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Chapter 9

Current Status of and Problems with the Forest Inheritance Tax in Japan

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Abstract

The number of aged forest owners is increasing as Japanese society ages and the number of inheritances involving forest is increasing. The current forest inheritance policies, including the inheritance tax, were introduced after World War II and the entire inheritance system urgently needs improving. Although tax-reduction policies have decreased the forest inheritance tax, private forest owners are facing a greatly decreased domestic timber market and low stumpage prices. The number of non-resident and non-farmer forest owners is increasing, and the traditional farm family-based forestry system is facing a crisis. As the population of Japan decreases, especially in rural areas, the forest inheritance tax must be reconsidered so that non-resident and non-farmer forest owners who have little knowledge of forest management will sell their forests to new owners who are interested in forest management, such as current resident forest owners and forestry companies. Although the 2014 measure that postpones payment of the forest inheritance tax is an important way to support sustainable forest management, especially by large-scale forest owners, the targeted individuals who obtain the advantage must be reconsidered.

Keywords: family-based forestry, small-scale forestry, non-resident forest owners, non-farmer forest owner, aged forest owner, depopulation, tax reduction, postponement of tax payment, stumpage price, Glaser formula, forest management plan

1. Introduction

Two-thirds of all land in Japan is covered by forests and is classified by ownership. As of March 31, 2012, 7.7 million ha (30.6% of total forest) constituted the national forest, 2.9 million ha (11.6%) were public forest (owned mainly by prefectural and municipal governments), and 14.4 million ha (57.6%) were private forest (Forestry Agency [1]). Private forest

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includes many types of ownership, but the highest proportion is owned by individual private foresters (hereinafter, called "forest owners" or "private forest owners"), many of whom were small-scale farmers in the past. A total of 1,018,752 people are forest owners with a total forested area of 5.7 million ha.[1] The forested areas owned by individual forest owners in Japan are generally small, as approximately 761,086 of the 1,018,752 owners have <5 ha of forest.[2] Almost all forest land owned by private forest owners was obtained by inheritance from family members, until now.

Japan has one of the most rapidly aging societies in the world, and 26.6% of the population was >65 years of age in 2015, more than any European country. In mountainous regions, in particular, depopulation and aging have progressed simultaneously. In about 44.4% of forest households, householders were ≥65 years old in 2000 [2]. Therefore, the proportion of households of which the householder is ≥75 years old is increasing. Forest inheritance will increase under these conditions and there will likely be problems related to forest inheritance in the near future.

Since the national land survey has not been completed, the number of forested areas for which the correct boundaries are not known is increasing, as many owners do not know the specific boundaries of their forested areas. Forest owners were more aware of their boundaries in the 1950s when fuelwood was consumed for heat. This relationship between the forest and forest owner weakened when fuelwood consumption decreased. In addition, as a result of depopulation and aging, some hamlets have disappeared [3]. In such districts, the new owners who inherited forested land were non-residents and were likely to abandon any forest management activities.

An inheritance tax is due when any property, including forest, is inherited. However, the inheritance tax and annual fixed property tax became a burden to private forest owners once they were no longer gaining additional economic benefits from the forest. The economic importance of broad-leaved trees decreased drastically when fuelwood was no longer consumed, and stumpage prices for coniferous plantation forests, such as *Cryptomeria japonica* and *Chamaecyparis obtusa*, decreased greatly. This became a problem because owners cannot afford the costs of planting and weeding after cutting when the stumpage price is low, and they cannot harvest the coniferous trees.

The problems of forest inheritance are complex and are related to various conditions and problems surrounding Japanese forestry. In this chapter, the problems related to forest inheritance in the current and near future are revealed from the perspective of the inheritance tax system. Section 2 presents the research methodology. A general explanation of the Japanese and forest inheritance tax systems is described in Section 3. In addition, three current problems are discussed: preferential treatments to reduce the forest inheritance tax, the relationship between the forest inheritance tax and the forest planning system, and the

[1] Ministry of Agriculture, Forestry, and Fisheries, the 2000 World Census of Agriculture and Forestry (in Japanese)

[2] In the 1990 World Census of Agriculture and Forestry, the minimum holding size of the surveyed forest owners was 0.1 ha, and 1,452,225 forest owners owned forest land from 0.1 ha to 1 ha.

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relationship between the forest inheritance tax and forest holding size. Finally, in Section 4, conclusions are reached and future research topics are proposed.

2. Methods

This research included a literature survey and analysis based on government statistics, predominantly from three sources.

The first data source was the National Tax Agency Annual Statistics Report,[3] in particular the national total number of ancestors and value of forest land properties from a breakdown table of inherited property by type. Although this data provided information on the ancestors, it was difficult to obtain data on inheritors. The value of timber was based on the price of standing timber at the standard cutting age, which is published almost annually in the form of a circular notice on legal interpretation from the Director General of the National Tax Agency to the heads of regional taxation bureaus. For example, in Yoshino, the calculation was based on the Yoshino forestry area of Nara prefecture under the authority of the Osaka Regional Tax Bureau.

The second source of data was the Census of Agriculture and Forestry, which included basic statistics related to forest owners, although the data were not always continuous due, for example, to national budget cuts. The minimum holding size of forest land included in the survey was 0.1 and 1 ha in the 1990 and 2000 censuses, respectively. Moreover, since 2005, the survey interval changed from 10 to 5 years, and the survey method changed completely. To account for these differences, only forest owners with ≥1 ha were considered in this study.

Finally, the third source of data was Housing and Land Statistics. The Statistics Bureau of Ministry of Internal Affairs and Communications collect this data every 5 years. Although the main objective of these statistics is to survey the housing situation, survey items related to land owned by each household were added in the 1998 survey. There are two surveys: survey A was completed by approximately 3 million householders and survey B was completed by 0.5 million householders. For the first time in the 2013 survey, survey A included a survey item on ownership of land other than current residence, including farmland and forest land.

In this chapter, examples of tax calculations for forest owners were not included, in part because the inheritance tax is estimated for all inheritance properties including forest and it is difficult to show a separate calculation for forests. Usui and Hayashi [4] noted that the contents of inheritance properties differ, and the value of the inheritance tax for forest and the burden it places on the inheritor may differ. Furthermore, it is generally difficult to determine all inheritance property based on on-site surveys.

[3]Tax statistics are available at https://www.nta.go.jp/foreign_language/tax_statics/index.htm. This statistic is published in both Japanese and English.

3. Status of forest inheritance tax

3.1. Inheritance tax

All inheritors must pay an inheritance tax, which is applied to all inherited properties, including forests. The amount charged is the exempted amount subtracted from the total value of the property. The current exemption is 30 million yen plus 6 million yen per inheritor. The tax rate is determined by the classification of the chargeable amount. A progressive taxation system is used, and the current rate is 10–55%. In 2015, the exemption was reduced from 50 to 30 million yen and the exemption per person was reduced from 10 to 6 million yen, resulting in a decrease in the minimum value for inheritance tax. In addition, the tax rate classification table was changed in 2015, and the maximum taxation rate was raised from 50 to 55%. The current tax rate table is shown in **Table 1**. The maximum tax rate decreased from 75 to 70% in 1988, and from 70 to 50% in 2003. In 2015, the maximum rate increased to 55%.[4]

3.2. Forest inheritance tax

The major taxes related to private forest owners include inheritance tax, which is a national tax, fixed property tax, which is paid as an annual municipal tax, and forest income tax, which is a national sales tax that must be paid by sellers of standing trees.[5]

Forests are evaluated by dividing the area into forested land and standing trees. The forested land evaluation is calculated by multiplying the evaluation of the property tax[6] by a constant number. When forest land is located near an urban area, its value is generally high due to the effect of the housing land price.[7]

Chargeable amount (million yen)	Taxiation Rate (%)
less than 10	10
10 – 30	15
30 – 50	20
50 – 100	30
100 – 200	40
200 – 300	45
300 – 600	50
600 and over	55

Source: National Tax Agency.

Table 1. Tax rate.

[4] In the United States, the maximum rate was 35% in 2011 (Butler [5], p. 374).

[5] There is limited literature related to inheritance tax in Japan in English. Examples include GHQ/SCAP ([6], pp. 64–66), the Forestry Agency [7], and Iwai [8].

[6] The registered area is used to evaluate the annual property tax ([9], p. 145). Generally, in areas where the national land survey has not been completed, the registered area is less than the actual area.

[7] Except for areas restricted to forest practices, forest owners can transfer the land use from forest to other uses, such as housing land.

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The current method to calculate standing trees is as follows [10]. The value of 1- to 39-year-old standing trees is based on the standard reforestation cost, in which the value for a 1-year-old tree is determined by the national tax office, and the value for 2- to 39-year-old trees is calculated as 1.5% the compound interest rate. The value of trees from 40 years old to the standard final cutting age[8] is calculated using the Glaser formula. **Figure 1** shows an example of this calculation based on *C. japonica*, with a standard final cutting age of 60 years.[9] In **Figure 1**, the black line shows the value from 1-year old to the fixed tree age and the red line shows the value from the fixed tree age to the standard final cutting age calculated using the Glaser formula.

