

Reviving Lucrative Matsutake Mushroom Harvesting and Restoring the Commons in Contemporary Japan

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Abstract:

This paper presents a brief history of matsutake mushroom production in Japan – this is probably the most valuable mushroom in the world, and it cannot be cultivated so must be found wild in natural forests. The harvesting of matsutake, almost always from *iriai* common land, has declined in Japan in spite of the lucrative profits available. Some have assumed this decline is due to losses of iriai land or difficulties managing land in common, and it is certainly the case that much iriai land has been converted to suburbs, golf courses, and the like. However, it appears that a very serious problem is the impoverishment of habitat. One problem is the decline and disease in the species of pine tree with which matsutake is associated, and another is that matsutake actually depend on traditional commons practices of gathering and clearing undergrowth and leaf litter that is gathered as fuel or fertilizer. This paper compares bidding systems for allotment of matsutake gathering rights in three villages with different practices, to examine the impact of these arrangements on village finances, matsutake production, and enhancement of matsutake habitat. Contrary to the expectations, habitat for matsutake was not improved when land owners were guaranteed the gathering rights to matsutake growing on their own individual lands. Instead, habitat improvement was most successful and matsutake production was highest on community-owned lands in Oka Village where the *iriai* tradition is strongest.

Keywords: *Matsutake, Japan, Kyoto, iriai, bidding system, community's revenue, collective forest management*

1. Introduction

The matsutake, *Tricholoma matsutake* (S. Ito & S. Imai) Singer, has long been the most highly prized mushroom in Japan. For example, the average wholesale price for Japanese domestic matsutake in 2007 was approximately ¥40,000 (U.S. \$383) per kg in Tokyo (WEB; Metropolitan Central Wholesale Market) and ¥51,000 (U.S.

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\$485) in Kyoto (WEB; Kyoto City Web). Although these prices are influenced by the decline of matsutake production as mentioned below, matsutake has been a lucrative natural resource. Due to such high value of matsutake, a unique communal institution for matsutake had been emerged. That is bidding of gathering rights of matsutake operated by a community and has played an important role for communities' administration.

However, this communal custom faces on challenges recently. These challenges had been caused by drastic decline of matsutake production and the following efforts of forest management for matsutake production.

This paper illustrates a brief history of communal customs for harvesting matsutake and its back ground. Further, in order to see whether one particular bidding and tenure system is more conducive to habitat enhancement than another, we present three case studies involving systems of bidding for picking rights and attempts to improve habitat for matsutake. The area focused in this paper is Kyoto, which is the most traditional place where matsutake has long been produced and consumed.

2. The Bidding Out of Matsutake Gathering Rights as a Manifestation of *Iriai*

2-1. Emergence and Expansion of Bidding Custom

In Kyoto Prefecture, which has long been famous for its production and consumption of matsutake, a unique system of making bids for matsutake gathering rights has developed over the centuries. Rurio Motoyoshi (1989) demonstrated the development of matsutake bidding systems through diligent study of historical documents. Historical records on the bidding for matsutake gathering rights have appeared as early as 1665, when Kamigamo shrine called for bids to sell the gathering rights for matsutake in its forests to inhabitants in the neighborhood, and then collected the bidding income as well as a tax on the amount gathered. (Before the Meiji era, a shrine was often powerful enough to own large lands.) Another example can be found in early 18th century records of the Tanabe clan under the Tokugawa Shogunate government.

Villages once treated matsutake like any other wild mushroom, i.e., its harvest was not restricted (Motoyoshi 1989; Chiba 1991). However, with expanding roads and railways that made the transport and sale of matsutake much easier, more and more villages came to see matsutake as a commercial resource capable of yielding substantial common profit under the *iriai* system, which is an indigenous commons in Japan. During the Edo era, bidding was conducted only in the vicinity of the center of Kyoto city; the first record of bidding invited by a village dates back to the 19th century, and by the mid-20th century almost all villages in Kyoto Prefecture came to

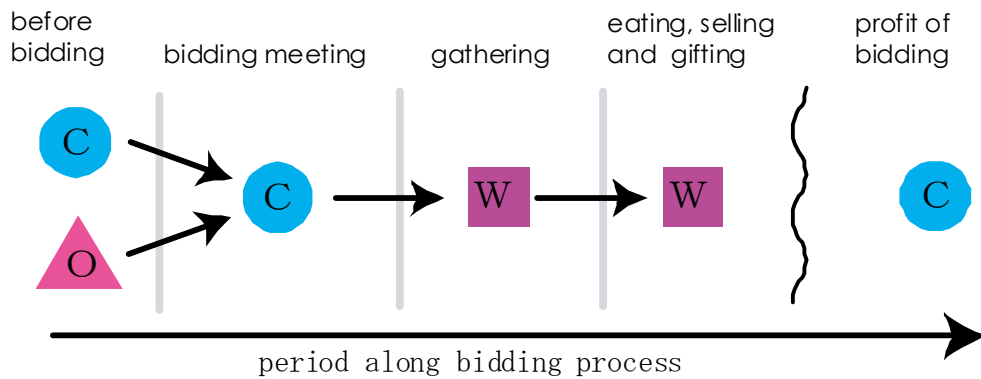
invite bids for matsutake.

