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# Utilization of Grass and Wood in Common-Use Imperial Land and Incorporation into Conservation Forest in Yamanashi Prefecture in the Early Twentieth Century

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### Introduction

Japan is a mountainous country with few plains, and most of the forests are in mountainous regions. The word *sanrin* (mountain and forest) is used to describe this landscape. Moreover, Japan is a country where regenerative forestry has developed since the early modern period, although such forestry sites were limited (Totman 1989). Therefore, another word, *rinya*, denotes a combined concept of forest and wilderness. This is because although today's mountains are almost entirely covered with trees, in the past there were many vegetation and grassy mountains that was intermediate between forest and grassy mountains.

Fujita, showing the use of *rinya* on a map of Japan, gave an impression of the transformation of grassy mountains into plantations from the end of the Edo (Tokugawa) era to the present (Fujita 1995). In addition, Ogura attempted a statistical analysis to determine the change in the area of grassy mountains from the Meiji period (1867–1912) to the present throughout the country (Ogura 2012, 206–7). He assumed that the wilderness area at the beginning of the twentieth century was about five million hectares (the total area of *rinya* was about 24 million hectares). However, it is difficult to determine the accuracy of statistics collected during the Meiji period, when grassy mountains were rapidly declining.

Murayama, S., Ž. Lazarević, and A. Panjek, eds. 2024. *Changing Living Spaces: Subsistence and Sustenance in Eurasian Economies from Early Modern Times to the Present*. Koper: University of Primorska Press.

Moreover, such statistics do not provide information on the vegetation that lies between forests (area with trees) and wilderness (area without trees). Similarly, previous studies have examined grassy mountains in the early modern period<sup>1</sup> and provided an overview of their use in each study area, but these data are unfortunately not detailed.

In Japan, the first Forest Act was enacted in 1897 (Meiji 30), establishing the system of conservation forests, primarily to conserve water sources and prevent landslides through logging regulations and management requirements. A well-known reason for this was the severe damage caused by floods, which were common in many areas at the time. At the same time, the River Act and the *Sabo* (landslides prevention) Act were also enacted (Ohta 2012, 122–4). Although rapid modernization changed not only the legal system but also society and the economy, rural people still needed grassy and bushy mountains for agriculture and daily life.

The materials traditionally collected by rural residents from the grassy and bushy mountains are called *koshiba-shitakusa* (Takemoto 2021a, 416). These include *kaya*, *karishiki*, firewood and fallen leaves. *Kaya* is Japanese silver grass that has been used as manure, fodder for cattle and horses used in ploughing and other agricultural work, and as roofing material. *Karishiki*, the budding branches of broad-leaved trees that sprout in early spring, were trampled into rice nurseries and rice paddies as green manure. Firewood was used as fuel for boiling, cooking and heating. The ashes after burning were used as fertilizer. Fallen leaves were also used as compost in the fields.

The *sanrin* from which these resources needed for daily life were obtained often took the form of *iriai* commons, which were jointly administered by the commoners. However, when the Meiji government clarified ownership of the *sanrin* for tax purposes, these *iriai* commons were also

1 There are a few detailed studies about *sanrin* resource utilization by residents. Mizumoto (2003) clarified the vegetation of mountains in Iida, Nagano Prefecture in the seventeenth century as follows: grass and twigs, 63.9%; mix of grass and pine and deciduous trees, 8.2%; deciduous trees, 10.9%; mix of deciduous and coniferous trees, 11.4%; and bare mountains, 6.2%. However, according to Tokoro (1980), in *Kinsei ringyo shi no kenkyu*, *karishiki*, utilization in the Chikuma area in the 18th century drawn from hamlet records was 15–35 *da* of *karishiki* for 0.1 *cho* of rice paddies (25 *da* on average), and 15 *da* of *karishiki* for 0.1 *cho* of fields were needed. Tokoro also estimated that 20 *da* was needed for 0.1 *cho* of rice paddies and fields. Additionally, he mentioned 5–6 *se* of *rinya* was needed to collect 1 *da* of *karishiki*. From this data, the necessary *rinya* area was 10–12 times that of the paddy and field area. The consumed quantity of firewood was also 20–30 *da*/year/household. See also Furushima (1974, 111–25).

incorporated into the state or municipalities and divided among individuals, eventually blurring jurisdictional boundaries and making their responsibilities unclear. Moreover, residents were often only permitted to use the resources of the *sanrin*.