In 2004, the compound interest rate was reduced from 2 to 1.5%, the fixed tree age at which the calculation method changed rose from 10 to 39 years, and the standard reforestation cost decreased.[10] **Figure 1** shows examples of the calculations before and after the 2004 amendment. The value of standing trees per ha decreased markedly for all tree ages after these changes.[11]

To calculate the value of trees older than the standard final cutting age, the value of standing trees, from the standard final cutting age to twice the standard final cutting age, is calculated

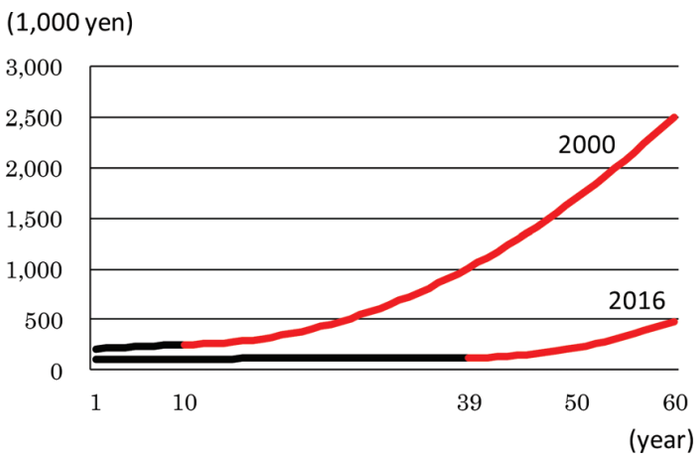

Figure 1. Example of evaluation of standing trees. Note: This is an example calculated using the final cutting age and the value of standing *C. japonica* trees at the final cutting age in the Yoshino forestry area.

[8]The standard final cutting age is determined by the circular notice from the Director General of the National Tax Agency for forestry areas. In the case of *C. japonica*, the standard final cutting age may be 50, 55, or 60 years, while that of *C. obtusa*, may be 60 or 65. In the amendment in 1993, the standard final cutting age was postponed by 5 or 10 years based on actual practices of tree cutting ([11], pp. 18–19). This postponement resulted in a decrease in the standing tree value. In the amendment, the standard distance between the location of trees to the nearest timber yard along forest road was changed. The distance changed from 1.5–2 to 0.3–0.5 km ([11], p. 19), resulting in a decrease in the evaluation of standing trees. Tezuka [12] noted that a distance of about 2 km was the average ca. 1955.

[9]This graph is based on **Figure 2** of Yamamoto [10].

[10]For example, the standard reforestation cost decreased from 210,000 to 103,000 yen for *C. japonica* and from 245,000 to 141,000 yen for *C. obtusa* ([10], p. 38).

[11]The 2004 amendment resulted in an average decrease in value to 50%, and maximum decrease to almost 30% ([10], p. 40). In the example in **Figure 1**, the decreasing rate is greater than the average decrease in the amendment in 2004, because the standard value at the standard final cutting age decreased, as shown in **Figure 2**.

based on a 2% compound interest rate.[12] The value of standing trees over twice the standard final cutting age is estimated based on expert opinions.[13]

The standard value of the standard final cutting age changes based on the actual stumpage price. The example in **Figure 1** is based on the standard value at the standard final cutting age in the Yoshino forestry area of Nara Prefecture, under the jurisdiction of the Osaka Regional Tax Bureau, a representative privately owned traditional forestry area in Japan. The standard value at the standard final cutting age in this area is shown in **Figure 2**. Over the past 20 years, the value has decreased, although this decreasing trend recently stopped.[14]

Table 2 shows the standard values per ha at the standard final cutting age in 1999 and 2016. The standard values decreased in all forestry areas. The value in the Yoshino forestry area, used in the example of **Figure 1**, decreased at a rate of 82.5%, showing the maximum decrease.

As a result of a number of changes, including the standard value of standing trees at the standard final cutting age, the value of standing trees has decreased in recent years.

3.3. Measures to reduce the forest inheritance tax

After evaluating forested land and standing trees, several tax reductions are available. If the forest is specified as a protected forest under the Forest Act (Act No. 249 of 1951), the value of

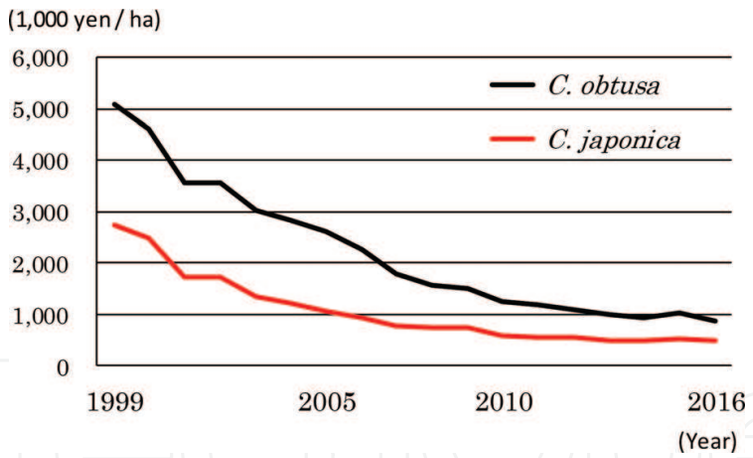

Figure 2. The standard value of standing trees at the standard final cutting age. Source: National Tax Agency. Note: Example in the Yoshino forestry area. As data are lacking for 2002, values for 2002 are the same as those for the previous year.

[12]In the example in **Figure 1**, the standard values per ha at the standard final cutting age, 60 years, in 2001 and 2005 were 2,500,000 and 480,000 yen, respectively. Calculated from the 2% compound interest rate until two times the standard final cutting age, the value of a 120-year-old tree would be 8,203,000 and 1,575,000 yen, respectively.

[13]This rule is based on the circular notice from the Director General of the National Tax Agency.

[14]Some individuals who elected to postpone payment of the forest inheritance tax expressed their opinion on the reduction of the payment related to the decrease in the standing value because both the stumpage price and standard value at the standard final cutting age decreased ([13], p. 128).

(1,000 yen, %)

Prefecture	Forestry area	1999	2016	Change
Miyagi	North part of Miyagi	1,530	560	-63.4
Tochigi	Watarasegawa	1,860	710	-61.8
Tokyo	Tama	1,750	390	-77.7
Shizuoka	Tenryu	1,710	480	-71.9
Fukui	Echizen	2,140	550	-74.3
Nara	Yoshino	2,750	480	-82.5
Shimane	Hiigawa	1,440	470	-67.4
Ehime	Imabari and Matsuyama	1,400	480	-65.7
Fukuoka	Chikugogawa and Yabegawa	1,110	330	-70.3
Kumamoto	Kumagawa	1,020	440	-56.9

Source: National Tax Agency.

Table 2. Standard value at the standard final cutting age of *C. japonica*.

the forest land and standing trees is reduced by 30–80% according to the cutting method allowed (**Table 3**). In forests where cutting activities are completely prohibited, the reduction rate is 80%.

If a forest falls under a forest management plan in the Forest Act, a 5% reduction has been applied to the evaluation values of the forest land and standing trees since 2002.[15]

A 15% reduction is applied to the evaluation value of standing trees. For example, if an inheritor takes possession of a 20-year-old plantation forest and sells the forest when the trees are 50 years old, the forest income tax on 50-year-old trees will be applied. However, because the forest was inherited, ancestor(s) owned from the planting year until they were 20 years old. Thus, the 15% reduction rule[16] was introduced for standing trees across the board to cancel out future income tax related to the first 20 years of ownership by ancestor(s).

Category	**Rate (%)**
Clear cutting	30
Selective cutting	50
Single tree selective cutting	70
Cutting is prohibited	80

Table 3. Value reduction rate of protected forests.

[15]The forest management plan in the Forest Act changed in the fiscal year of 2012. In the former system, the total area under the forest management plan was generally high, for example, around 75% in 1997. However, the percentage of forest under the new forest management plan decreased. Correspondingly, the area of forest eligible for the 5% reduction rule decreased.

[16]The rule was introduced to the Inheritance Tax Act (Act No. 73 of 1950) in the amendment of 1954 ([12], p. 3).

3.4. Number of ancestors and evaluation value of forest property

Table 4 summarizes the land characteristics of all properties in 2014. In 2014, there were 56,329 ancestors, and 93% (52,327) of ancestors had land property. The inheritance tax is necessary in cases when the total evaluation of properties exceeds the value of several exemptions. However, the inheritance tax tends to be applicable when there is land included as property.

Of the 52,327 ancestors with land property, 51,513 cases included housing land, meaning that in most cases, including forest land, the land property included housing land. This is in agreement with the results of the 2013 Housing and Land Statistics conducted by the Statistics Bureau of the Ministry of Internal Affairs and Communications, which estimated that 2,673,000 households owned forest land, of which 2,569,400 households (96.1%) had their own house. Therefore, only a small percentage of cases included inherited land property that was only forest land.

In total, 20.9% of ancestors had land properties that included forest land. However, these properties only accounted for 1.4% of the total value of properties. The average value of forest land per ancestor was 6.8 million yen, much less than the values of housing land, farmland, and rice fields.

Figure 3 shows the number of ancestors with property that included forested land and the value of forest land per ancestor from 1988 to 2014.

About 10,000 inheritances that included forested land were required to pay inheritance tax. The evaluated value of forest land per inheritance has decreased since 1992. For example, when the value in 1992 is fixed to 100, the value in 2014 is 17.4. The reason for this decrease is the decrease in the value of forest land, since the values of both forest land and housing land have decreased. **Figure 4** shows the number of ancestors and value of housing land. The pattern of the graph is similar to that of forest land, and when the peak value in 1992 is fixed to 100, the value in 2014 is 36.1.