2-2. Bidding practices and the use of bidding income

The manner of bidding for matsutake, as arranged by each village, varied in detail. However, at that time many of them adopted the “Whole Bidding System,” defined in this paper as a system under which bids are solicited by the community for the gathering rights on both communal and privately owned forests. A survey of 96 villages in Kyoto Prefecture in 1979 showed that a Whole Bidding System was conducted in a majority of villages in Miyama and Keihoku districts (Motoyoshi 1980).

Under the Whole Bidding System, even if a villager owns a *matsutake-yama* (a forest or mountain where matsutake grows), he must bid for the right to harvest the matsutake growing on that land. As these private forests were originally part of *iriai* forests, it can be seen that this apparent absurdity is rooted in the philosophy of *iriai* (Motoyoshi 1989), that is, the traditional custom of jointly using the village lands, especially its matsutake resources. It is evident, then, that the *iriai* philosophy has persisted even after lands were privatized.

The Whole Bidding System for matsutake is interesting in that the landowner does not hold the gathering rights, and those who do hold the exclusive rights to the gathering and selling of matsutake and related benefits (eating, gifting) change from year to year through the bidding process (Fig. 1).



a right belongs to;

all villagers collectively, private land owner and winning bidder

Fig. 1. A typical right shifting model of the Whole Bidding System. Before bidding, all rights of land use are held by individual land owners or all villagers collectively according to land ownership in law. At the moment of bidding meeting, all rights are presumed to be shared by all villagers equally regardless of land ownership. After the gathering rights of matsutake are sold, only winning bidder can enter forests and harvesting matsutake, then only he can eat, sell and present matsutake. Profit of bidding eventuated in all villagers' profit at some future date.

The bidding meeting (at which bids are made) is typically held in an assembly hall at the beginning of September. Bidders are usually limited to original natives of the village, but according to Nagasakiya (1993), outsiders and even matsutake traders are allowed to bid in villages near Kyoto. Almost all the bidders are older men.

The *matsutake-yama* to be bid upon are divided into parcels for which bids are invited one by one. The order in which the parcels are bid out is determined by prior consultation or lottery in some villages, and is fixed in others. The number of parcels bid upon changes according to matsutake productivity, i.e., the village stops inviting bids for a parcel in which matsutake productivity seriously declines, and opens bidding on "new" parcels in which matsutake have begun to appear. As matsutake production has declined in recent times, the former scenario is more common.

Because the revenue of a village will suffer if the bids are too low, many villages set a beginning bid price or price floor called *shikine*, and they typically eat and drink rice wine or beer before starting the bidding in order to boost the bid prices. Some people may win the gathering rights to several parcels while others win nothing

at all. Once someone pays the bidding money to the village, he gains all the rights for gathering and selling matsutake on the parcels he successfully bid for regardless of land ownership. In almost all cases, he holds exclusive rights until the 15th of November when the game hunting season starts. During the time that the winning bidder holds the gathering rights, no one, not even the land owners, can walk in their own forest even if it is not matsutake-yama without permission. If they try to even get near the forest area without permission, they may be suspected of being a matsutake thief.

The revenue collected from bidding is used by villages to benefit their inhabitants. This is the main reason why villages have continued to practice the bidding system. According to Motoyoshi (1989), the revenue of many villages depends upon the bidding income from matsutake, and the percentage of bidding income as a portion of total village revenue reaches 90% in some cases. One village established an elementary school by saving up bidding income (Arioka 1997). According to Motoyoshi (1989), village documents from the time that village bidding systems were first developed around 1900 express the idea that those who don't have *matsutake-yama* should still enjoy the profit from matsutake. Thus, an underlying philosophy of *iriai* seems to be permeating the traditional bidding process.

