lands account for 5,476 ha (13%) and 33,658 ha (77%), respectively. The population has

decreased from 31,502 to 23,569 over the past 18 years from 1995 to 2013, indicating a depopulation of nearly 8000. 65 or order accounts for 28% or 6,641 persons. This indicates the typical mountain village of the inland mountainous territory, making a progress of a depopulation drain and aging at the same time (Jangsu County, 2015). On the other hand, Jangsu-gun's schisandra was bred from the seedling collected from the colony of schisandra in Jangsu-gun in Jeollabuk-do, and cultivators repeatedly selected high quality seeds to make continual improvements. They succeeded in Korea's first mass artificial cultivation in 1979. As a result, the seedlings from Jangsu-gun spread to a national scale, quickly boosting the production of schisandra.

The subject of analysis, Jangsu-gun, has 324 ha of farmland cultivating schisandra and 705 farms (state-supported farms) accounting for approximately 12% of production. Production output was 806,000 kg and production amount was approximately 11 billion won. Schisandra sales are divided into fresh fruit, schisandra syrup, and dried schisandra. However, the total sales of schisandra, amounting to 11 billion won in 2014, broke down to 8.4 billion for fresh fruit (726,000 kg of fresh fruit), 2.6 billion won for syrup (77,000 kg fresh fruit + 51,000 kg sugar = 128,000 kg), and 30 million won (3,000 kg fresh fruit = 400 kg dried fruit). The selling price for fresh fruit was 12,000 won/kg, that for syrup was 20,000 won, and that for dried schisandra was 75,000 won. For the type of trade, Jangsu-gun estimated 88% in direct sales, 12% in self-consumption, 1% other, and the selling price for schisandra as of 2014 was determined at the level of 14,000 won/kg by the Schisandra Federation. The actual price was 10,000–14,000 won, and it was 1.1–12,000 won on average).

Schisandra Producing Organization

Schisandra production organizations of Jangsu-gun include the Forestry Association, the Schisandra Federation, and the Schisandra Farming Association Corporation.

First, Jangsu-gun's Forestry Association has 5 ha of schisandra plantation for its own revenue-making, and is planning a 134 ha cultivation scale, with 392 members of the association who own schisandra farms as of 2015, for the distribution of profits among members. The association is planning the production of 660,000 kg and is also

planning to continuously manage the excellent quality of Jangsu-gun schisandra to maintain its reputation, and register it to the Geographical Indication System in order to enhance the actual income of producers. The association established the plan to purchase schisandra as part of the profit distribution program for members in 2014, but the actual purchase was small, at around 1,000 kg due to a lack of processing facilities (Jangsu County Forestry Association, 2015). Jangsu-gun Schisandra Federation has 600 farms (60 or more Cultivation Teams: 6–30 persons per team) operating without paying membership fees, and the local government is supporting member farms with the purchase of schisandra packing boxes. Finally, the Schisandra Farming Association Corporation was established using 140 million won by collecting 500,000 won from each of the 200 regular members and 4 million won from each of the 10 directors. The corporation provides members with benefits such as the selling of schisandra and the supply of materials at lower prices through group purchasing. However, the corporation did not have processing facilities, such as those for producing syrup, due to a lack of local government support and a lack of capital, and has had difficulties with the development of various processed goods and product design.

Case Research for Schisandra Production Farms

Manpower Composition Status

The 48 households surveyed had 95 members, and each household had 2.0 members on average and the average age was 65. By strata, 37% of members were 70 or older, 28% were in their 50s, and 22% were in their 60s,

in respective order, and those who were in their 70s or older represented the highest ratio. For reference, 48 farms surveyed had 5–20 years of experience cultivating schisandra (Table 3).

Current Status of Cultivated Farmland and Forest

The size of the cultivated farmlands of the 48 farms surveyed in total was 53.6 ha, 1.1 ha by farm on average. The forest accounted for 64.1 ha in total and 1.3 ha by farm on average. By strata, 23 farms had land smaller than 1 ha and the average size was 0.6 ha, 19 farms had the land around 1–2 ha and the average was 1.4 ha, and 6 farms had 2 ha or larger areas of land and the average was 2.5 ha. However, leased land accounted for 37% of all cultivated farmlands, and the lease rate was greater in larger cultivated farmlands (Table 4).