Category	Number of ancestors (number)	Percentage (%)	Value of properties (million yen)	Percentage (%)	Average per ancestor (million yen)
Rice field	11,133	21.3	263,646	5.1	23.7
Farm land	14,358	27.4	593,975	11.5	41.4
Housing land	51,513	98.4	3,781,938	73.5	73.4
Forest land	10,929	20.9	74,034	1.4	6.8
Other land	14,863	28.4	487,309	9.5	32.8
Total	52,327	100.0	5,146,902	100.0	98.4

Source: National Tax Agency Annual Statistics Report.
Note: The total of number of ancestors is the actual number of ancestors. In cases of rice fields and farmland, cultivation rights and perennial tenant rights are included. In the case of housing land, leaseholding is included.

Table 4. Land property in 2014.

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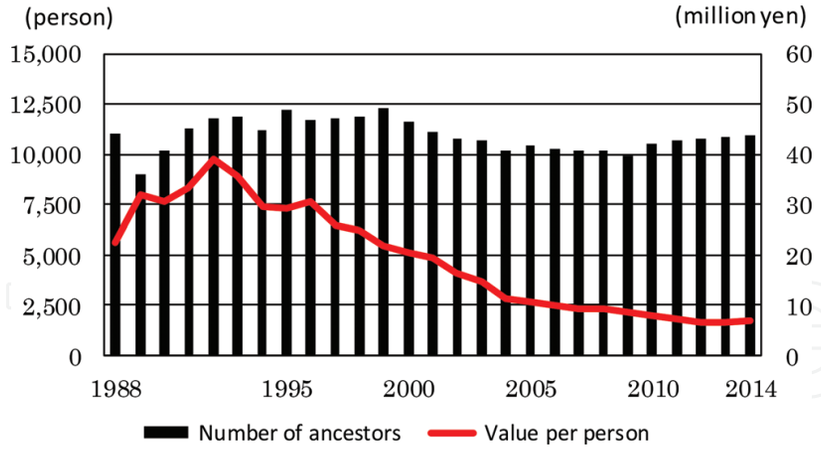

Figure 3. Number of ancestors and value of forest land. Source: National Tax Agency Annual Statistics Report.

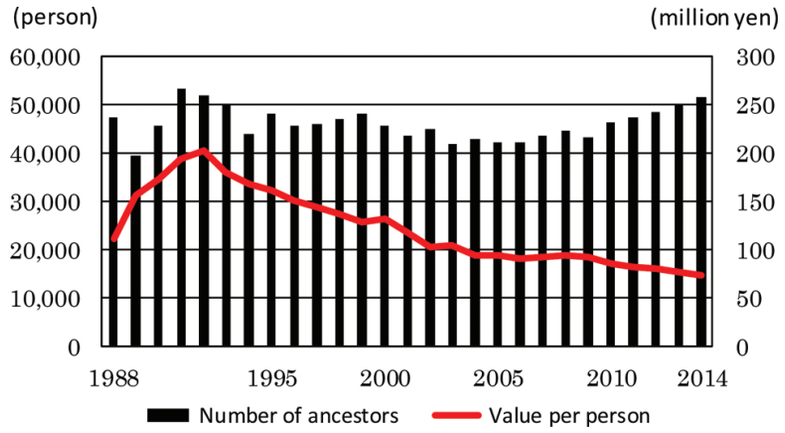

Figure 4. Number of ancestors and value of housing land. Source: National Tax Agency Annual Statistics Report.

Figure 5 shows the number of ancestors and value of the inherited property when only standing trees are considered and forest land is excluded, both of which are decreasing.

3.5. Decrease in the value of forest and stumpage price

The value of forest land per ancestor has decreased since 1992 (**Figure 3**). The value in the peak year (1992) was 39 million yen, which decreased to 6.8 million yen in 2014. The reason for this decrease is a decrease in the standard value at the standard final cutting age due to decreases in both forest land and stumpage prices (**Figure 6**).

The stumpage prices of *C. japonica* and *C. obtusa* peaked in 1980, and have been decreasing since. Setting the stumpage price in 1980 to 100, the stumpage price in 2016 was 12.3 for *C. japonica* and 14.4 for *C. obtusa*. Compared to the stumpage prices in 1960, 7,148 yen and 7,966 yen for *C. japonica* and *C. obtusa*, respectively, the stumpage prices in 2016 were 39.2 and 77.2% of those in 1960, respectively. Since this represents the nominal price, a long-term increase in prices should be considered. Using the Corporate Goods Price Index of 2005 by the Bank of Japan, the index was 50.8 and 105.0 in 1960 and 2011, respectively. Using the Consumer Price Index of 2010 by the

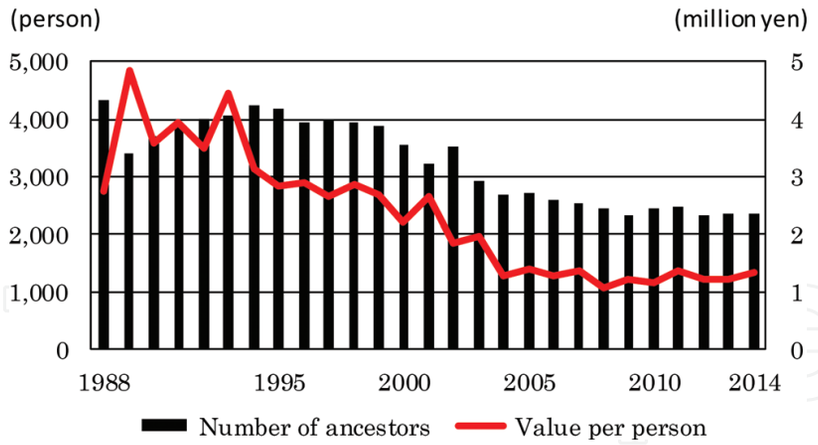

Figure 5. Number of ancestors and value of standing trees. Source: National Tax Agency Annual Statistics Report.

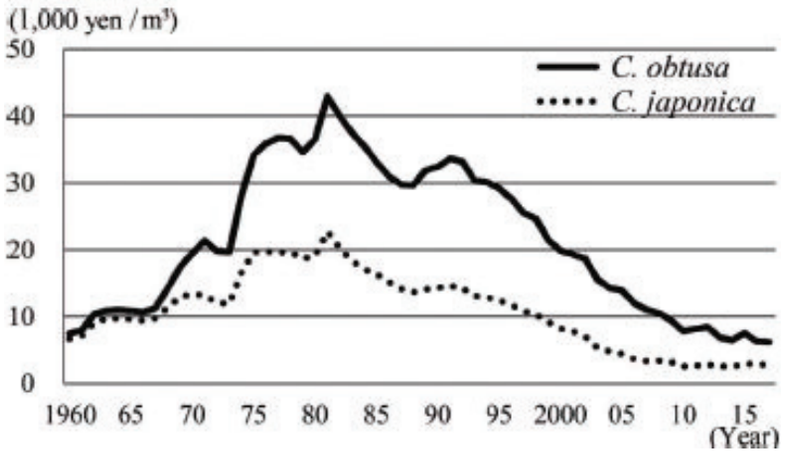

Figure 6. Stumpage price. Source: Forestry Agency, Annual Statistics of Forestry, Annual Statistics of Forest and Forestry; original source is the Japan Real Estate Institute. Note: As of March 31.

Bank of Japan, the index was 19.1 and 99.7 in 1960 and 2011, respectively. In other words, between 1960 and 2011, the Corporate Goods Price Index increased twofold and the Consumer Price Index increased fivefold. Under such long-term increases in the price index, the nominal prices of 2016 were 39.2 and 77.2% of those in 1960, showing a decrease in price.

The large decrease in stumpage price has affected the value of forests during evaluations for inheritance tax. Since the area of inherited forest is not included in the National Tax Agency Annual Statistics Report, further statistical analysis is difficult, and analyses related to on-site surveys is a topic of future research.

Given the large decreases in stumpage price, it is possible that the stumpage price will decrease beyond the break-even point. When forest owners cannot expect any income from cutting after inheritance, the inheritance tax is only a burden to the inheritor. This would create a scenario where there is a probability that some forest owners would cut standing trees to

reduce the standing tree value before their death.[17] Since many plantation forests planted after World War II are now reaching the standard cutting age, and thinning has been promoted by the Forestry Agency, the value of standing trees is increasing. To reduce the burden of the inheritor further, forest owners may sell not only standing trees, but also the forest land. It has been noted that some forest owners, for example, older owners without an inheritor, have stopped managing their forest with the intent of selling their forest land along with standing trees to logging companies;[18] however, it is difficult to determine the statistics behind this trend. It should be mentioned that the reason for such action is not limited to inheritance, as the decrease in stumpage price (**Figure 6**) and decrease in log price have led to decreases in income from timber sales. **Table 5** shows statistical indexes of forest management. Net income (subtracting column (B) from column (A)) has recently decreased. The percentage of tax in

(1,000 yen)

Holding size	Year	Gross income (A)	Cost (B)	(A)-(B)	Tax	Tax / (B)	Tax / (A-B)
Total	2003	2,751	2,235	516	156	7.0	30.2
	2008	1,784	1,681	103	136	8.1	132.0
	2013	2,484	2,371	113	145	6.1	128.3
20 - 50 ha	2003	1,598	953	645	82	8.6	12.7
	2008	1,225	938	287	75	8.0	26.1
	2013	2,773	2,013	760	131	6.5	17.2
50 - 100 ha	2003	2,312	1,748	564	140	8.0	24.8
	2008	1,098	1,191	-93	108	9.1	
	2013	1,742	1,652	90	106	6.4	117.8
100 - 500 ha	2003	3,460	3,108	352	225	7.2	63.9
	2008	3,218	2,959	259	209	7.1	80.7
	2013	3,198	3,309	-111	224	6.8	
500 ha and over	2003	60,253	63,495	-3,242	2,303	3.6	
	2008	30,302	28,131	2,171	2,357	8.4	108.6
	2013	9,346	13,851	-4,505	415	3.0	

Source: Ministry of Agriculture, Forestry and Fisheries, Statistics of Forest Management.[19]
Note: In this case, tax refers to taxes, public dues, various burden charges, etc.