3. Challenge for Bidding Institution

3-1. Decline of matsutake production

Matsutake production relates closely to human activities in forests. In Japan, the matsutake is associated ectomycorrhizally with species of *Pinus*, *Tsuga*, and *Picea*. Among these host trees, Japanese red pine (*Pinus densiflora* Siebold & Zucc.) is by far the most common. It is typically a pioneer species, hence forests of Japanese red pine used to be widespread in areas surrounding settlements. For centuries these red pine forests have been thinned repeatedly by villagers cutting trees and understory shrubs and collecting fallen leaves for fuel and/or fertilizer, a practice that favored the growth of matsutake as well as the pines.

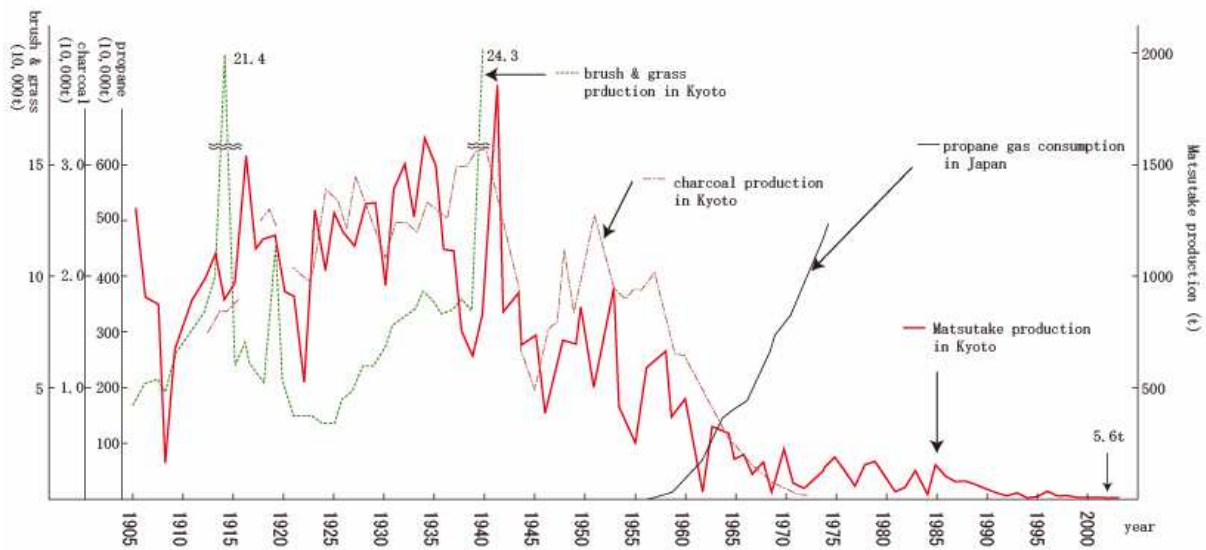


Fig. 2. Matsutake (*Tricholoma matsutake*) production in Kyoto and some indexes about forest use of aiming at fuel and fertilizer supply. This image is made by combining the original images of Kyoto Prefecture Forest Experiment Station (1977:1) and Arioka (1997:273), and recent transition data of matsutake production are based on "Statistics of Forestry in Kyoto" contributed by Kyoto Prefecture Agriculture, Forestry and Fishery Agency.

A number of studies on the ecology of matsutake have shown that these forests where vegetation disturbance takes place are favored by matsutake (Ogawa 1979, Tominaga and Yoneyama 1978, The MATSUTAKE Research Association 1983, Ito and Iwase 1997, Yoshimura 2004). For example, in Kyoto Prefecture, traditional timber use (such as the use of wood and brush for fuel) is positively correlated with matsutake production (Fig. 2). As Hosford et al (1997) described in their summary of existing research on *T. matsutake*, "Forests consisting predominantly of pines, with few other tree and shrub species, are most favorable for matsutake production. Ideal conditions also include an open canopy that allows light to penetrate to a sparsely vegetated forest floor, and warm, well-drained soils with thin litter and organic layers."

Not harvesting pressure, but habitat change, has been considered as the primary cause of the matsutake's dramatic decline in Japan. The loss of favorable matsutake habitat has occurred for three reasons: 1) its primary host tree in Japan, Japanese red pine, has died in great quantity due to the pine wilt disease which is caused by the non-native "pinewood nematode" (*Bursaphelenchus xylophilus* (Steiner et Buhrer) Nickel et al) 2) many historically productive forests located close to settlements have been converted to building estates, golf courses and so on; and 3) the replacement of wood and other biomass fuels by oil and gas has greatly diminished the age-old practice of removing trees, shrubs and fallen leaves (Ogawa 1979, Hosford et al 1997, Yoshimura 2004). With diminished removal activities,

trees and shrubs other than Japanese red pines, especially broadleaf trees, are favored, and their dense growth blocks the sunlight needed by pine seedlings. As a result, when mature pines die due to pine wilt disease, the mycorrhizae of matsutake are unable to transfer to new trees. Furthermore, when thick layers of leaf litter and organic material accumulate on the soil, matsutake are prevented from growing vigorously by overgrowing saprobic microbes.