Cropping Status

Considering cropping status, schisandra accounted for 45% of all farmland, the highest ratio followed by fruits. By strata, farms with land smaller than 1 ha were cultivating schisandra (47%), vegetables (13%), and hot pepper (11%), in respective order, farms with land sized 1–2 ha were cultivating schisandra (51%) and fruits (12%), and farms with land 2 ha or greater were cultivating schisandra (34%), fruits (24%), and ginseng (22%), in respective order (Table 5).

Status of Gross Income of Household

The average gross income of 48 households was 36 million won, and the income sources comprised schisandra (42%), fruits (14%), and special crops (14%) in

Table 3. Composition of Manpower

(Unit: Person)

Division	Average Farming Family	Total (48 Farming Families)	20s	30s	40s	50s	60s	70s or older
Total	2.0	95 (100)	1 (1)	1 (1)	10 (11)	27 (28)	21 (22)	35 (37)
Male	1.0	46	–	1	3	13	12	17
Female	1.0	49	1	–	7	14	9	18

Note: Number inside () is a component ratio (%)

Table 4. Status of Cultivated Farmland

(Unit: Farming Family, ha)

Division	Number of Farming Families (a)	Average Farmland (b)/(a)	Average Forest Land (c)/(a)	Cultivated Farmland (Paddy + Field)					Forest Land (c)
				Total (b)	Owned	Leased	Rented	Non-used	
Total	48	1.1	1.3	53.6 (100)	34.0 (63)	19.6 (37)	8.3	0.5	64.1
Less than 1 ha	23	0.6	0.8	12.8 (100)	9.4 (73)	3.4 (27)	8.1	0.5	18.5
1–2 ha	19	1.4	2.1	26.0	15.9 (61)	10.1 (39)	0.2	–	40.3
2 ha or larger	6	2.5	0.9	14.8 (100)	8.7 (59)	6.1 (41)	–	–	5.3

Note: Number inside () is a component ratio (%).

respective order. Among farmers in their 40s, farms with 1.5 ha or larger land areas cultivating schisandra showed the highest average gross incomes. Regarding gross income from schisandra, farmers in their 40s and 70s or older accounted for 59% and 54%, respectively, and by cultivation scale of schisandra, larger cultivation showed a greater ratio of its gross income, and the cultivation scale of 1.5 ha or greater accounted for 94% of schisandra (Table 6).

Future major household economy

For the major income source for the household economy, 24 out of 48 farms answered schisandra, 19 farms fruits, and 15 farm pensions. By age, 12 out of 19 farms owned by farmers 70 or older answered schisandra, farms with larger schisandra cultivations answered that the major income source for the household was schisandra (Table 7).

Table 5. Cropping Status

(Unit: ha)

Division	Total	Schisandra	Schisandra Seedling	Fruit	Ginseng	Hot Pepper	Rice	Vegetables	Special Crop	Livestock	Mushroom
Total	53.6 (100)	24.3 (45)	3.3 (6)	7.3 (14)	4.8 (9)	4.5 (8)	4.0 (8)	3.5 (7)	1.0 (2)	0.6 (1)	0.3 (1)
Less than 1ha	12.8 (100)	6.0 (47)	0.3 (2)	0.6 (5)	0.3 (2)	1.5 (12)	1.4 (11)	1.6 (13)	0.8 (6)	–	0.3 (2)
1 – 2ha	26.0 (100)	13.2 (51)	2.4 (9)	3.1 (12)	1.3 (5)	2.6 (10)	0.9 (3)	1.9 (7)	–	0.6 (2)	–
2ha or Larger	14.8 (100)	5.1 (34)	0.6 (4)	3.6 (24)	3.2 (22)	0.4 (3)	1.7 (11)	–	0.2 (1)	–	–

Note: 1. Number inside () is a component ratio (%)

2. Special crops include blueberry, Korean raspberry, and painted maple sap, and fruits include apple and apricot

Table 6. Income Composition

(Unit: Farming Family, 10,000 Won)

