

## **Community-based forest management in Japan, 1974-2010: A quantitative approach to property wards**

**Mika Asai\***

**Abstract:** Villagers in Japan collectively used and managed various properties such as forests, ponds, and irrigation canals during the Edo period (1603–1868). The building of a modern nation-state however brought about changes in the economic organization of community-based management. Municipal mergers and dissolutions in 1889 were one such example. The central government then instituted the property ward (*zaisanku*) system, which allowed villagers to sustain their properties within the limits of the village community.

Although a large number of case studies on property wards have been made, little is known about their overall financial standing, which is an aspect which could contribute to a better understanding of each case. This paper thus explores the financial trends of all property wards that own forest area by analyzing their financial reports published over the span of FY 1974–FY 2010.

The findings demonstrate that most property wards in FY 1976 depended on subsidies, based on the 5-year moving average. Meanwhile, the profitability of forestry had consistently dropped. This resulted in a decrease in the proportion of those property wards gaining sales profits on the one hand, and an increase in the proportion of those incapable of burdening the forest management costs on the other. Although the government heavily subsidized forest owners, the number of property wards that enjoyed financial support from the government decreased. This trend compelled village communities to dissolve their property wards. As a whole, property wards have gradually dispensed with forest management. Nevertheless, based on the 5-year moving average, the property wards in 17 % of the municipalities supervising the forest-owned property wards sustainably managed their forest areas over the span of FY 1976–FY 2008, owing to both sales profits and subsidy. This paper statistically informs of financial trends and reveals which property wards have succeeded in sustainable forest management.

**Key Words:** Property wards (*zaisanku*), Financial reports, Sustainable management

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\* Graduate School of Economics, Hitotsubashi University, Japan, e-mail: ed062002@g.hit-u.ac.jp

## 1. INTRODUCTION

Research from scholars of common property has suggested that the commons and the community are an integral and indispensable part of contemporary efforts to conserve environmental resources (Agrawal 1999; Berkes 2004). Some of these commons can be granted a corporate status as property wards (*zaisanku*) in Japan, which were de facto established in 1889 and allowed villagers to maintain their properties within the limits of the village community. Murota and Mitsumata (2004) studied several cases of property wards and suggested their significance in natural resource management, environmental conservation and regional development.

Villagers belonging to property wards collectively used and managed various properties such as forests, ponds, irrigation canals, cemeteries and hot springs. The present study focused on forestry management, because 2,019 of 3,550 property wards were reserved as forest areas in 2007 (Izumi et al. 2009).

This data analysis will contribute to the understanding of the current-situation and to future policy research, although previous research on property wards has mainly used an approach pertaining to the legal history and case studies (e.g. Shimada 1958; Watanabe 1974; Murota et al. 2004).

Few studies have analysed the forestry management trends based on overall property wards. This is because little is known about the financial reports of property wards, which are annually reported by each municipality to the government (Ministry of Internal Affairs and Communications). They are not published openly but are accessible by an information disclosure request. The Forestry and Forest Products Research Institute (2012) and the Forestry Agency (2008–2012) have compiled separate lists of forest and forestry statistics. However, they made no mention of the financial reports of the property wards.

Thus, this paper explored the forestry management trends based on property wards by analysing their financial reports published during FY 1974–FY 2010. The remainder of this paper is structured as follows: Section 2 provides an outline of these financial reports and methods used in this study. Section 3 presents our results. Section 4 discusses the main findings. Section 5 concludes with the contributions and the limitations of our study.

## 2. METHODS

An outline of the financial reports is as follows: each municipality annually presents

the financial report of its property wards at the government's request. Each report contains data regarding the number of property wards and their income and the expenditure settlement document. We determined that the first financial report was made in 1963, which was compiled on the basis of each prefecture (Ministry of Home Affairs 1963). The existing reports that are made on the basis of municipalities were initiated in 1974. The Ministry of Internal Affairs and Communications stores these reports as electronic data. Thus, this study was based on these electronic data, which covered the period between FY 1974 and FY 2010.

The analysis covered 459 municipalities that recorded their expenditure on forestry management at least once during this period. Thus, we omitted those municipalities without any established property wards or those property wards that owned properties other than plantations or forests. If a municipality underwent annexation, its indicators were combined with its new municipality.

In Japan (2010), the 459 municipalities roughly corresponded to one fourth of the municipalities. These 459 municipalities established approximately 3,000 property wards, 2,000 of which delivered their income and expenditure settlement documents to their municipalities. In contrast, others probably did not draw up their documents because of an idle state. Furthermore, municipalities hesitated to acquire them from the property wards that are regarded as de facto private institutions. Therefore, 459 municipalities, which covered 2,000 property wards, were the objects of our study.