### Objectives and Methods

In Yamanashi Prefecture, the study area of this chapter, many *iriai* commons were designated as imperial property in 1889 (Meiji 22). They were returned to the prefecture in 1911 (Meiji 44), and commoners were allowed to use and manage these imperial properties. In the mid-Meiji period before the return, the period covered in this chapter, this estate was called *iriai goryochi*, which can be translated as ‘gathering place on the imperial estate’, which is an oxymoronic expression considering that gathering was allowed on the site of the former *iriai* commons. *Iriai goryochi* is imperial land with recognized common use rights (Totman 2007, 136). In this chapter, this particular land is referred to as common use imperial land (CIL). The ownership, use, and management of *iriai* commons in Yamanashi Prefecture have been studied from the perspectives of the sociology of law and forestry.<sup>2</sup>

The most important material for this chapter is a report entitled ‘*Midai Gawa Iri Hoan-rin Hennyu Chousa-sho*’ [‘Survey Report on the River Midai water source for incorporation into conservation forests’] published by Yamanashi Prefecture in 1903 (Meiji 36). The purpose of this report was to incorporate this CIL into conservation forests in accordance with the Forest Act, which had just come into effect, to prevent damage from repeated flooding. As will be discussed in more detail later, although use was restricted by the Bureau of Imperial Estate (BIE), residents of the CIL were in fact using *sanrin* in the same manner as before it was incorporated into the imperial estate. The prefecture closely scrutinised the residents’ use of *sanrin* to interfere with the BIE’s management of the CIL.

The purpose of this book is to identify the impact of the changing socioeconomic and natural environment due to rapid modernization on the use and management of resources by the population. The key term ‘living spaces’ is used in this research. To achieve this goal, this chapter used the data in this report to clarify what institutions were introduced by the national and prefectural governments, what resources residents used, and

2 For example, Hojo (1979); Ohashi (1991); more recently Shiga et al. (2008).

how these affected the living space of Yamanashi Prefecture's mountain villages in the early twentieth century.

The units used in this chapter for area, weight, length, volume, and currency are described as follows:

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<i>cho</i>	measure of area (0.99 ha; 2.45 acres)
<i>tan</i>	measure of area (0.1 cho; 0.099 ha; 0.245 acres)
<i>se</i>	measure of area (0.1 tan; 0.0099 ha; 0.0245 acres)
<i>tsubo</i>	measure of area (0.033 se)
<i>shaku</i>	measure of length (0.3 m)
<i>shakujime</i>	measure of volume used for wood ( $1 \times 1 \times 12$ shaku; 0.324 m <sup>3</sup> )
<i>kan</i>	measure of weight used for fodder and green manure (3.75 kg)
<i>soku</i>	measure of volume used for twigs (converted to 5 kan; 18.75 kg)
<i>da</i>	measure of volume used for karishiki (converted to 6 soku, 30 kan; 18.75 kg)
<i>tana</i>	measure of volume used for firewood ( $6 \times 6 \times 3$ shaku $\times 2/3 = 6$ shakujime; 1.944 m <sup>3</sup> ; converted to 500 kan; 1,875 kg)
<i>yen</i>	currency: one yen in the middle of the Meiji period was roughly equivalent to 4,500 times its present value, measured in terms of the price of rice
<i>sen</i>	currency (0.01 yen)

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### Establishment of the Forestry Division in Yamanashi Prefecture

At that time, Yamanashi Prefecture and the Prefectural Assembly were concerned about the annual flood damage. The first major step toward solving this problem was the 'Petition for the Protection of Forests', which was published under the joint names of the members of the Diet in March 1897 (Meiji 30), shortly before the passage of the Forest Act. One copy of the petition was sent to the Speaker of the House of Peers and the Speaker of the House of Representatives, and the other copy was sent to the Minister of Agriculture and Commerce and the Minister of the Imperial Household. The national government, however, was slow to respond. In December 1900, the chairman of the Prefectural Assembly submitted to the governor 'An opinion requesting the establishment of a division specifically for the purpose of demarcating forests and encouraging afforestation'. This opinion was discussed in the Prefectural Assembly and approved by a large majority (Yamanashi Prefecture 1903b; 1973, 779).

Among the reasons for the establishment of a specialized division by the prefecture were: (1) the allocation of some imperial forests to the ownership of iriai organizations and the prefecture and the correction of their allocation, (2) the clear distinction between conservation forests and common-use forests, and (3) the taking of measures to promote afforestation

and to spread the idea of forestry. The Forest Policy Department would be mainly responsible for (1) and (2), and the Afforestation Department for (3), with a Bachelor of Law and a Bachelor of Forestry, respectively, in charge. As a result, 'Division 6' was newly established in June 1902 (Meiji 35) and Otosaku Saito was appointed as the first head of the Division. However, no persons with a Bachelor of Law degree were hired and the Forest Policy Department and Afforestation Department were not created; instead, the Forestry Section and the Survey Section were established. In 1905, Division 6 was renamed the Forestry Division, but the duties of the Division did not change significantly at the time of its establishment (Yamanashi Prefecture 1922, 131).

The reasons why Saito was appointed as the first Division Head are as follows (Takemoto 2021b): he was born in Niigata in September 1866 (Keio 2) and worked for the Forestry Bureau as soon as he graduated from Tokyo Norin Gakko Ringaku-bu [Tokyo Agricultural and Forestry School's Forestry Department] in 1890 (Meiji 23), which was the first forestry school established in Japan. (Its present name is Department of Forest Science, Faculty of Agriculture, University of Tokyo.) Later, when the Sino-Japanese War broke out, he served in the war and was appointed head of the education and police station at Linkipo in Taiwan in 1896. The following year, due to difficulties during the Alishan Expedition, he returned to Japan and temporarily moved back to his wife's family home in Ichikawa, Yamanashi Prefecture.