Table 5. Index of forest management.

[17]Sugano and Tani ([14], p. 32) introduced the following management example: a forest owner conducted clear-cutting of 40- to 50-year-old *C. japonica* and *C. obtusa*, and then planted low-value broad-leaved trees. In addition to the value of standing trees, the total value of the inherited properties decreased. As a result, the tax rate (see **Table 1**) decreased. Nagata [15] mentioned a similar problem at the time of the post-war tax reform, in that there was a large imbalance between cases in which the forest owners conducted clear-cutting and cases in which the forest owners maintained the forest without clear-cutting.

[18]Such situations have been mentioned before 2000 (e.g., [16], p. 2).

[19]Statistics Bureau, Ministry of Internal Affairs and Communications, e-Stat, http://www.e-stat.go.jp/SG1/estat/List.do?bid=000001047783&cycode=0 [Accessed: April 18, 2017] (in Japanese)

which forest inheritance tax is not included in the statistics based on the total cost is almost 6–8%; however, the amount of tax currently yields a net income. This management situation is the foundation of the current abandonment of forest management.

4. Discussion

4.1. Preferential treatment for forest inheritance tax

4.1.1. Changes in the background of preferential treatment for the forest inheritance tax

Several forest inheritance taxes have been reduced for forest land and standing trees. As a background, forests were necessary for daily life in the past, and forestry practices and maintenance were conducted mainly by the forest owner, who invested in the forest over the long-term, but with low profitability. However, this background has changed.

4.1.1.1. End of fuelwood use

As a result of the end of fuelwood use, the importance of fuelwood in forest management has decreased. **Figure 7** shows the percentage of fuelwood to the total cutting volume. At the beginning of the 1940s, the percentage was over 60%. After World War II, it decreased in a linear manner, and fell to only 3% in 1972. Because of the end of fuelwood consumption, daily use by forest owners and their family almost disappeared, except for activities such as mushroom production.

During the period when fuelwood consumption decreased, the Forestry Agency strongly promoted the planting of coniferous trees such as *C. japonica* and *C. obtusa*. **Figure 8** shows the area of plantation. In the 1950s and 1960s, the annual plantation area was approximately 300,000 ha, which began to decrease in the 1970s and is currently around 20,000 or 30,000 ha, less than 10% of the peak.

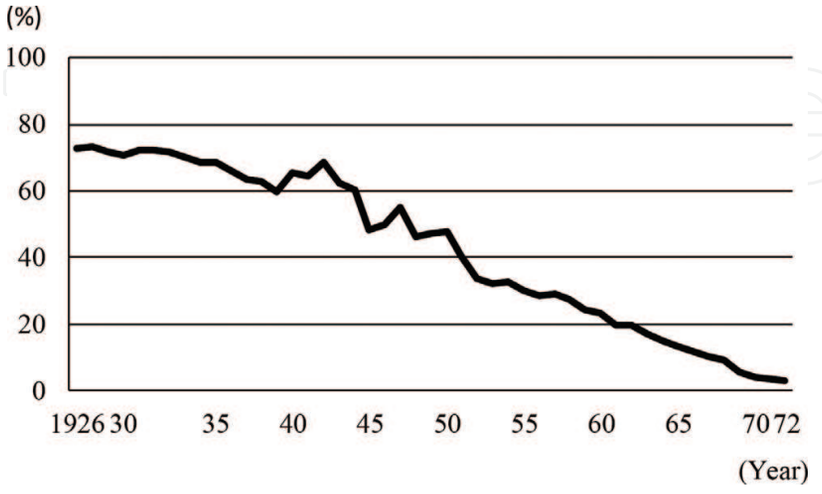

Figure 7. Percentage of fuel wood for the total cutting. Source: Forestry Agency, Division of Research [17], Forestry Agency [18–20].

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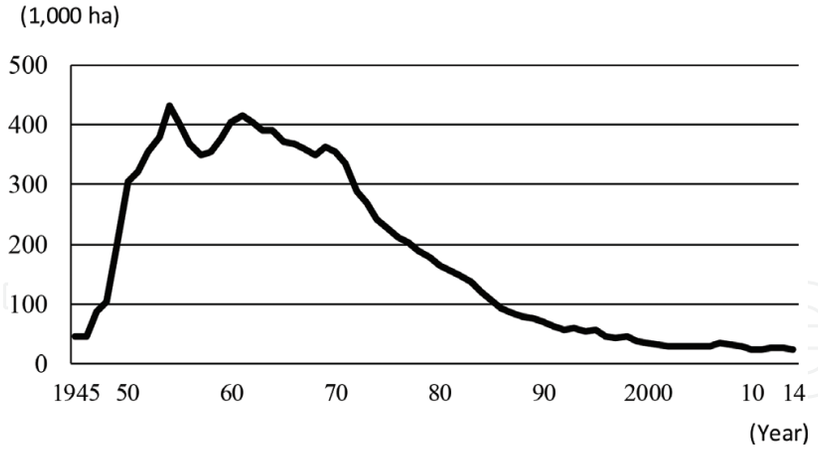

Figure 8. Area of plantation. Source: Forestry Agency, Division of Research [17], Forestry Agency [1, 18–20].

To create coniferous plantations, a large amount of labor was necessary to conduct planting and initial treatment, such as weeding. In the 1950s and 1960s, the peak period of planting, family labor within the forest owner's household and employees of forest owners' cooperatives had large roles in private forestry. The forests planted during that time are now about 50 years old, and require thinning and final cutting, but these activities are conducted by forestry companies or forest owners' cooperatives. Since most forest owners do not have the machinery necessary for such activities, it is difficult for families to conduct cutting activities.

In the past, the relationship between forest land and agriculture was considered as a role of private forest. However, of all forest owners, 58% also owned farmland based on the 2015 Census of Agriculture and Forestry.[20] Meanwhile, based on the 2013 Housing and Land Statistics, 71% of forest owners also owned farmland [21]. Just after the end of World War II, most forest owners were probably farmers, and the percentage of non-farming forest owners has increased. In addition, in the field of farm management, the relationship to forest resources has disappeared.

4.1.1.2. Increase in non-resident forest owners

The spread of depopulation and number of non-resident forest owners is increasing throughout Japan. In the 2000 Census of Agriculture and Forestry, non-resident forest owners accounted for 24.6% of total forest owners. As the number of aged owners is increasing, inheritance appears to be increasing. In some cases, the inheritor does not live in the same municipality as the ancestor. **Table 6** shows the percentage of non-resident forest owners by region, which shows regional differences. In Hokkaido, the northern-most prefecture, the percentage of non-resident forest owners reached 46.1%. In the mountainous areas of north Kanto and Kinki regions, it was ≥40%. Therefore, before discussing daily use or maintenance, it must be stressed that many owners are non-residents.

[20] From the Department of Statistics, Ministry of Agriculture, Forestry and Fisheries. The survey was conducted for forest owners with holding areas ≥1 ha.

(%)

Region	Urban area	Agricultural area			Total
		Flat land	Medium	Moutain	
Hokkaido	46.1	44.7	55.5	55.6	52.6
Tohoku	14.1	17.8	14.4	13.7	14.5
Hokuriku	11.1	13.5	16.3	23.7	17.7
Kanto and Tosan	23.1	19.3	22.5	28.8	24.6
Nort Kanto	24.9	18.3	22.1	45.0	27.9
South Kanto	28.3	22.5	28.0	30.2	27.9
Tokai	30.7	21.6	23.9	32.7	30.4
Kinki	23.3	20.8	21.3	42.9	32.6
Cyugoku	8.6	11.2	12.5	16.4	13.8
Shikoku	20.1	17.1	19.7	29.8	25.9
Kyusyu	12.8	12.2	15.2	21.2	16.6
Total	19.8	25.2	21.5	28.9	24.6

Source: Ministry of Agriculture, Forestry and Fisheries, the 2000 Census of Agriculture and Forestry.

Table 6. The percentage of non-resident forest owners in 2000.

Depopulation and aging have long been a problem in Japan, and there have been a number of discussions regarding the end of hamlets. The Ministry of Land, Infrastructure, Transport and Tourism ([22], p. 12) predicted an increase and decrease in population at a 500-m mesh resolution based on the 2010 Population Census. Comparing the number of meshes between 2010 and the 2050 prediction, 19% of meshes changed from populated areas to unpopulated areas, and 44% of meshes showed a decreasing rate of population of ≥50%. In these areas, the percentage of non-resident forest owners is likely to increase.

4.1.1.3. Forest as property

Since most Japanese private forest owners have small holding areas, forest has an important role as household property. Such areas are too small to conduct planting and periodic cutting to receive a sufficient annual income from forest products to cover the household economy. Thus, the main deciding factor of whether to cut trees is related to the large expenditure, which has long been a characteristic of the Japanese private forest sector. In addition, daily use has disappeared and the number of non-resident forest owners has increased; therefore, the consideration of forest as property is further increasing.