We selected four indicators related to forestry management in the financial reports: the establishment of property wards, expenditure on forestry management, income from the sale of property, and subsidies (Table 1).<sup>1</sup> We calculated the 5-year moving averages for these indicators, because standard forestry management practices in Japan are usually conducted at least once every 5 years (e.g. Kanagawa Prefecture). We annually classified these 459 municipalities into six types, depending on whether the 5-year moving average of the indicators was zero or nonzero.

The six types were named as follows: self-income, with subsidy, dependent on subsidy, other financial resource, no expenditure on forestry and no property ward. The first four types had expenditure on forestry in common, but differed in terms of financial sources. Self-income was the most financially independent type because income was earned by selling their property (e.g. stumpages) and spent for forestry management. The difference between with-subsidy and dependent-on subsidy types

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<sup>1</sup> Ministry of Internal Affairs and Communications (b) defined each indicator.

lies in whether or not it derived income from selling their property. That is, with-subsidy type gained both income and subsidy. However, those that gained neither subsidy nor income were categorized as other financial resources. No expenditure on forestry-type held the forest, but never paid for forestry management for more than 5 years. The municipality that abolished a property ward was called a no property ward.

Figure 1 shows the trend in the municipality number classified by these six types.

Table 2 indicates the changing patterns of forestry management trends based on the property wards for each municipality from FY 1976 to FY 2006. The seven figures in the first column represent the changing pattern for each municipality. Five-year intervals were observed between each figure, where the first figure and the second figure represent the type between FY 1976 and FY 1981, respectively. This table describes the changing patterns that were detected in more than five municipalities.

### 3. RESULTS

Figure 1 shows the trend in the number of each type with respect to the forestry management of property wards. The results indicated that with subsidy in 1976 accounted for the highest percentage (51%). Self-income was in second place and accounted for 34%.

From FY 1976 to FY 2008, the proportion of with subsidy declined by half, from 51% to 25%. Self-income remained approximately 30%, although it temporally fluctuated. No expenditure on forestry management and no property ward increased from 7% to 17% and from 1% to 11%, respectively.

Table 2 shows the changing patterns for each municipality with respect to the property ward types from 1976 to 2006. The changing pattern could be broadly divided into three patterns, focusing on the patterns applicable to more than five municipalities. The most common pattern was 2222222, which indicated that property wards continued to conduct forestry management using the subsidy, and this accounted for 17%. The next pattern was a transition from with subsidy to self-income, which accounted for 12%. The third most common pattern was 1111111, which indicated that property wards were consistently burdened with the costs of forestry management, and they profited from selling their property, which accounted for 5%.

### 4. DISCUSSION

Figure 1 shows that only the property wards in one-third of the municipalities with established forest-owning property wards could finance themselves independently in FY 1976, while the other half were dependent on the subsidy. This was because of the age of forest stands in Japan, where too much weight is attached to younger timber.

The imbalance in the age of forest stands was caused by intense afforestation between the 1950s and 1960s (Table 3). Much of the timber in Japan was cut down during the Second World War, although the scarcity of the labor force then did not permit adequate afforestation. Unmanaged forest areas spread after the war. After the war, the recovery of forests areas by afforestation took 10 years. Meanwhile, the transition to fossil fuels dramatically reduced the demand for wood as a fuel, whereas the high economic growth increased the demand for timber. Thus, the Japanese government promoted the development of timber plantations in vacant areas where the coppicing of deciduous trees had been conducted previously. As a consequence, the post-war reconstruction, the transition to fossil fuels and the high economic growth led to intense afforestation, which resulted in imbalances in the ages of forest stands in 1976.

Standard timber plantations in Japan can be harvested only after 50 years, and the maintenance during the first 10 years accounts for 70% of the production costs (Ministry of Agriculture, Forestry and Fisheries 2013).

In the 1950s and 1960s, forest owners enthusiastically invested in plantations for future harvesting, with financial support from the government. This situation resulted in the highest percentage in with subsidy compared with all other types during FY 1976 (Figure 1).

The government might expect the property wards to become independent of financial assistance, because the timber matures and income is generated by the final cutting after a few decades. An increase in the number of viable forest owners was expected to enhance the proportion of self-income. In reality, however, it sustained approximately 30% between FY 1976 and FY 2008 (Figure 1).