On this occasion, Saito was confronted with a major flood disaster that killed more than 150 people in the prefecture. Based on this experience, he wrote his 'Opinion on Flood Control in Yamanashi Prefecture' in the *Yamanashi Nichinichi Shimbun* [Yamanashi Daily News]. He strongly advocated the incorporation of the devastated *sanrin* into conservation forests, using the Forest Act that had just come into effect, on the grounds that 'the cause of the floods is solely due to the deforestation of *sanrin* forests' (Saito and Aoshima 1899). Saito presented statistical data and pointed out that there were also many treeless areas in the imperial forests that should be converted into conservation forests. He also called for taking modernization measures, such as introducing laws to control forest fires, organizing grass mountains, promoting afforestation and holding tree planting days in elementary schools. At the same time, he showed consideration for local residents who used the grassy mountains for fertilizer and fodder by proposing specific and detailed measures to avoid inconvenience to them. However, after this contribution, he was trans-

ferred to Ishikawa Prefecture as an engineer and teacher of forestry. He had not been back to Yamanashi Prefecture for a little over three years before returning as Division Head.

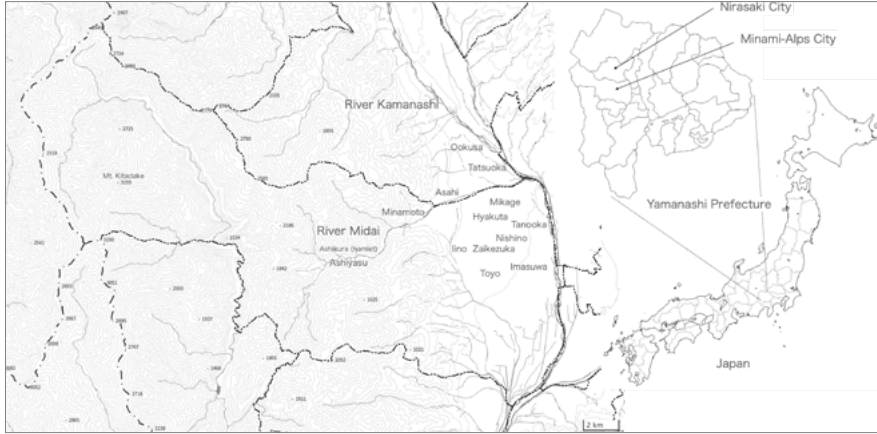
As soon as Division 6 was established in 1902, the prefecture issued regulations for the conservation forests. In addition, a policy statement of Division 6, 'Forest Remediation in Yamanashi Prefecture', was published in September 1903 (Meiji 36). This statement was probably reviewed by Saito, who had become the Division Head the year before. The 'forest remediation' was to be applied to the devastated forests, first as a compulsory measure by including them as conservation forests in the Forest Act and ordering afforestation, and second as a supplementary measure by establishing seedling plots, providing seedlings, establishing model forests, and promoting forestry techniques (Yamanashi Prefecture 1903a). In the supplementary measures, Saito implemented in Yamanashi Prefecture what he had promoted in Ishikawa Prefecture (Endo 1938, 193–8). However, in the compulsory measures, it was necessary to work on developing laws and regulations that had never been introduced before.

Saito even created his own 'Instructions for Conservation Forest Incorporation Records' and published it in a journal so that other prefectures could use it (Saito 1903a; 1903b). He also created an example of the conservation forest ledger to be kept in the offices of towns and villages in the prefecture, and called for a nationwide unification of standards for keeping the ledger (Saito 1903a, 41–6).

### **Survey Report on the River Midai Water Source for Incorporation into Conservation Forests**

Yamanashi Prefecture, which established the Forestry Division, prepared 'Conservation Forest Survey Guidelines' in consultation with the BIE and conducted a fact-finding survey to include CILs in conservation forests. As a result, a total of 34,377 *cho* were incorporated in the prefecture in 1903–1904 (Meiji 36–7), with the largest area of 5,390 *cho* in the Midai River basin (Yamanashi Prefecture 1922). This 'Survey Report' (Yamanashi Prefecture 1903c) initially contained the following information about the Midai basin:<sup>3</sup> (1) flood control and damage costs, and (2) water source area by land category. This information was compiled into a report on each of the two CILs in the water source area, the 36-ham-

3 The River Midai basin is located in western Yamanashi Prefecture (figure 10.1).



**Figure 1** Map of the Midai River and the Villages in the Meiji Period That Are Now Part of the City of Minami-Alps, Yamanashi Prefecture

Source Prepared by the author on the basis of the map of the Geospatial Information Authority of Japan

let CIL<sup>4</sup> and the Ashikura CIL,<sup>5</sup> by interviewing residents and other concerned persons on the following topics: (3) forest condition (vegetation and degree of degradation), (4) BIE income from the sale of firewood, *karishiki*, and grass to local residents, and (5) implementation of the Regulation on Conservation and Supervision. In addition, with respect to the 36-hamlet CIL, the study estimated (6) the amount of wood and firewood collected by residents, (7) the amount of *karishiki* and grass collected and the area of grassy mountains used by residents, and (8) the cost of alternative fertiliser.