The current situation surrounding private forest is changing. Generally, forest owners do not manage and work in their forest on a daily basis. This is in part because the number of non-resident owners is increasing, and will likely continue to increase in the future with the expansion of unpopulated areas. Moreover, forests are becoming land estates. At the same time, both the stumpage price and value of forest property have decreased. Under these conditions, ongoing tax reductions have the potential to encourage non-resident ownership,

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although it is highly possible that the increasing number of non-resident owners will abandon forest practices.

4.1.2. Final cutting in protected forest

The forest inheritance tax has been reduced and the fixed property tax is exempt in protected forest[21] where the cutting method is determined under the Forest Act. Namely, an inheritor can inherit protected forest with a low inheritance tax rate and hold the forested area without paying any property tax. Approximately 30% of non-national forest is protected.[22]

Under the Japanese protected forest system, forests in which cutting activities are completely prohibited exist in limited areas, while most protected forests can be cut for commercial purposes under some restrictions. However, under the current inheritance and fixed property tax, even if the forest reaches the final cutting age, protected forest owners can simply hold the forest. The government revised the Basic Plan on Forest and Forestry in May 2016, with the main goal of increasing timber production. In 2014, the domestic timber supply was 24 million m^3, which the government plans to increase to 32 million m^3 and 40 million m^3 in 2020 and 2025, respectively. However, under the current tax system, it is possible that cutting activities in private forests, especially under various restriction systems, such as protected forests, will not be realized as estimated.

4.2. Forest inheritance tax and forest planning system

4.2.1. Forest management of large-scale forest owners and forest inheritance problems

Some forest owners who hold large parcels are managing their forests full-time. At times, the inheritance tax has become a considerable burden for such owners. In particular, if a large part of inherited property is forest, the forest may be clear cut to pay the inheritance tax. Since the current stumpage price is generally low, the cutting area may be large. A forest income tax is imposed on the income generated from cutting the trees to pay the inheritance tax, which may be a burden for the inheritor ([23], p. 241).

The final cutting age for *C. japonica* is around 50 years, but actual cutting tends to occur at older ages.[23] To avoid clear-cutting at the scheduled cutting age, some forest owners have performed repeated thinning after the standard final cutting age. In these cases, inheritance may occur

[21]Here, protected forest refers to *Hoanrin* designated as Article 25 of the Forest Act (Act No. 249 of 1951), which exists in both national and non-national forests. In practice, protected forests provide another system applied only to national forests, where commercial purposes cannot be pursued.

[22]There were 5,224,000 ha of non-national protected forest at the end of the fiscal year of 2014. The total area of non-national forest was 17,407,000 ha at the end of the fiscal year of 2011.

[23]Takagi [13] noted that the average number of years of constituting a generation change is approximately 30 years. Therefore, a cutting rotation of 60 years is equal to two generations. At least 100 years or 150 years is needed produce large high-quality logs for use in temples, etc., meaning that forest owners must pay the inheritance tax three to five times.

more than once between planting and final cutting.[24] Therefore, the burden of the inheritance tax can influence scheduled forest practices.

To illustrate the effects of this, the following section describes the opinions of forest owners, including opinions on the inheritance tax, based on the results of the opinion survey on forestry management[25] conducted by the Forestry Agency in the fiscal year of 2009. **Figure 9** shows the responses to the question on what support or measures are necessary for forestry management to continue in the next generation. The most frequent answer was the stabilization of timber price. This response reflects the long-term decrease in stumpage price (**Figure 6**). Since forest owners cannot pay the costs associated with reforestation under low stumpage prices, the second-most frequent answer was to subsidize the full cost of reforestation. Following these, a reduction in the inheritance and gift tax, development of forest owners' cooperatives and forestry entities, and reduction in fixed property tax were also deemed important. Due to the low stumpage price, it is necessary to decrease management costs, for example, by intensifying forest practices through the development of forest owners' cooperatives, etc. After these three suggestions, improvements related to taxes were selected, because the current inheritance tax has decreased correspondingly, but the decrease in the stumpage price is severe, and it is not practical for forest owners to cut standing trees under such stumpage prices.

Figure 10 shows the percentage of respondents who selected the two tax-related responses, a reduction in inheritance and gift tax and a reduction in fixed property tax, classified by holding area of forest. The frequency of annual fixed property tax was only larger than that of

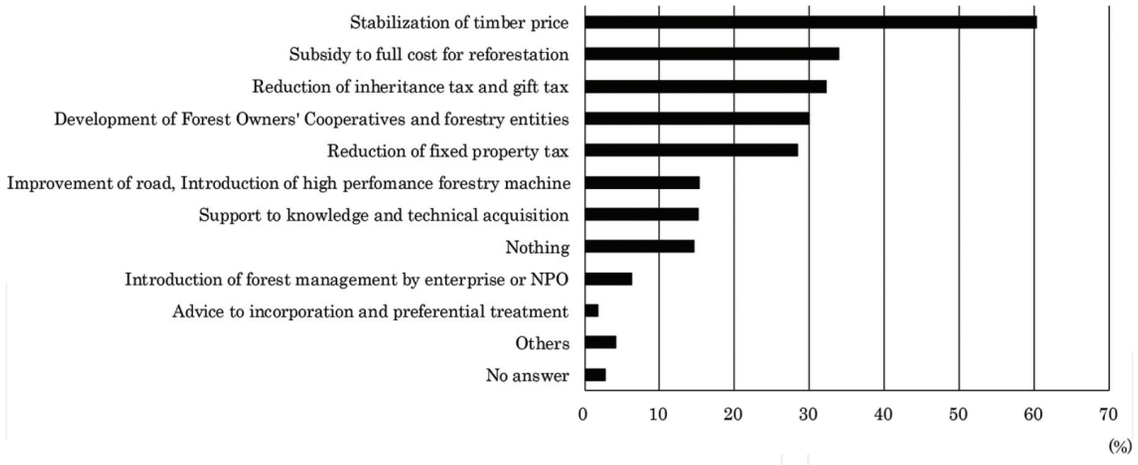

Figure 9. Forest owner opinions on strategies to support forestry management. Source: MAFF ([24], pp. 18–19). Note: Three answers were required.

[24]The basic idea of the Japanese inheritance system is that all inheritance property should be valued and paid at the time of inheritance, thus inheritance may occur more than once before final cutting. In the case of the United Kingdom, the inheritance tax is imposed only once at the time of cutting ([13], pp. 135–136).

[25]The opinion survey was conducted on March and April 2010. The survey was conducted for 1,607 forest owners selected from forest owners surveyed at the 2005 Agriculture and Forestry Census, of which 1,013 completed the survey [24].

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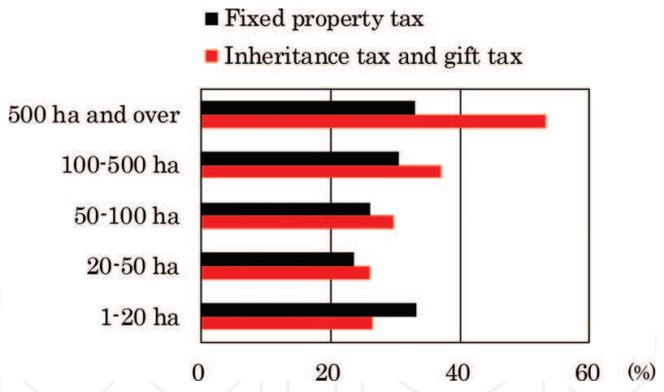

Figure 10. Percentage of forest owners classified by holding size who considered taxes to be an impediment to the continuation of forestry management. Source: MAFF ([24], pp. 18–19).

inheritance tax in the case of owners with <20 ha.[26] Among owners with ≥20 ha, the percentage of respondents who selected inheritance tax was larger, markedly so in the case of ≥500 ha, with 53.1% selecting inheritance tax. These results showed that the importance of inheritance tax increased according to holding size.

Figure 11 shows the same options related to taxes as **Figure 10**, but with the owners classified by management situation from the perspective of annual income. Forest owners with an annual income from timber sales more often considered the inheritance tax and gift tax to be an impediment than the property tax. Only owners holding unmanaged forested land more often selected the fixed property tax as a problem. To summarize these results, there is high demand for a reduction in the inheritance tax and gift tax among large-scale forest owners who sell timber every year.

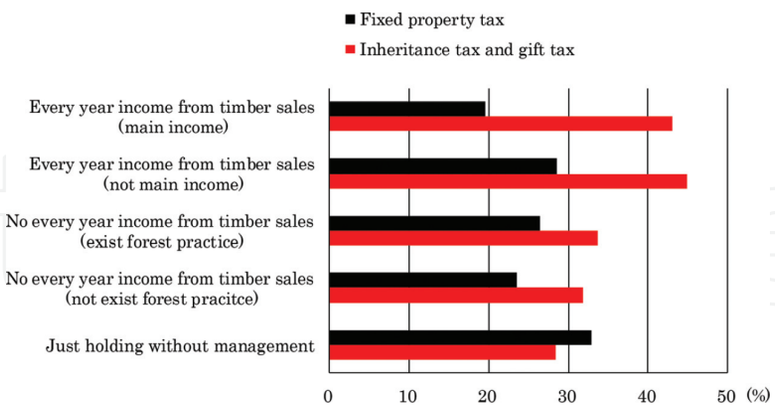

Figure 11. Percentage of forest owners classified by management situation and income who considered taxes to be an impediment to the continuation of forestry management. Source: MAFF ([24], pp. 18–19).

[26] In the case of small-scale owners, owners can obtain income from timber sold at long intervals, and must pay fixed property tax every year ([25], p. 32).