This low percentage was caused by a long-term downturn in the stumpage price (e.g. the Sugi stumpage price shown in Table 3), which was determined by various factors such as the development of the free trade system and because of the changing demand (Ogi 2009; Table 3).

When considered along with the rapid deterioration in forestry, the stable number of self-income indicated that these property wards were likely to practice methods that facilitated sustainable forestry management.

In response to the shrinking market for domestic timber, the government enhanced and expanded the subsidy for silviculture (Table 3). This expansion was also affected by the trade friction with the United States. In order to boost domestic sources and reduce Japan's trade surplus, the Japanese government expanded public investment after 1985. In accordance with this, the subsidy for silviculture was also increased (Ishizaki 2012).

Despite this quantitative expansion of financial assistance, the number of municipalities with subsidy halved in the past 30 years. Thus, the Japanese government has intensively financially supported property wards to help them survive in the competitive market.

As a result, the property wards that conducted forestry management with subsidy accounted for 17% of the number of municipalities, whereas the property wards that bore none the cost for the forestry management for more than 5 years accounted for 17% (Figure 1; Table 2).

If the market conditions do not change, the number of municipalities with self-income will not increase, and there will be no expenditure on forestry management and no property wards.

## 5. CONCLUSION

This paper aimed to provide insights into forestry management trends in the property wards between FY 1976 and FY 2008, by using their lesser-known financial reports data. This study finds that property wards, located in half of the 459 municipalities in FY 1976, enjoyed subsidies for forestry management; these subsidies were provided in response to the intensive afforestation of the 1950s and 1960s that saddled each property ward with a heavy monetary burden for silviculture. The number of municipalities wherein property wards were provided with subsidies halved in FY 2008, even though the government increased subsidies for reforestation and silviculture. Nevertheless, the property wards in 17% of the municipalities supervising the forest-owned property wards availed of the subsidies and continually managed their forests under the adverse economic environment of the past thirty years, while

30% did so out of their own resources.

Previous works on property wards focused on the controversy surrounding their legal status. For example, Tai (1967) insisted that the government was supposed to temporarily admit the property wards system in order to encourage smooth mergers among municipalities; hence, the property wards were to gradually transfer their properties to municipalities. Watanabe (1974) agreed with the limitations of the property wards system, though he emphasized their private institutional characteristics. Murota and Mitsumata (2004) re-evaluated livelihood in property wards, where community-based forest management still survives. This paper contributes to the understanding of forestry management trend in property wards.

Our study has three limitations. First, we could not determine the activities that accompanied the lack of money flow. Second, types with subsidy had a higher likelihood of occurring in municipalities with established multiple property wards. Third, we could not determine the effects of government directed credit, which plays an important role in subsidy, because the financial reports did not contain these data. However, the property wards were assumed to be involved with forestry management so the financial report only supplied significant data related to this activity.

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#### LITERATURE CITED

- Agrawal, Arun, and Gibson C. Clark. 1999. Enchantment and disenchantment: the Role of community in natural resource conservation. *World Development* 27 (4):629–649.
- Berkes, Fikret. 2004. Rethinking community-based conservation. *Conservation Biology* 18 (3):621–630.
- Forestry Agency. 2011. *Minyu-rin Shinrin Seibi Shisaku no Aramashi* [Outline of the Private-forest Policy]. Tokyo.
- Forestry Agency, ed. 1996–2002. *Ringyo Tokei Yoran* [Statistical Abstracts of Forestry]. Tokyo: Rinya Kosai Kai.
- Forestry Agency, ed. 2003–2008. *Shinrin Ringyo Tokei Yoran* [Statistical Abstracts of Forestry]. Tokyo: Rinya Kosai Kai.
- Forestry Agency, ed. 2008–2012. *Shinrin Ringyo Tokei Yoran* [Statistical Abstracts of Forest and Forestry]. Tokyo: Japan Forest Foundation.