### **Flood Control and Damage Costs**

The cost of the levees in the Midai River basin, which had been repeatedly flooded, was calculated as the sum of expenditures by the state, prefectures, and others, and averaged 14,353 yen/year in 1893–1902. Similarly, losses due to flood damage (e.g. damage to farmland) averaged 26,221 yen/year in 1892–1901. Both losses were enormous, underscoring the urgency of the flood control issue.

4 The 36-hamlet CIL was comprised of 13 new villages, or 33 former hamlets (table 1).

5 Ashikura, the sole user of Ashikura CIL, is the closest hamlet to the water source of the River Midai (figure 10.1).

**Table 1** Villages and Hamlets Comprising the 36-hamlet CIL

Current municipality	Villages	Hamlets	Households	Grade	
Minami-Alps City	Ashiyasu	Ashikura	116	1	
		Anzuu	4	1	
	Minamoto	Suzawa	16	1	
		Ooarashi	14	1	
		Shiomaie	14	1	
		Komaba	23	1	
		Chikuyama	33	2	
		Iino-shinden	122	2	
		Arino	188	2	
	Iino	Iino	285	3	
	Toyo	Kmiimai	143	5	
	Zaikezuka	Zaikezuka	232	4	
	Nishino	Nishino	213	3	
	Hyakuta	Dodo	225	3	
		Kami-hatta	156	4	
		Mikage	Yaghoshima	130	4
			Mujina	97	3
			Kami-takasago	106	6
		Tanooka	Tokunaga	68	6
	Imasuwa		Enokihara	48	4
		Shimo-takasago	72	6	
		Kami-imasuwa	187	6	
		Shimo-imasuwa			
Nirasaki City	Asahi	Kamijo-minamiwari	86	3	
		Kamijo-nakawari	62	5	
		Kamijo-kitawari	151	5	
	Tatsuoka	Shimojo-minamiwari	90	6	
		Shimojo-higashiwari	85	6	
		Wakao-shinden	53	6	
	Ookusa	Shimojo-nishiwari	—	—	
		Shimojo-nakawari	34	5	
		Kamijo-higashiwari	53	5	
		Wakao	75	6	
Total	13	33	3181		

*Notes* The actual number of hamlets in the 36-hamlet CIL was 33. This was because the other four hamlets gave up their use of the commons, while one hamlet (Iino-shinden) rejoined in 1883 (Meiji 16), when the Regulation on the Disposal of Grass and Wood was issued. 'Grade' refers to the amount of money each hamlet paid to the user organization of the 36-hamlet CIL. First-grade hamlets paid in proportion to the number of households, Second-grade hamlets 90% of the number of households, Third Grade 70%, Fourth Grade 50%, Fifth Grade 30%, and Sixth Grade 15%.

*Source* Yamanashi Prefecture (1903c, 27–35).



### **Water Source Area by Land Category**

Since the ledgers prepared for tax collection did not show the actual area by land category for the Midai River water source, a new general 20,000:1 scale general map was first prepared based on the 200,000:1 and 20,000:1 maps of the General Staff Office. Then the boundaries and topography were drawn on the map by field survey, and each area was simply determined with a planimeter. As a result, although the ledger showed 20,000 ha for the entire water source area, the actual area was about 7,000 ha. The 36-hamlet CIL with 16,666 ha in the ledger was actually 4,103 ha, while the Ashikura CIL with 1,351 ha in the ledger was actually 1,184 ha. It became clear that these two CILs accounted for 75 percent of the total water sources. The rest were privately owned forests and fields in Ashiyasu and Minamoto villages.

### **Forest Condition (Vegetation and Degree of Degradation)**

First, the forest conditions of the 36-hamlet CIL are shown in table 2. The 'grassy mountain' was not only easily accessible, but also a completely devastated area where only *karishiki* and grass were collected for manure and fodder. The 'deciduous broadleaf forest' adjacent to the grassy mountains was a degraded forest area, most of which had been overcut. *Karishiki* and bushes were harvested near the grassy mountains, and firewood was cut in inconvenient places in the back of the deciduous broadleaf forest, adjacent to the grassy area. A small amount of building material was harvested in the 'native conifer forest' near the summit. The 'newly planted area' where villagers had planted under the guidance of the prefecture was only four or five years old. Overall, more than 90 percent of the area was considered devastated or semi-devastated by the prefecture.