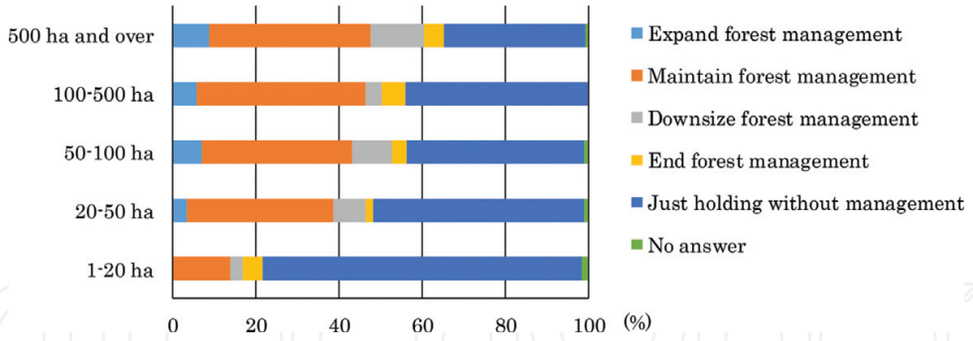

Figure 12. Forest owners intended future forestry management policy. Source: MAFF ([24], p. 11).

Figure 12 shows the results of the responses to the survey question related to future management policy. Among owners with a holding area <20 ha, approximately 80% answered that they plan to hold without management. This same response was selected by 43.9 and 33.9% of owners with holding areas of 100–500 and ≥500, respectively. Meanwhile, there was no clear relationship among owners who responded that they plan to end forestry management by holding size.[27] In addition, 4.6, 5.8, and 4.8% of owners with <20, 100–500, and ≥500 ha, respectively, responded that they plan to expand management. Finally, 35–40% of owners with ≥20 ha responded that they do not plan to make changes.

4.2.2. Postponement of inheritance tax payment by large-scale forest owners

4.2.2.1. New measures on the postponement of payment of inheritance tax in 2014

The government introduced a new system in April 2012 allowing the postponement[28] of the inheritance tax payment[29] under specific conditions for forest owners with ≥100 ha. The basic conditions are as follows.

For forest land, the forest management plan made by the ancestor must be certified. In addition, forest practices and the investment to forest road network must be conducted or planned for forests to be eligible for postponement, and the total forest area must be ≥100 ha.

[27]Sugano ([26], p. 24) conducted a questionnaire survey on forest inheritance and noted that a number of forest owners, both small- and large-scale, answered that they would dispose of their forest property if inheritance occurred.

[28]A postponement system for the delayed payment of the inheritance tax applied to all forests existed before 2012 when the new postponement for only large-scale forest owners was introduced. The main contents are as follows. The content of the postponement is equal to the payment during less than 15 years with 5.4% interest tax. For standing trees located in a forest under a forest management plan, it is an unequal payment with a reduced rate of 3.6% interest ([9], pp. 102–104). The interest tax was initially 4.8%, but decreased to 4.2% in the fiscal year of 1987, and decreased to 3.6% in the fiscal year of 1990 ([11], pp. 17–18). For forests under a special forest management plan promoting long rotation operation, the limit of the number of years for postponement was extended to 40 years in the fiscal year of 1991 ([11], p. 18).

[29]In this new measure, only inheritance tax payment can be postponed. Gift tax is not included in this new measure, which has already been introduced to farmland ([14], p. 31).

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For standing trees, the age should not have reached the standard age for final cutting, as determined in municipal forest development plans, by a specific year. The specific year is the average remaining lifetime up to 30 years.

The inheritor must inherit all of the ancestor's forest management according to the forest management plan of the ancestor. The inheritor must succeed at completing the ancestor's forest management plan, continue making a forest management plan, and conduct forest practices according to the forest management plan.

The postponement of paying inheritance tax is available until the day of the death of the inheritor for up to 80% of the amount of inheritance tax imposed on forests that satisfy the above conditions. At the time of the death of the inheritor, the total amount of postponed tax is exempted. Since the new postponement has only just been introduced, data on this postponement are not available. However, Sugano and Tani ([14], p. 32) reported that applications for this tax postponement are currently very low.

4.2.2.2. Relationship between the new postponement and forest planning systems

The new postponement system introduced in 2012 has a close relationship with the forest management planning system based on the Forest Act.[30] The current forest management planning system introduced in 2012 focuses on intensive forest management and improvements to forest road networks. When the forest owner makes a forest management plan, the forest owner can receive several benefits, such as a reduction in forest inheritance tax, reduction in forest income tax, subsidy related to reforestation, or low-interest loan on forestry from the Japan Finance Corporation. Although many coniferous plantations planted after World War II now require thinning, if a forest owner wants to conduct thinning as well as construct forest or spur roads, a forest management plan is necessary to obtain a subsidy. Ultimately, forest management plans have a close relationship with government subsidies. There are three types of forest management plans, one of which can be made by sole forest owners holding ≥100 ha of forest.[31] Under the postponement system, a one-person forest management plan is necessary. The two additional conditions related to the forest management plan necessary to obtain a postponement of inheritance tax are that within 10 years after inheritance, the forest owner should expand the management area at least 30%, up to 150 ha, and should expand forest or spur roads to a level determined by the local municipal forest development plan.

In old forests with a dense forest road network, it is not necessary for forest owners to obtain a subsidy related to forest practices; therefore, there is little merit to making a forest management plan. When there are no special benefits to obtaining a subsidy, a forest management plan may constrain forest management. For example, when forest owner wants to conduct

[30] In the case of exceptional measure in France, a forest plan is necessary ([16], p. 4). Based on the act enacted in 1963, forest owners who own ≥25 ha have an obligation to make a simplified forest management plan. When the forest owner follows the contents of the plan over 30 years, three-quarters of the inheritance tax is exempted.

[31] Under the amendment of the Forest Act in 1939, forest owners with ≥50 ha must make a forest plan, and forest owners with <50 ha must join a regional forest owners' cooperative, and the cooperative must have a forest plan. The current system has a common characteristic with the 1939 planning system in that it includes a forest management plan that targets large-scale forest owners with a specific minimum holding size.

final cutting, he/she can contact a logging company without a subsidy. Furthermore, the percentage of forest owners who want to expand forest management is generally low (see **Figure 12**). For example, a forest owner who owns ≥500 ha would have to expand the forest management by 150 ha, which is the upper limit of the conditions related to the postponement, and only a few forest owners have conducted this expansion to postpone the inheritance tax.

Large-scale forest owners often own forest in remote areas, and some investment is necessary to satisfy the forest road network density conditions. In addition, after investing in the forest road network, the value of the land will increase.[32] Regardless, an initial cash reserve is necessary to expand the holding size or increase the forest road network. Given the long-term decrease in stumpage price, the number of large-scale forest owners who want to expand forests and invest in roads is limited.

Because the postponement measure in 2012 is connected with forest management plan, when a forest owner cannot continue the forest management plan or the certification of the forest management plan is canceled, the forest owner must pay the postponed inheritance tax. Typical examples[33] of this include the case that the forest owner cannot accomplish the objectives related to the expansion of forest management area and forest road network density, or the case that the forest owner entrusts all or a part of the forest management to others. Expanding holding forest and forest road networks are straightforward obligations. However, there is another condition as follows: in a year when the forest owner does not conduct any planting, cutting, or road construction, the forest owner must pay the postponed inheritance tax. Generally, forest management does not require forest practices annually; therefore, this condition may be too strong. When the forest owner pays the postponed inheritance tax, he/she must also pay the annual interest tax of 3.6%. Considering the payment of the interest, it may be difficult to apply the postponed tax, except cases where the inheritor decisively shows continuous forest management until death.

One final comment should be made regarding the forest planning system, which has a strong connection with the inheritance tax postponement. The forest management plan is located at the bottom of the forest planning system. First, there is the Basic Plan on Forest and Forestry at the top of the forest planning system, and the current version published on May of 2016 includes the objective of increasing domestic timber production in Japan (see Section 4.1.2). The existence of the objectives of expanding management size and forest road networks in the postponement measures seems to be related to the basic policy direction of domestic timber production. However, the method for continuing forest management differs. In cases where the holding size is large and the forest area is not dispersed, the expansion of forest management area may lead to a decrease in efficiency. In addition, once the forest road network reaches a certain density, further investment may not be necessary. The current forest road volume conditions are based on logging using vehicles. While the majority of logging systems use vehicles, there are some areas where cable logging systems are used. For example, in some steep mountainous areas,

[32] After the construction of forest or spur roads, the value of the standing trees along the road increases. When inheritance occurs just after a road investment, the road investment results in an increase in the inheritance tax ([23], p. 241). This is the reverse case of clear-cutting before inheritance.

[33] Based on the webpage of the National Tax Agency. https://www.nta.go.jp/taxanswer/sozoku/4149.htm [Accessed: April 20, 2017].

there may be an advantage to using cable logging systems. Moreover, in the Yoshino forestry area, helicopter logging is used for high quality logs. Although it may seem logical that a continuous forest management model includes the expansion of management area and forest road networks, the automatic requirement of such expansive conditions in large-scale forest management should be avoided, and should allow for practical alternative measures.

4.2.3. Problems associated with the postponement measures

Some problems are inherent in this new policy. For example, this system applies only to large-scale forest owners with ≥100 ha, and many forest owners whose families manage their forest have <100 ha. Meanwhile, many non-residential forest owners with ≥100 ha have no interest in forest management. Regarding the forest management planning system, only forest owners with ≥100 ha can make forest management plans independently. Accordingly, in both the forest planning system and the postponement system of inheritance tax, the Forestry Agency has used 100 ha as the limit of the desirable holding size.