- Forestry and Forest Products Research Institute, ed. 2012. *Kaitei Shinrin Ringyo Mokuzai Sangyo no Shorai Yosoku* [Outlook Study on the Forest, Forestry and Forest Industry: Data, Theory and Simulation]. Tokyo: Nihon Ringyo Chosa Kai.
- Ishizaki, Ryoko. 2012. Shinrin Seisaku no Zaisei Shishutsu [Silvicultural fiscal policy]. In *Kaitei Gendai Shinrin Seisaku Gaku* [Forest Policy Study], edited by K. Endo. Tokyo: Nihon Ringyo Chosa Kai.
- Izumi, Rui, Haruo Saito, Mika Asai, and Utako Yamashita. 2011. *Commons to Chiho Jichi* [Commons and Local Autonomy]. Tokyo: Nihon Ringyo Chosa Kai.
- Japan Real Estate Institute. Sanrin Soji oyobi Yamamoto Ryuboku Kakaku Shirabe [Survey on Timberland and Timber Price]. Tokyo.
- Kanagawa Prefecture. Kanagawa Chiki Shinrin Keikakusho: FY 2003–FY 2012 [Forestry Planning in Kanagawa Prefecture]. Kanagawa, Japan.
- Ministry of Agriculture, Forestry and Fisheries. 2013. *Mokuzai Jukyu Hyo* [Timber Balance Sheet] [cited April 30 2013]. Available from <http://www.e-stat.go.jp/SG1/estat/List.do?bid=000001022382>.
- Ministry of Agriculture, Forestry and Fisheries. 2013. *FY 2008 Ringyo Keiei Tokei Chosa Hokoku* [Statistical Research in Silvicultural Management] 2009 [cited April 30 2013]. Available from <http://www.maff.go.jp/j/tokei/kouhyou/rinkei/index.html>.
- Ministry of Home Affairs, ed. 1963. *Zaisanku no Gaikyo* [Property Ward Trend]. Tokyo.
- Ministry of Internal Affairs and Communications. a. Chiho Zaisei Jokyo Chosa: Shichoson Bun, Table 48 [Survey on Municipal Finance, Table 48]. In *FY 1974–FY 2010*.
- Ministry of Internal Affairs and Communications. b. FY 2006 Chiho Zaisei Jokyo Chosa Hyo Sakusei Yoryo: Shichoson Bun, Ichibu Jimu Kumiai Bun [FY 2006 Handbook of Survey on Municipal Finance].
- Murota, Takeshi, and Gaku Mitsumata. 2004. *Iriai Rinya to Commons* [Iriai Forest and Commons]. Tokyo: Nippon Hyoron Sha.
- Ogi, Tamutsu. 2009. *Kokusan Zai ha naze urenakatta noka* [Why was few domestic timber sold?]. Tokyo: Nihon Ringyo Chosa Kai.
- Rinya Kosai Kai, ed. 1965–1995. *Ringyo Tokei Yoran* [Statistical Abstracts of Foresry]. Tokyo: Rinya Kosai Kai.
- Rinya Kyosai Kai, ed. 1962–1964. *Ringyo Tokei Yoran* [Statistical Abstracts of Forestry]. Tokyo: Rinya Kyosai Kai.
- Shimada, Kinzo, ed. 1958. *Koyu Rinya no Kanri ni kansuru Kenkyu* [Current Status and the Future Challenges of the Public Forest]. Tokyo: Rinya Kyosai Kai.



Tai, Nobuyuki. 1967. Zaisanku [Property wards]. *Jichi Kenkyu* 43 (2):101–115.

Watanabe, Yozo, ed. 1974. *Iriai to Zaisanku* [Iriai and Property Wards]. Tokyo: Keiso Shobo.

Table 1. Classification of municipalities based on the financial reports of property wards

Types	Property ward	Expenditure on forestry management	Income from sale of property	Subsidy
(1) Self-income	x	x	x	
(2) With subsidy	x	x	x	x
(3) Dependent on subsidy	x	x		x
(4) Other financial resources	x	x		
(5) No expenditure on forestry management	x			
(6) No property ward				

Table 2. Changing patterns in the municipalities based on the financial reports of property wards form FY 1976 to FY 2006

Changing pattern	Number in municipalities	%
2222222	77	17
1111111	24	5
2222211	13	3
2211111	11	2
2222221	10	2
2111111	7	2
2222111	7	2
1555555	6	1
2221111	6	1
1115555	5	1
1222222	5	1

Source: Author's analysis based on Ministry of Internal Affairs and Communications (a)

Note: N=459.