Next, the forest condition of Ashikura CIL is presented (table 2). First, 'grassy or bare mountain' accounted for 10 percent. 'Broadleaf forest on the verge of devastation' and 'coniferous forest on the verge of devastation' accounted for 48 percent and 13 percent, respectively, for a total of over 60 percent. 'Coniferous forest in natural condition', 'newly planted coniferous forest', and 'coppiced broadleaf forest' (*karitate-rin*) together accounted for nearly 30 percent of the total area. In the 'coppiced broadleaf forest' (*karitate-rin*) conceived by the village head, a fire line was established by prohibiting fire in the conventionally used grass cutting area. In the first year, an area with many broadleaf trees that sprouted and grew back, such as chestnut and oak, was selected, and the better

**Table 2** Forest Condition of Two CILs on the River Midai

Vegetation	Area ( <i>cho</i> )	Rate
36-Hamlet CIL		
Grassy mountain	1.128,52	0,28
Deciduous broadleaf forest	2.627,92	0,64
Native coniferous forest	263,01	0,06
Newly planted area	84,00	0,02
Total	4.103,45	1,00
Ashikura CIL		
Coniferous forest in natural condition	214,57	0,18
Coniferous forest on the verge of devastation	155,69	0,13
Newly planted coniferous forest	55,32	0,05
Coppiced broadleaf forest ( <i>Karitate-rin</i> )	74,50	0,06
Broadleaf forest on the verge of devastation	566,28	0,48
Glassy or bare mountain	117,97	0,10
Total	1.184,33	1,00

Source Yamanashi (1903c, 25, 91).

trees were retained at a ratio of about one plant/*tsubo*, which is equivalent to 3.3 square meters, and the rest was mowed along with the grass. In the second year, the superior trees left behind were mowed, leaving two or three sprouts if they were chestnuts, and five or six sprouts if they were miscellaneous trees. In the third year, one or two chestnuts and three or four miscellaneous trees were also left, and no maintenance was required after the fourth year. The ‘coppiced broadleaf forest’ (*karitate-rin*) significantly reduced the amount of *karishiki*, but increased the amount of branches used as firewood, so the number of villagers who demanded this method gradually increased, and it was used on a larger scale from the following year onwards. In this way, the area grew to 74 *cho* and 5 *tan* within four years from 1899 (Meiji 32). The Survey Report highly recommended this method. The forest condition of Ashikura CIL was rated as much better than that of the 36-hamlet CIL, which was attributed to the fact that it was common only for one hamlet and not for several hamlets.

### **BIE Income From the Sale of Firewood, *Karishiki*, and Grass to Local Residents**

BIE income was revealed: the 36-hamlet CIL had 209 *shakujime* of lumber and 66 *tana* of firewood, for a total of 605 *shakujime* (100 *tana*), with a selling price of 59.1 yen/year (average for 1895–1902, excluding 1898). Likewise, it had 5,696 *soku* of twigs and 39,871 *soku* of grass, for a selling

price of 52.09 yen/year (average for 1895-1902). Residents paid a total of 104.61 yen/year, or 2.73 *sen/cho* (the total area of the 36-hamlet CIL was 4,103 cho) to the BIE. The amount/*cho* paid to the BIE by the 36-hamlet CIL and the Ashikura CIL was extremely low, considering that the Survey Report found that good forest land at that time brought in a net income of 40–50 yen/*cho*/year.

### **Implementation of the Regulation on Conservation and Supervision**

The ‘Regulation on the Disposal of Grass and Wood’ [*Soumoku harai-sage jouki*] of 1883 (Meiji 16) was the prefectural government’s first codification regarding resource extraction in the *iriai* commons. In accordance with this regulation, the prefectural government forced the 36-hamlet *iriai* commons in 1885 (Meiji 18) to each establish a ‘Regulation on Conservation and Supervision’ for grass and wood. However, the Survey Report showed that the prefecture did not conduct on-site inspections and left the matter alone, and that many of the agreements were not respected. In 1889 (Meiji 22), the *iriai* commons were incorporated into imperial ownership, and the following year the new ‘Rules on the Disposal of Grass and Wood’ [*Soumoku harai-sage kisoku*] were issued. After remaining untouched for some time, the ‘Regulations on Conservation and Supervision in the 36-hamlet CIL’ were reinstated in 1899 (Meiji 32). However, it was still not enforced because there was no on-site inspection or supervision. In the Ashikura CIL, the regulations were also introduced, but again they were not followed. After 1899, however, each of the five sub-hamlets in Ashikura began to take responsibility for creating coppiced broadleaf forests (*karitate-rin*).

For the 36-hamlet CIL, the amount of forest resources used by residents was surveyed. It is a case study of a mountainous area in western Yamanashi Prefecture in the middle of the Meiji period; therefore, it is limited by location and time. However, it is unique, accurate, and detailed data on the use of *sanrin* resources.

### **Amount of Wood and Firewood Collected by Residents**

Firstly, the frequency of wood use by the residents and the amount of wood collected in each village were studied. Nine of the 13 total villages in the 36-hamlet CIL collected wood. The villages can be roughly divided into five villages (Iino, Minamoto, Hyakuta, Zaikezuka, and Nishino) that primarily used the 36-hamlet CIL and four villages (Asahi, Tatsuoka, Ookusa, and Ashiyasu) that also took wood from other locations (table 3).