Division	Number of Farming Families (a)	Average by Farming Family (b)/(a)	Total (b)	Schisandra	Schisandra Seedling	Fruits	Special Crops	Permanent Forest Work	Pension	Regular Crop	Other
Total	48	3,603	172,956 (100)	71,789 (42)	2,730 (2)	24,200 (14)	23,400 (14)	15,300 (9)	13,308 (8)	7,975 (5)	14,254 (8)
Age	40 s	3	5,667	17,000 (100)	10,000 (59)	–	4,000 (24)	–	–	–	3,000 (18)
	50 s	13	4,628	60,165 (100)	18,425 (31)	30 (–)	6,700 (11)	12,500 (21)	13,500 (22)	360 (1)	1,250 (2)
	60 s	13	4,310	56,033 (100)	22,049 (39)	2,700 (5)	11,500 (21)	9,100 (16)	1,800 (3)	3,924 (7)	2,500 (4)
	70 s or Older	19	2,093	39,758 (100)	21,315 (54)	–	2,000 (5)	1,800 (5)	–	9,024 (23)	4,225 (11)
	70 s or Older	19	2,093	39,758 (100)	21,315 (54)	–	2,000 (5)	1,800 (5)	–	9,024 (23)	4,225 (11)
Scale of Cultivation of Schisandra	Less than 0.5 ha	27	2,503	67,568 (100)	16,639 (25)	100 (–)	9,500 (14)	8,900 (13)	10,800 (16)	10,740 (16)	5,675 (8)
	0.5–1.0 ha	12	4,119	49,428 (100)	18,200 (37)	30 (–)	14,700 (30)	6,000 (12)	4,500 (9)	1,608 (3)	150 (–)
	1.0–1.5 ha	8	5,964	47,710 (100)	29,200 (61)	2,600 (5)	–	8,000 (17)	–	960 (2)	2,150 (5)
	1.5 ha or Larger	1	8,250	8,250 (100)	7,750 (94)	–	–	500 (6)	–	–	–

Note: 1. Number inside () is a component ratio (%)

2. Special Crop includes ginseng, blueberry, and mushroom, Regular Crop includes hot pepper, rice, and vegetables, and Other includes forest trees, self-employment, temporary forest work, permanent forest work, remittance, rent, and so forth

3. Other indicates forest trees and the sales amount was 37 million won (2 persons)

Table 7. Major Income Source for the Household Economy

(Unit: Farming Family)

Division	Total	Schisandra	Fruit Growing	Pension	Agriculture	Ginseng	Self-Employment	Temporary Forest Work	Permanent Forest Work
Total	48 (100)	24 (50)	9 (19)	7 (15)	3 (6)	2 (4)	1 (2)	1 (2)	1 (2)
Age	40 s	3 (100)	2 (67)	1 (33)	–	–	–	–	–
	50 s	13 (100)	7 (54)	1 (8)	1 (8)	–	1 (8)	1 (8)	1 (8)
	60 s	13 (100)	3 (23)	5 (38)	2 (15)	1 (8)	2 (15)	–	–
	70 s or Older	19 (100)	12 (63)	2 (11)	4 (21)	1 (5)	–	–	–
Scale of Cultivation of Schisandra	Less than 0.5 ha	27 (100)	11 (41)	4 (15)	7 (26)	3 (11)	–	1 (4)	1 (4)
	0.5–1.0 ha	12 (100)	7 (58)	4 (33)	–	–	–	–	1 (8)
	1.0–1.5 ha	8 (100)	5 (63)	1 (13)	–	–	2 (25)	–	–
	1.5 ha or Larger	1 (100)	1 (100)	–	–	–	–	–	–

Note: Number inside () is a component ratio (%)

Table 8. Schisandra Production Cost

(Unit: 10,000 won)

Division	Input Cost in the Beginning of Cultivation				Input Cost Provided by Farmer (2014)					
	Average by Farming Family	Total	Self-funded	Government-funded	Average by Farming Family	Total	Labor Cost	Fertilizer	Rent	Chemicals
Total (48)	1,591	76,387 (100)	43,569 (57)	32,818 (43)	255	12,252 (100)	4,912 (40)	3,846 (31)	1,870 (15)	1,624 (13)
Age	40s (3)	2,760	8,280 (100)	4,717 (57)	3,563 (43)	646	1,939 (100)	800 (41)	719 (37)	90 (5)
	50s (13)	2,109	27,417 (100)	16,757 (61)	10,660 (39)	234	3,043 (100)	1,268 (42)	782 (26)	564 (19)
	60s (13)	1,634	21,240 (100)	12,350 (58)	8,890 (42)	318	4,140 (100)	1,589 (38)	1,229 (30)	892 (22)
	70 s or Older (19)	1,024	19,450 (100)	9,7455 (50)	9,705 (50)	165	3,130 (100)	1,255 (40)	1,116 (36)	324 (10)
Scale of Cultivation of Schisandra	Less than 0.5 ha (27)	809	21,849 (100)	10,779 (49)	11,070 (51)	157	4,251 (100)	1,620 (38)	1,275 (30)	826 (19)
	0.5–1.0 ha (12)	1,541	18,491 (100)	11,901 (64)	6,590 (36)	285	3,425 (100)	1,138 (33)	1,235 (36)	522 (15)
	1.0–1.5 ha (8)	3,168	25,347 (100)	14,269 (56)	11,078 (44)	449	3,595 (100)	1,354 (38)	1,305 (36)	522 (15)
	1.5 ha or Larger (1)	10,700	10,700 (100)	6,620 (62)	4,080 (38)	981	981 (100)	800 (82)	31 (3)	–