Table 3. Forestry indicators in Japan for FY 1955–FY 2010

FY	Artificial afforestation <sup>a</sup> 10 <sup>3</sup> ha	Timber supply		Sugi stumpage price 10 <sup>3</sup> yen/m <sup>3</sup>	National subsidy for silviculture <sup>b</sup> 10 <sup>9</sup> yen
		Total 10 <sup>6</sup> m <sup>3</sup>	Domestic 10 <sup>6</sup> m <sup>3</sup>		
1955	342	45	43	4	
1960	316	57	49	7	
1965	284	71	50	9	5
1970	269	103	46	13	9
1975	170	96	35	20	19
1976	163	103	36	20	22
1977	156	102	34	20	26
1978	146	103	33	20	32
1979	132	110	34	19	35
1980	116	109	35	23	36
1981	110	92	32	20	36
1982	109	90	32	18	36
1983	103	91	32	17	36
1984	90	91	33	16	36
1985	81	93	33	15	35
1986	72	95	32	14	35
1987	66	103	31	14	37
1988	64	106	31	14	40
1989	60	114	31	14	40
1990	55	111	29	15	40
1991	48	112	28	14	42
1992	46	109	27	13	46
1993	47	108	26	13	54
1994	41	110	24	12	50
1995	49	112	23	12	64
1996	41	113	22	11	56
1997	38	110	22	10	64
1998	39	92	19	9	68
1999	33	98	19	8	60
2000	31	99	18	8	55
2001	28	91	17	7	60
2002	27	88	16	5	70
2003	25	87	16	5	56
2004	25	90	17	4	58
2005	26	86	17	4	52
2006	24	87	18	3	47
2007	26	82	19	3	38
2008	23	78	19	3	29
2009	23	63	18	3	41
2010	19	70	18	3	24

Sources: Japan Real Estate Institute, Forestry Agency (2011), Forestry Agency (1996–2002; 2003–2008; 2008–2012), Ministry of Agriculture, Forestry and Fisheries (2013), Rinya Kyosai Kai (1962–1964), Rinya Kosai Kai (1965–1995)

<sup>a</sup>Excluding 'National Forest' in the total.

<sup>b</sup>Including a supplementary budget.

Figure

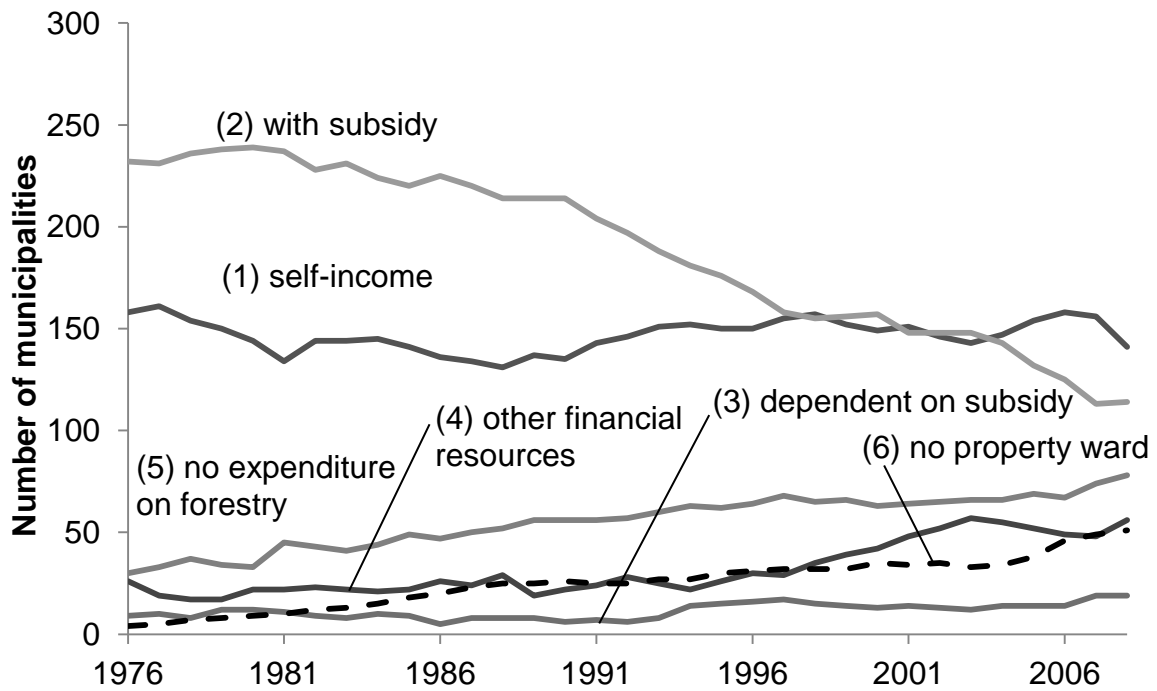


Figure 1. Temporal changes in the number of municipalities classified by types of the forestry management property wards in FY 1976–FY 2008.

Source: Author's analysis based on Ministry of Internal Affairs and Communications (a)

Note: N=459.