**Table 3** Timber and Firewood Collected from the 36-hamlet CIL

Villages mainly utilizing the 36-hamlet CIL (Iino, Minamoto, Hyakuta, Zaikezuka, and Nishino)				
	High use frequency	Low use frequency	Non-use	Total
Number of households	200	600	836	1.636
Average number of people entering /household	2	1		
Average days of entrance /person	100	40		
With horse /person-day	10.000	4.000		14.000
Without horse /person-day	30.000	20.000		50.000
Total /person-day	40.000	24.000		64.000
Quantity of collecting with horse / kan/day	40	40		
Quantity of collecting without horse /kan/day	15	15		
Total quantity of collecting with horse /kan	400.000	160.000		560.000
Total quantity of collecting without horse /kan	450.000	300.000		750.000
Total quantity of collecting /kan	850.000	460.000		#####
Total quantity of collecting /tana	1.700	920		2.620
Residue /tana	170	92		262
Sum total of quantity of collecting /tana	1.870	1.012		2.882
Villages utilizing the 36-hamlet CIL and other places (Asahi, Tatsuoka, Ookusa, and Ashiyasu)				
	Ashiyasu	Other three villages		
Number of households	159	863		
Firewood consumption per household /tana	4	3		
Total firewood consumption /tana	636	2,589		
Utilization rate of the 36-hamlet CIL	0,2	0,1		
Total consumption of firewood from the 36-hamlet CIL /tana	127	259		386
Sum total /tana				3.268

Source Yamanashi prefecture (1903c, 69–71).

The first group consisted of 200 households that used CIL frequently, 600 households that used it infrequently, and 836 households that did not use it, for a total of 1,636 households. In the case of the households that used the mountain area frequently, an average of two people per household entered the mountain area, and each person entered the mountain area about 100 days per year, resulting in 4,000 person-days. Of these, 1,000 person-days were with horses and 3,000 person-days were with-

**Table 4** Estimated Quantity of Wood Collected from the 36-hamlet CIL

Type of wood	<i>Tana</i>	<i>Shakujime</i>	<i>Kan</i>	Rate
Timber	163,35	992,10	82.675	0,05
Firewood	1.960,20	11.761,20	980.100	0,60
Brushwood	326,70	1.960,20	163,350	0,10
Twig ( <i>moya</i> )	821,75	4.930,50	410.875	0,25
Total	3.267,00	19.602,00	1.633.500	1,00
Total without twigs	2.445,25	14.671,50	1.222.625	0,75

Source Yamanashi prefecture (1903c, 69–71).

out horses. Those with horses could collect 40 *kan* per day and those without horses could collect 15 *kan* per day, for a total of 400,000 and 450,000 *kan*, respectively. For the 600 households with less frequent use, the total amount collected by those with and without horses was 160,000 and 300,000 *kan*, respectively. Together with 10 percent of the residue at the time of harvest and unit conversion, this amounted to 2,882 *tana*.

In the latter four villages, the utilization rate of the 36-hamlet CIL was low, 20 percent in Ashiyasu and 10 percent in the other three villages, due to the other mountains from which the wood was obtained. They mainly collected firewood, with each household consuming four *tana*/year in Ashiyasu village and 3 *tana*/year in the other three villages. Multiplied by the number of households, the firewood consumption was 386 *tana*/year in the four villages from the 36-hamlet CIL.

Table 4 illustrates the volume of harvested wood by type: timber, firewood, brushwood, and twigs (*moya*). The term '*moya*' was limited to this region and was commonly called *koshiba*. *Moya* was harvested from grassy mountains rather than forests, and the sprouts of broadleaf trees, generally at least three years old, were used as firewood. Excluding *moya*, the amount of wood collected was 2,445 *tana*, about 24 times the 100 *tana* paid to the BIE. The amount of *moya* collected was also 13 times the amount paid to the BIE.

### ***Amount of Karishiki and Grass Collected and the Area of Grassy Mountains Used by Residents***

Initially, seven villages used *karishiki* and grass from the 36-hamlet CIL (table 5). For each of these villages, the total area of rice paddies, fields, and nurseries was examined, and for each of these areas, the rate of use of *karishiki* and grass and CIL was also examined to determine the area of rice paddies, fields, and nurseries that were supplied with *karishiki* and grass from the CIL. Rice paddies accounted for 166.2 *cho*, or about 20 percent of

**Table 5** Area of Rice Paddy, Field, and Nursery Where Villagers Used Karishiki and Grass from the 36-hamlet CIL

Village	Rice paddy in summer (wheat field in winter)						Other field						Rice nursery							
	Entire		Karishiki /		CIL		Grass		CIL		Entire		Karishiki		Entire		Karishiki		CIL	
	area	input rate	grass input area	grass area	use rate	use area	input rate	input area	use rate	use area	area	input rate	input area	use rate	use area	area	input rate	input area	use rate	use area
Iino	88,9	0,8	71,1	0,5	36,0	149,6	0,27	39,9	0,8	32,0	4,20	0,5	2,10	0,8	1,6800					
Hyakuta	47,7	0,5	23,9	0,7	16,7	175,9	0,00	0,0	0,0	0,0	0,06	0,5	0,03	0,7	0,0203					
Asahi	191,7	0,8	152,0	0,1	15,2	31,8	0,80	25,4	0,1	2,5	0,13	0,9	0,12	0,3	0,0318					
Tatsuoka	173,0	0,0	0,0	0,0	0,0	63,6	0,10	6,3	0,0	0,0	0,00	0,0	0,00	0,0	0,0000					
Ookusa	120,0	0,9	108,0	0,1	11,8	69,0	0,80	55,2	0,1	5,5	0,07	0,9	0,06	0,5	0,0300					
Minamoto	170,0	1,0	170,0	0,5	85,0	51,0	0,90	45,9	1,0	45,9	10,20	1,0	10,20	0,8	8,1600					
Ashiyasu	10,5	0,2	2,1	0,7	1,5	59,0	0,20	11,8	0,7	8,3	0,02	0,2	0,01	0,8	0,0024					
Total	801,8	---	527,1	---	166,2	599,9	---	184,5	---	94,2	14,68	---	12,52	---	9,9315					
Average	114,5	0,6	75,3	0,4	23,7	85,7	0,4	26,4	0,4	13,5	2,10	0,6	1,79	0,6	1,4188					