Note: Number inside () is a component ratio (%)

Schisandra Production and Sales Status

Schisandra production requires financial input in the beginning of cultivation and during the year of production. First, as the cost in the beginning of cultivation can be divided into self-funded and government-funded costs, the commencement costs of cultivation by farm were 15.91 million won, self-funded by up to 57% and government-funded by up to 43%. Older farmers appeared to spend less financial input, and it was 27.6 million won for farmers in their 40s, whereas 10.24 million won was spent by farmers in their 70s, approximately 2.5 times less than that of farmers in their 40s. By the scale of cultivation, more was put into larger land areas, and 8.09 million won was put into land areas smaller than 0.5 ha, and 107 million won into 1.5 ha or larger land areas, approximately 13 times that put into land areas smaller than 0.5 ha and approximately six-fold the farm average, 15.91 million won. The self-funded cost for the cultivation year as of 2014 was 2.55 million won per farm and it comprised of labor costs (40%), fertilizers (31%), rent (15%), and so forth. The input was smaller for older farmers, and it was 6.46 million won for farmers in their 40s and 1.65 million won for farmers in their 70s, which was approximately 35% lower than the farm average of 2.55 million won. By scale of cultivation, the input was larger for greater scale, and it was 1.57 million won for land areas smaller than 0.5 ha and 9.81 million won for 1.5 ha or larger land areas, approximately 6 times larger than that for land smaller than 0.5 ha and approximately 38% lower than the farm average of 2.55 million won (Table 8).

Schisandra was sold at a price of 7,000 – 15,000 won/

kg, 12,000 won/kg on average. It was sold at wholesale by 96% and retail by 4%. However, 4,449 million worth of schisandra was either disposed of or could not be processed into syrup and sold due to a lack of manpower and poor sales after harvest, and this amounted to 6.2% of the entire sales amount (Table 9).

Respondents answered that the main difficulties in producing schisandra were the manpower required for cultivation and harvest, either provided by themselves or hired. Especially, as the harvest and sales take place simultaneously during the harvest season, there were cases where farmers partly gave up harvesting due to a lack of manpower, and cases where the marketability of the harvested schisandra declined due to neglect. In terms of difficulties in selling, the respondents cited the fall of the schisandra price and the decrease of income due to the nationwide expansion of cultivation areas, and no selling of fresh fruit and syrup due to a lack of a market.

For demand, respondents mentioned the purchase of schisandra of local government for the stabilization of the selling price and the increase in incomes, opening of markets through connections with pharmaceutical companies and food companies capable of mass selling, the expansion of public relations for Jangsu-gun schisandra, the expansion of processing facilities (syrup, dry schisandra, other processed goods, etc.), the installation of an auction market and a union market, the installation of washers, and the development of packing box design. While schisandra is usually sold as a fresh fruit, unsold schisandra is processed into a syrup by adding an equal amount of sugar for further sales. However, the syrup is

Table 9. Schisandra Sales Price and Method

(Unit: 10,000 won)

	Division	Total	Retail	Wholesale	Experience	Remarks
	Total	71,789 (100)	68,905 (96)	2,684 (4)	200 (-)	4,449
Age	40 s	10,000	10,000 (100)	-	-	-
	50 s	18,425 (100)	16,775 (91)	1,550 (8)	100 (1)	1,200
	60 s	22,049 (100)	21,949 (100)	-	100 (-)	-
	70 s or Older	21,315 (100)	20,181 (95)	1,134 (5)	-	3,249
Scale of Cultivation of Schisandra	Less than 0.5 ha	16,639 (100)	16,239 (98)	300 (2)	100 (-)	810
	0.5–1.0 ha	18,200 (100)	17,366 (95)	834 (5)	-	1,068
	1.0–1.5 ha	29,200 (100)	29,100 (100)	-	100 (-)	2,571
	1.5 ha or Larger	7,750 (100)	6,200 (80)	1,550 (20)	-	-

Note: 1. Number inside () is a component ratio (%)

2. The figures under the Total column do not include the amount indicated under the Remarks column

3. The figures under the Remarks column indicate the amount of schisandra that was not harvested due to a lack of manpower, discarded after harvest due to poor sales, or not sold after being processed into syrup at a ratio of 12,000 won/kg

sold in small amounts, not in large amounts, and does not provide farmers with large profits at once, as fresh fruit would. Additionally, the taste of syrup varies depending on who made it, as farmers apply different ratios for mixing schisandra and sugar, and most farmers are not satisfying certain conditions for permission in order to produce syrup. Only a few farmers are producing dried schisandra in small amounts, as the drying process is quite cumbersome and they tend to lack the facilities and spaces to perform it.