Therefore, the relevance of using 100 ha as a criterion should be examined. After checking publications by the Forestry Agency, only a small, detailed introduction was found ([27], p. 107). In potential support of the introduction of the postponement of the inheritance tax, 53% of forest owners with ≥500 ha thought that a reduction in the inheritance tax was necessary to support the continuation of forestry management in the next generation (see **Figure 10**). Judging from the results of this question in **Figure 10**, except forest owners with <20 ha, interest in a reduction in the inheritance tax tended to increase with increased holding size. The Forestry Agency [27] explained that the objective of creating the postponement of the inheritance tax was to support a smooth business succession to the main provider and effective and stable forestry management. However, there is no basis for the use of 100 ha as the inclusion criterion. In the questionnaire survey on taxes (**Figure 10**) and future plans (**Figure 12**), the responses of forest owners differed according to holding area, but a clear reason of the use of 100 ha could not be found from these survey results.

4.3. Forest inheritance tax and forest holding size

4.3.1. Small-scale family forest management and inheritance

Before World War II in Japan, inheritance operated under a family system,[34] where the eldest son inherited essentially all family estates. In addition, the inheritance tax at the time was generally

[34]The family system was abolished after World War II, which appears to have had an effect on long-term forest management, although this remains a topic for future research. Regarding the argument related to the inheritance tax, Tezuka [16] proposed the creation of exceptions for the inheritance of forest. It is worth noting that the following rule was included in his proposal. In the case that it was agreed upon among all related persons in an argument of the distribution of forest property that one inheritor inherit all forest property and succession was conducted by this agreement, the forest inheritance tax would be exempted. Although this inheritor is not limited to the first-born person or son in his proposal, in practice, his proposal resembled the family system before World War II. Takagi [13] pointed out that the German inheritance system includes an exemption whereby the tax differs based on the relation between the ancestor and inheritor, and the maximum exemption is given to the partner and children. This exemption system is not a family system, but supports inheritance by family members. In the Japanese system, there is no difference in the potential exemption among inheritors, except for partners.

low ([28], p. 74; [12], p. 2). After World War II, the family system was abolished, and any family member could inherit forest land. In the inheritance system after the war, all children had equal rights to the inherited property, which resulted in the concern that already small farms would become further segmented ([15], p. 92). Under the new inheritance system, forest land may be divided at the time of inheritance.[35] However, actual practices regarding the division of forested land at the time of inheritance are not clear due to a lack of statistical surveys.[36]

In Japan, forest holding sizes are small. In 2015, 829,000 forest owners owned ≥1 ha. **Table 7** shows the breakdown of households by forest holding size.

Based on the 2013 Housing and Land Statistics by Statistics Bureau of the Ministry of Internal Affairs and Communications, 2,673,100 households were estimated to have forest land. However, as shown in **Table 7**, there is a large discrepancy between this estimate and the number of households determined by the Census of Agriculture and Forestry, which included forest

Holding size	Number of forest owners	Percentage (%)
1-5 ha	616,687	74.4
5-10	110,944	13.4
10-20	59,650	7.2
20-30	18,617	2.2
30-50	12,713	1.5
50-100	6,715	0.8
100-500	3,316	0.4
500 ha and over	331	0.0
Total	828,973	100.0

Source: MAFF, the 2015 Census of Agriculture and Forestry.
Note: Surveyed households had ≥1 ha.

Table 7. Number of households classified by holding size (2015).

[35]Regarding forest plots, GHQ/SCAP ([6], p.65) noted that "some will be subdivided into small and inefficient units" unless there are changes to the taxation system. Based on the Forestry Agency [18, 20], which surveyed the state of forest inheritance in 10 regions during 1963 and 1964, farm households who owned a lot of forested land tended to divide the forest land. Farm households who owned less forest land tended to divide the farmland. Moreover, forest land was easier to divide because, in the case of forested land, there was no limit to holding as in the case of farmland. As a result, forest land was easier to segment than farmland during inheritance. Katayama [29] concluded that the only way to avoid segmentation of forest at the time of inheritance was incorporation of a company to hold the forest.

[36]Sadachi [11] noted that the Forestry Agency conducted a survey on inheritance in 1980 and 1988, which found that the number of forest owners almost doubled at inheritance.

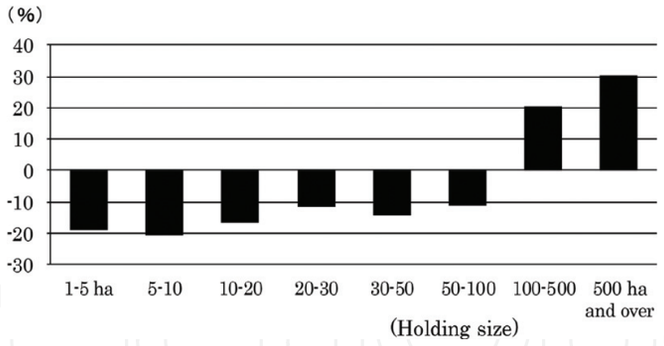

Figure 13. Change in the number of households with forest land between 2000 and 2015 classified by holding size. Source: MAFF, the 2000 and 2015 Census of Agriculture and Forestry. Note: Surveyed households had ≥1 ha.

owners with <1 ha.[37] Between 2000 and 2015, the number of households with forest land decreased by 189,779 (18.6%) (**Figure 13**).

Although there was an overall decrease of 18.6% in the number of households that owned forest land, the number of forest owners with <100 ha decreased, while the number of forest owners with ≥100 ha increased. However, because a smaller number of households had ≥100 ha, this smaller change is expressed as a large percentage. In contrast, approximately 75% of owners had <5 ha of forest land (**Table 7**).

Although there is no current survey on forest inheritance in Japan, the importance of demographics, such as depopulation and aging, is increasing. In the 2000 Census of Agriculture and Forestry, 65- to 69-year olds accounted for the largest proportion of householders who owned both farmland and forest land, but 41.0% of households had no successor for agriculture [2]. The number of aged forest owners with no successor is increasing, which could lead to an increase in inheritances at death. Under the inheritance rule created after World War II, there was some importance on gifting property before death.[38] **Table 8** shows the number of inheritances and gifts before death in the 1960s ([18, 20], p. 18).

In the case of the household successor, 31.0% of households gifted all or a part of the forest property before death. Meanwhile, in 50.5% of cases, the land was gifted before death to someone other than the successor. This shows that, at least at that time, gifting before death had some importance for the inheritance of forest, and ancestors often gifted forest to successors or other family members before death after clear-cutting. The objective was that inheritors

[37]The number of forest owners with 0.1–1 ha was 1,572,000 in the 1960 Census of Agriculture and Forestry. In 1960, there was another publication on the number of forest owners conducted by Forestry Agency [30]. Here, the number of forest owners with <1 ha is 3,033,000. It is possible that the number of forest owners with <0.1 ha was approximately 1.5 million at the time of 1960.

[38]Usui and Hayashi [4], pp. 41–42) surveyed the situation surrounding forest inheritance and classified households based on the corresponding inheritance tax as follows: (1) cutting the old, natural forest, (2) compulsory destructive cutting, (3) selling real estate, (4) borrowing money, (5) planned gift before death, and (6) a combinations of the above five patterns. The best strategy was concluded to be a combination of (1) and (5), emphasizing the role of gift before death. Yamazaki [31] pointed out that there were many cases of tax avoidance by tentative division or gifting of forest before death, concluding that this situation was the forest owners' legitimate resistance to the forest inheritance tax.

Classification	Method how to get forest land	Number of household	Percentage (%)
Successor of household	Gift before death	30	15.0
	Inheritance	130	65.0
	Both	32	16.0
	Nothing	8	4.0
	Total	200	100.0
Ohters	Gift before death	55	50.5
	Inheritance	43	39.4
	Both	11	10.1
	Total	109	100.0

Source: Forestry Agency ([18, 20] p. 18, **Table 3**).
Note: Based on 200 surveyed households.

Table 8. Gifting of forest land before death (1960s).

would not be burdened with paying the forest inheritance tax. The tax rate of the gift tax is higher than that of the inheritance tax; however, immediately after clear-cutting, the value of standing trees is negligible and only the forest land has value, which is generally low, excluding areas near cities. Even at a high gift tax rate, if the value of property is low, the ultimate amount of gift tax is low. When a forest owner conducts clear-cutting in a small area and gifts it to inheritor(s) each year, the forest inheritance tax is greatly reduced. As shown in **Table 8**, someone other than the successor received forest land in 109 (54.5%) of the surveyed households, indicative of segmentalization.

In households with both farmland and forest land, it may be possible to use both gifts before death and inheritance after death to transfer land to a successor. For example, old coniferous trees can be cut and gifted before death, while low-value broad-leaved trees are left and inherited at death to reduce the total tax. In addition to benefits to the inheritor, there is another explanation of why clear-cutting was common at that time. In the 1950s, the market share of domestic logs was high, and forest owners could sell their trees and receive income at almost any time. Therefore, both conditions, the existence of an inheritor and income from clear-cutting, were satisfied.