Note: Only seven of 13 villages used the 36-hamlet CIL for *karishiki* and grass. Villagers grew rice in summer and wheat in winter on the same land. Source: Yamanashi prefecture (1903c, 72-9).

**Table 6** Estimated Area of the Mountain for Collecting *Karishiki* and Grass in the 36-hamlet CIL

		Input to paddy and field		Total quantity	Collecting from mountain	
		Total Area	Quantity per 0.1 cho		Quantity per 0.1 cho	Total area
		(cho)	(kan)	(kan)	(kan)	(cho)
<i>Karishiki</i>	Rice paddy	166,20	204,0	339.048	48,0	706,35
	Rice nursery	9,93	50,0	4.966	1,0	496,60
	Total	176,13		344.014		1202,95
Grass	Wheat field	166,20	198,0	329.076	61,2	537,70
	Other field	94,20	198,0	186.516	61,2	304,70
	Total	260,40		515.592		842,40

*Note* Although the estimated total area of mountain needed for gathering *karishiki* was 1,202 *cho*, villagers gathered *karishiki* for rice nurseries and for rice paddies in the same place but at different times of the year. Accordingly, the total area needed to collect *karishiki* was 706 *cho*. The villagers cultivated rice in summer and wheat in winter on the same land, so the area of rice paddies and the area of wheat fields were identical. *Source*: Yamanashi prefecture (1903c, 72–9).

the total area; other fields 94.2 *cho*, or about 15 percent of the total area; and nurseries 9.9 *cho*, or about 70 percent of the total area. Note that the fields used for rice in summer were used for wheat in winter, so both *karishiki* and grass were used.

Next, the amount of *karishiki* and grass needed per 0.1 *cho* of rice paddy, field, and nursery was determined by interviewing residents (table 6). These quantities were multiplied by the input area (table 5) to estimate the quantities and areas of *karishiki* and grass collected. The total amount of *karishiki* and grass collected, 859,606 *kan* (171,921 *soku*), was 4.3 times the 39,871 *soku* paid to the BIE. The estimated area of mountain needed was 706 *cho* for *karishiki* and 842 *cho* for grass, which could be covered by the 1,128 *cho* of grass-covered mountains and 2,628 *cho* of deciduous broadleaf forest identified in the forest conditions (table 2).

### Cost of Alternative Fertiliser

The prefecture investigated how much it would cost per 0.1 *cho* to apply manure and fertilizer other than *karishiki* and grass to rice paddies, wheat fields, and nurseries (table 7). This suggested that if labour were paid to collect *karishiki* or grass, an alternative manure or fertilizer could be purchased for about half the cost. In practice, however, *karishiki* and grass could be collected for a small amount paid to the BIE when labour costs were not considered. In the rice paddies, labour costs were about 3 yen, which could be replaced with night soil or soybeans for half that

**Table 7** Comparison of Manures Available for Agriculture in Yamanashi in the Mid-Meiji period

	Manure	Price (yen)	Quantity
Rice nursery (0.1 <i>cho</i> )	<i>Karishiki</i>	1.5-1.75	50 kan
	Night soil	0.275-1.375	6-30 koku
	Pea manure	0.4-1	20-50 kan
	Lime phosphate	0.9-1.8	1-2 kan
	Charcoal	0.75-1.8	1.5-3.6 kan
Rice paddy (0.1 <i>cho</i> )	<i>Karishiki</i>	2.71-3.195	204 kan
	Soy bean	1-2	1-2 to
	Night soil	0.75-1.25	1.5-2.5 koku
Wheat field (0.1 <i>cho</i> )	Grass	2.08-2.46	198 kan
	Night soil	1.6-2.5	100-160 kan
	Soy bean	2-3	2-3 to
	Lime phosphate	0.9-1.9	1-2 kan

*Note* Prices of *karishiki* and grass were estimated from labour costs.

*Quantities* of *karishiki* and grass were based on those calculated in table 6

*Source* Yamanashi prefecture (1903c, 80).

amount. In wheat fields, labour costs were 2-2.5 yen and could be replaced with lime phosphate for half that amount. In the nursery, labour costs were 1.5-1.75 yen and could be replaced by charcoal or lime phosphate for the same amount. The average percentage of *karishiki* and grasses applied to rice paddies, fields, and nurseries was 40-60 percent (table 5), but what other types of fertilizer were used was not reported.