CONCLUSION

The average gross income of 48 families cultivating schisandra was 36 million won, and schisandra accounted for 42% of the gross income of all households. For major income sources for the household economy, 24 out of 48 farming families said they depend on schisandra, and 17 out of 48 planned on expanding the scale of cultivation for schisandra. Schisandra was sold at 7,000–15,000 won/kg, 12,000 won on average, and sold at wholesale by 96% and retail by 4%. However, 4.449 million worth of schisandra was either disposed of or could not be processed into syrup and sold due to a lack of manpower and poor sales after harvest, amounting to 6.2% of the entire sales amount. Respondents cited a lack of manpower, either provided by themselves or hired, required for cultivation and harvest as the primary difficulty in producing schisandra, the decrease in income due to the fall of the schisandra price, and fresh fruit and syrup remaining unsold due to a lack of distributors, as main difficulties in selling. Respondents' wish lists included the purchase of schisandra of the local government for the stabilization of the selling price and the increase of incomes, the opening of markets through connections with pharmaceutical companies and food companies capable of mass selling, the expansion of public relations, the expansion of processing facilities, the installation of the auction market and the union market, the installation of washers, and the development of packing box design. However, the result of the investigation shows that the lower the age, the higher the average gross income of household. The average gross income of 56,670 thousand won of the households who are in their 40s is way higher in comparison with 36,030 thousand won of the whole classes. The schisandra ratio in household income was 59% in 40s, indicating higher than the average 42%. This represents the highest ratio compared with other classes. For the cultivation scale of schisandra, it was found out that the larger land areas represented higher household average gross income: farms with 1.5 ha or greater and farms with 1.0–1.5 ha were 94% and 61% of schisandra income, respectively. Therefore, the lower age and the greater cultivation scales of schisandra had the greater household incomes, and the ratio of schisandra in household income was high as well.

As a result, it is necessary to support households focusing on 40s and farms with the cultivation scale of 1.5 ha or greater for income increase of household and local economic development from now on.

Therefore, the following plans should be devised to stabilize schisandra production and increase the income of farming families in Jangsu-gun.

1. Although there are the Schisandra Farming Association Corporation, Schisandra Federation, and the Forestry Association in Jangsu-gun, these schisandra related organizations need to become unified in order to develop the schisandra of Jangsu-gun into a specialty of the region. It is deemed that doing so would stably secure the output and price of schisandra, enhance the public relations effect, and expand sales due to the joint development of demand and joint brand sales, and enable efficient support and the execution of a budget.
2. Particularly, the Forestry Association is cultivating schisandra for the profit of its members, but it can cause damage to smaller schisandra related organizations and farming families due to competition, considering the central government's financial support and capacity to mobilize financial resources; the local government needs to play a mediator's role in the unification of schisandra related organizations.
3. For Jangsu-gun's schisandra to prove its brand value on a national scale and become a stable income source for farming families, it is deemed necessary that the local government purchase a fixed amount of schisandra from farming families having difficulties selling the crop, to secure an appropriate cultivation scale for Jangsu-gun schisandra and a continuous production rate.
4. For schisandra of Jangsu-gun, using the Geographical Indication System of the Korea Forest Service is deemed necessary, considering the characteristics of the region, such as its being the first place in Korea that succeeded in the artificial cultivation of schisandra and the place that distributed schisandra nationwide. This will lead to market dominance and sales expansion through the early establishment of the brand.
5. The local government, as well as farming families, shall intensify their public relations efforts by expanding the urban-rural exchange and through the connection with local festivals in order to expand the sales of schisandra.
6. Lastly, many fresh fruits of schisandra are not harvested or remain unsold due to a lack of manpower and market, while price drops are expected due to overproduction following the nationwide spread of the production of schisandra, which had been produced only in a few locations. Therefore, developing processing and commercializing technology is deemed to be a solution for using unsold and abandoned schisandra and for achieving high added value.

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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