However, since 41% of households who owned farm and forest land in 2000 had no inheritor, many ancestors could not gift their forest before death.[39] Moreover, because of the low stumpage price, it was sometimes difficult to pay for reforestation after clear-cutting. In addition, in some areas, the deer population has increased markedly, resulting in the necessity to invest in

[39] Attention must be paid to the difference between inheritor and successor of agriculture and forestry. Forestry Agency [18, 20] showed this point already by the on-site survey in Nagano Prefecture in the 1960s. Here, the case that children was only one son, was introduced, and whether he will succeed agriculture and forestry or not was serious interest for parents. Recently, the number of children is decreasing in Japan, this is also related to the problems of successors of agriculture and forestry.

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protection against damage by deer. Without effective countermeasures for such damage, it is difficult to conduct clear-cutting and reforestation of coniferous trees such as *C. japonica* or *C. obtusa*, even in very small areas. Currently, the benefits of conducting clear-cutting to decrease the value of standing trees and gifting to successors before death seems to have decreased, especially for small-scale owners. Future research should clarify the current state of inheritance using on-site surveys.

4.3.2. Forest management intensification

One of the current main forestry policies by the Forestry Agency is cost reduction in forestry production. Concurrently, the Forestry Agency has been promoting expansion of forest management planning area, and an important objective of this policy is reducing associated costs. Article 12 of the Basic Forestry Act (Act No. 161 of 1964) determined that the expansion of forestry management was necessary for small-scale forestry. The introduction of the forest management planning system in 2012 was also related to the expansion of forest management and cost reduction; however, increases in area with forest management plans have stagnated. Although detailed figures have not been published, the Basic Forest and Forestry Plan stated in May 2016 that 28% of forests were covered by forest management plan ([32], p. 4). The reason for the lack of expansion of the area under forest management plans was not clarified due to a lack of data; however, one reason seems to be that forest management planning is closely connected to the subsidy system. This close connection is useful for forest owners who want to obtain a subsidy to conduct forest practices. For forest owners' cooperatives, such a system is beneficial, because owners in such cooperatives can work together to make and execute a plan. However, among forest owners who do not want to conduct thinning or construct forest roads, the current forest management planning system may not be attractive. Future analyses should clarify the reasons for the low percentage of planning area.

Within the scope of this study, only one relationship between aging and inheritance is discussed. Considering the relationship between householder age and the percentage of households who sold timber in the previous year based on the 2000 Census of Agriculture and Forestry, 60- to 64-year olds showed the peak percentage (5.3%). Meanwhile, 3.3 and 3.7 of 80- to 84-year olds and ≥85-year olds, respectively, sold timber in the previous year [2]. Although the current situation is unknown, because the last available data are from 2000, this trend appears to be related to the current decrease in willingness to sell timber, especially among >80-year-old forest owners. **Figure 14** shows the age of the major financial supporter of households with forest from the 2013 Housing and Land Statistics.

In Japan, 65 is the usual age of retirement. The percentage of ≥65 years old has reached 51.8% in **Figure 14**. Considering that the peak age-class of timber sales was 60- to 64-year-olds in the 2000 Census of Agriculture and Forestry, the number of forest owners who want to sell standing trees may decrease. Ultimately, the low percentage of area covered by forest management plan could be related to demographic factors.

In forests owned by aging persons, especially small-scale forests without a forest management plan, there is a high likelihood that forest roads will not be constructed and the owners will simply hold the forest without managing it. In mountainous areas, where owners have small

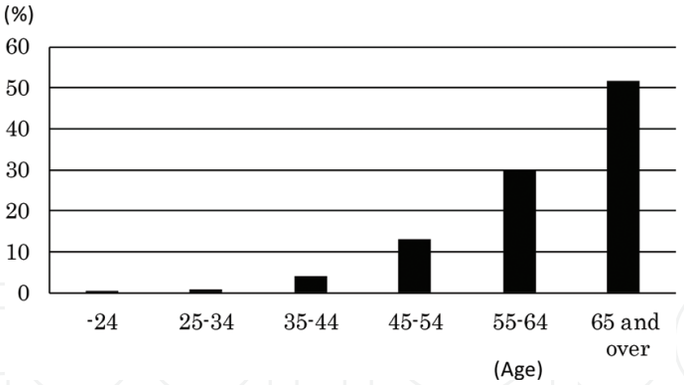

Figure 14. Age of the major financial supporter of households holding forests. Source: MIC, Statistics Bureau ([33], Table 87). Note: The major financial supporter is not the same as the householder. Generally, financial supporters are younger than householders.

areas of farmland, forest land, and housing land, the total value of the inheritance property may be less than the minimum taxable rate, and the inheritor may continue to hold the forest without paying the inheritance tax when inheriting the forest property. This ensures that the small-sized holdings will continue in the future.

The total population of Japan reached to a peak in the 2010 Population Census, but showed a decrease in the 2015 Population Census. The National Institute of Population and Social Security Research ([34], **Table A-8**) has estimated that the total population in 100 years will decrease to almost one-third based on an analysis of the 2010 Population Census. In such a situation, if the system and conditions surrounding forest management do not change, the percentage of non-resident forest owners will increase.

Immediately after the end of World War II, most forest owners were also farmers. Since the family system was abolished after the war, children other than the successor could inherit forest, and many children moved to cities when beginning school or for a job. Therefore, the percentage of non-farmer forest owners has been increasing. In the 1990 Census of Agriculture and Forestry, 36.4% of forest owners with ≥0.1 ha were non-farmers, while 42.0% with ≥1 ha forest were non-farmers in the 2015 Census of Agriculture and Forestry.[40] The situation surrounding non-farmer non-resident forest owners is unclear, and should be examined further in future research. Regarding forest owners who live in urban areas, since the value of housing land is generally high, the total value of inheritance properties may surpass the minimum value for imposing the inheritance tax, and this set of circumstances should also be examined further in future research.

5. Conclusions

The current forest inheritance tax system assumes that private forests are managed using a traditional family base. Furthermore, as a long-term production period is considered, some tax reduction measures have been applied to evaluate forest land and standing trees. Japanese forestry is facing management difficulties, particularly with the long-term decrease in

[40]Department of Statistics of the Ministry of Agriculture, Forestry and Fisheries.

stumpage prices that has occurred and the amendment of methods to evaluate forest land and standing trees. As a result, the value of forests has decreased.[41] However, the number of non-resident non-farmer inheritors is increasing, making it necessary to reconsider the forest inheritance system, including the inheritance tax,[42] because the background and assumptions for preferential treatment have changed.

A new classification for private forest owners is needed. Under the current forest inheritance tax system framework, forest owners who manage their forests continuously with a plan, do not live on the land, and have no knowledge or concern about their forest management practices are treated equally, as if they were a family working the forest. In the latter case, this is just a holding of an estate, and the number of such forest owners will likely increase in the future. Tax reduction measures for such forest owners should be reconsidered.[43] If the reduction policy were canceled for such forest owners, they could begin forest management or sell the forest to appropriate persons who could manage it. A major problem is determining how to group forest owners. For example, forest owners could be divided into resident or non-resident owners,[44] but other important factors include the existence or lack of forest management, a forest plan, investments to the forest, etc. Many technical problems are readily imagined for each of these methods, which should be examined in detail in future research.

A postponement measure for forest owners with ≥100 ha of forest was introduced in 2012, but few people have applied to this new system, because there are several inhibitory conditions related to the postponement of the inheritance tax. The situation surrounding management of forest owners with ≥100 ha of forest is varied. For example, 43.9 and 33.9% of forest owners hold 100–500 ha and ≥500 ha of forest land, respectively, without managing it; therefore, it is difficult to use the holding size as the sole criterion for the inheritance tax postponement (**Figure 12**).[45]

Under the current inheritance tax postponement system and the forest management planning system, the criterion of large-scale forest management is defined as ≥100 ha. However, there appears to be no theoretical or statistical basis for the use of 100 ha as the cut-off. Holding size should be considered as a criterion, but the 100-ha holding size criterion is not necessarily justified. Although the introduction of an appropriate minimum area may be necessary,

[41]Tezuka [16] pointed out the low inheritance tax in Germany. The value of 80–100-year-old spruce was almost equal to one fifteenth of 90-year-old *C. obtusa*. Since the value of the standing trees at the standard cutting age has decreased, as shown in **Figure 2**, the difference appears to be decreasing.

[42]As shown in **Table 5**, the total amount of various taxes or public dues is now sometimes greater than the net income from timber sales; thus, problems may exist in the taxation system beyond the forest inheritance tax; however, this was beyond the scope of this paper. Supporting this, Kim [35] noted increases in the burden of several taxes other than the inheritance tax in Japan.

[43]When non-resident forest owners want to continue just holding, the amount of inheritance tax and annual municipal fixed proper tax must be low. To maintain the low-value of standing trees, forest roads should not be developed because, after road construction, the value of the standing trees along the forest increases, resulting in higher taxes.

[44]Taxation of non-resident forest owners was discussed before World War II in Hokkaido, which had a high percentage of non-resident forest owners ([36], pp. 47–51, pp. 83–85).

[45]The current postponement of the forest inheritance tax is closely connected with the forest management plan. The period of the current plan is 5 years, and the plan focuses on forest practices and forest road construction, which are related to the subsidy system. The current management planning system appears to have problems from the perspective of the inheritance system, and should be examined further in future research.

additional measures for lower holding sizes are also needed. Furthermore, institutional redesign by including other criteria, such as area of residence and family labor force, etc. may be necessary, which is a topic for future research. Problems associated with the inheritance of private forest are not limited to Japan, but it was beyond the scope of this study to analyze the forest inheritance tax from an international perspective.[46] An increase in non-resident non-farmer forest owners and aging of forest owners can be found in various developed countries, and a comparison of international policy on the forest inheritance system, including the inheritance tax, taking this change into account is a topic for future research.

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