Based on these findings, the Survey Report argued that it would be more profitable for BIE, the iriai commoners, and national land security to incorporate the CIL into conservation forests and then afforest it than to leave it as it was.

### Concluding Remarks

The socioeconomic and natural environment in the mountain village living spaces of Yamanashi Prefecture in the middle of the Meiji period, which is the subject of this chapter, underwent very rapid change. The Meiji government enacted the Forest Act and other laws in response to frequent flooding throughout Japan, but the prefecture had developed countermeasures earlier or at the same time. Several years before Saito became Head of Division 6, he published a newspaper article describing his 'Opinion on Flood Control in Yamanashi Prefecture', in which he actively advocated the incorporation of degraded mountain forests, even on the imperial estate, into the system of conservation forests, which was



consistent with the flood control measures that the prefectural assembly was considering at the same time. As a result, the prefecture created Division 6 and introduced a policy of 'Forest remediation', enacting laws and regulations to this end. In particular, the prefecture was required to operate the system of conservation forests in accordance with the Forest Act, which had just come into force, in accordance with the prefecture's circumstances. The prefecture also made efforts to promote this policy by publishing it for the public.

The Survey Report on the Midai River water source included in the conservation forest revealed the cost of flood damage, area of water sources, forest condition of CILs, BIE income, conservation and supervision regulations, and the amount and area of *sanrin* resources used. Technologies such as planimeters were used, actual conditions were detailed through interviews with residents, and the necessary quantitative information was compiled. These results convincingly demonstrated to BIE that management of the CIL had been practically neglected. For the residents, the 36-hamlet CIL, which was in a state of disrepair, was contrasted with the Ashikura CIL, which was in relatively good condition, and it was shown that improvements could be made through resident innovation, such as coppiced forests called *karitate-rin*. At the same time, it was suggested that, given the labour required to do this, it would make more sense to purchase alternative fertilizers than to collect *karishiki* or grass, which would cause devastation.

Based on the data contained in the report, the 36-hamlet CIL had 28 percent grassy mountains and 64 percent degraded deciduous broadleaf forests. Ashikura CIL, on the other hand, had 10 percent grassy mountains and 48 percent degraded broadleaf forest. Compared to Mizumoto's (2003) study of Iida in Nagano in the early modern period, the 36-hamlet CIL had a higher percentage of grassy mountains and deciduous broadleaf forests, while the Ashikura CIL may have had a similar percentage. Vegetation such as planted forests and *karitate-rin* showed characteristics of the middle Meiji period. In addition, rice paddies received 204 *kan* per 0.1 *cho* of *karishiki*, fields received 198 *kan* per 0.1 *cho* of grass, and nurseries received 50 *kan* per 0.1 *cho* of *karishiki* (table 6). These inputs were less than half those found by Tokoro (Fujita 1995). However, the average percentage of arable land with *karishiki* or grass from the 36-hamlet CIL ranged from 40-60 percent. It is quite possible that they were mixed with other fertilizers, so it would not be surprising if the amount of *karishiki* and grass decreased compared to the early modern period. According

to Tokoro (Fujita 1995), 10-12 times the mountain area was needed compared to the field area, while in the case study in this chapter, 4.2 times the *sanrin* was needed for rice paddies and 3.2 times for fields. Just as the prefecture recommended the use of alternative fertilizer, the rapid changes in the socioeconomy would have led to significant changes in the use of *sanrin* resources.

Research on forest management in the colonies has shown that its characteristics can be found in five categories: redefinition of ownership, demarcation of forests, changes in the composition of forest vegetation, strict limitations on customary use, and control of burning (see Guha and Gadgil 1989, Roche 2010, Sivaramakrishnan 2008). The introduction of modern forestry in the colonies led to intense conflict between modern science, technology, and legal systems and traditional resource use due to unexpected climatic and vegetation conditions, as well as social and economic differences. The CILs in Yamanashi Prefecture in the early twentieth century were not a colony, but their actual situation fell under all these categories. The Survey Report was a proposal for what kind of ownership and use would be desirable for the residents and the prefecture in the chaos caused by rapid modernization.

Finally, another objective of this book is to compare living spaces in response to changes in socioeconomic and natural environments. As for the case studies in this chapter, further research is needed to compare these areas in Japan with mountain regions in Europe. For example, Kazuhiro Itami studied France and found major differences in grazing from those in this chapter (Itami 2020). In contrast to Europe, where afforestation and grazing clash, in Japan the national government and prefectures attempted to ‘forestize’ the traditional use of *sanrin* for flood protection and convert it into timber resources with high monetary value, as opposed to the traditional use of *sanrin* to obtain resources mainly for manure and fuel, such as *karishiki*, *koshiha*, and *kaya*. However, as part of a compromise with the residents, the possibility was created to switch to coppicing in addition to afforestation, which is an easy way to secure resources such as firewood. Our future task is to identify each of these compromises in micro-living-spaces in different regions and countries and discover similarities and differences.

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