Increasing the productivity of matsutake has been a priority of Japanese forestry, especially as it relates to the third reason stated above. Studies on the biology, ecology and cultivation of matsutake were first undertaken in the early 20th century (see Hamada 1964) and developed notably during the 1960s as the decline in Japan's matsutake production was noted. Based on the fruits of these studies plus the creative trials made by earnest farmers, some methods have been developed to increase matsutake productivity (e.g., Tominaga and Yoneyama 1978, The Matsutake Research Association 1983, Ito and Iwase 1997, Yoshimura 2000, 2004).

3-2. Promotion of Habitat Improvement and Arguments about Bidding customs in Kyoto Prefecture

As already shown in Fig. 2, Kyoto Prefecture, in spite of traditionally a major area for matsutake production, has experienced sharp declines in matsutake production characteristic of Japan as a whole. To deal with this situation, the Kyoto Prefecture Forest Experiment Station began studying the technology of enhancing matsutake productivity in 1965 (Yamagishi 1980). After considerable effort, they developed a habitat management regime called the "Kyoto method" (but which is similar to those developed by researchers in other regions). Basically, the "Kyoto Method" consists of first diagnosing the state of the forest, then cutting and removing broad-leafed trees and brush as required, and then raking up fallen leaves and surplus organic matter.

But this habitat improvement method poses some daunting technical problems for individual villagers, as have methods developed elsewhere (Amaranthus et al 2000, Yoshimura 2004). Disciplined know-how is needed to diagnose the state of the forest, and to choose appropriate responses. In the case of a forest in which fuel wood production and brush cutting has ceased for years, heavy labor is required initially, and several years of continued operations may be needed before the desired effects are noticeable.

In 1978, the Association for Promotion of Matsutake Production of Kyoto was established in order to promote habitat improvement throughout the prefecture. This association consists not of individual villagers but of villages, because villages are expected to be able to deal with the problems mentioned above; also, villages have taken the initiative in matsutake improvement efforts (Hori 1979). For the first time,

forest operations aimed at improving matsutake production were subsidized 50% by the Japanese government and 10% by the prefecture (Yamagishi 1980).

“Matsutake-Kaiho,” published by the Association for Promotion of Matsutake Production of Kyoto shows that, up to 1985, habitat improvement operations were conducted on 405 sites totaling 310 ha in 15 districts (Fujita 1987), and that in almost all cases the sites were communal forests as opposed to privately held lands.

As overall matsutake production has declined and habitat improvement efforts have been promoted, the bidding process, and in particular the Whole Bidding System, has come to be seen as irrational and counterproductive because in areas with a strong *iriai* tradition the landowners were not guaranteed gathering and selling rights for matsutake. As a result, it was said, they were not motivated to implement habitat improvement aimed at boosting matsutake production. Motoyoshi (1980, 1983) and the Fukuchiyama region agency (1981) first pointed out this problem, and an article by Murakami (1988) on Takatsu village (one of the villages we studied), shows that many villagers were pressing for changes to the Whole Bidding System.

4. Case Studies

Since the Meiji era, the center of matsutake production in Kyoto Prefecture has shifted northward from a suburb of Kyoto City to a nearby mountainous area (Motoyoshi 1989). We chose as our study site Ayabe District, 76 km northwest of Kyoto City in north-central Kyoto Prefecture (Fig. 3). Ayabe District contains the small city of Ayabe which is surrounded by mountainous villages (pop: 39,000), and connected to Kyoto by highway and rail. The district is 77% forested and has become a major producer of “Tanba-Matsutake,” a very famous brand in Japan during the modern era when matsutake production has been in decline (Hatanaka 2004).

In October and December of 2004 we interviewed the representatives of 13 villages and organizations in Ayabe District which hold bidding for matsutake. In this paper we present case studies of three of these villages: Kanegawachi, Takatsu, and Oka. The first two villages have changed their bidding system from the Whole Bidding System previously described to a Partial Bidding System, in which some or all privately held forests are exempted from bidding and the right of matsutake gathering reverts to the individual land owner. The third village, Oka, has only communal forests; some of its forest parcels are bid out while others are harvested jointly by villagers. Moreover, the villagers in Oka carry out habitat improvements aimed at enhancing matsutake production.

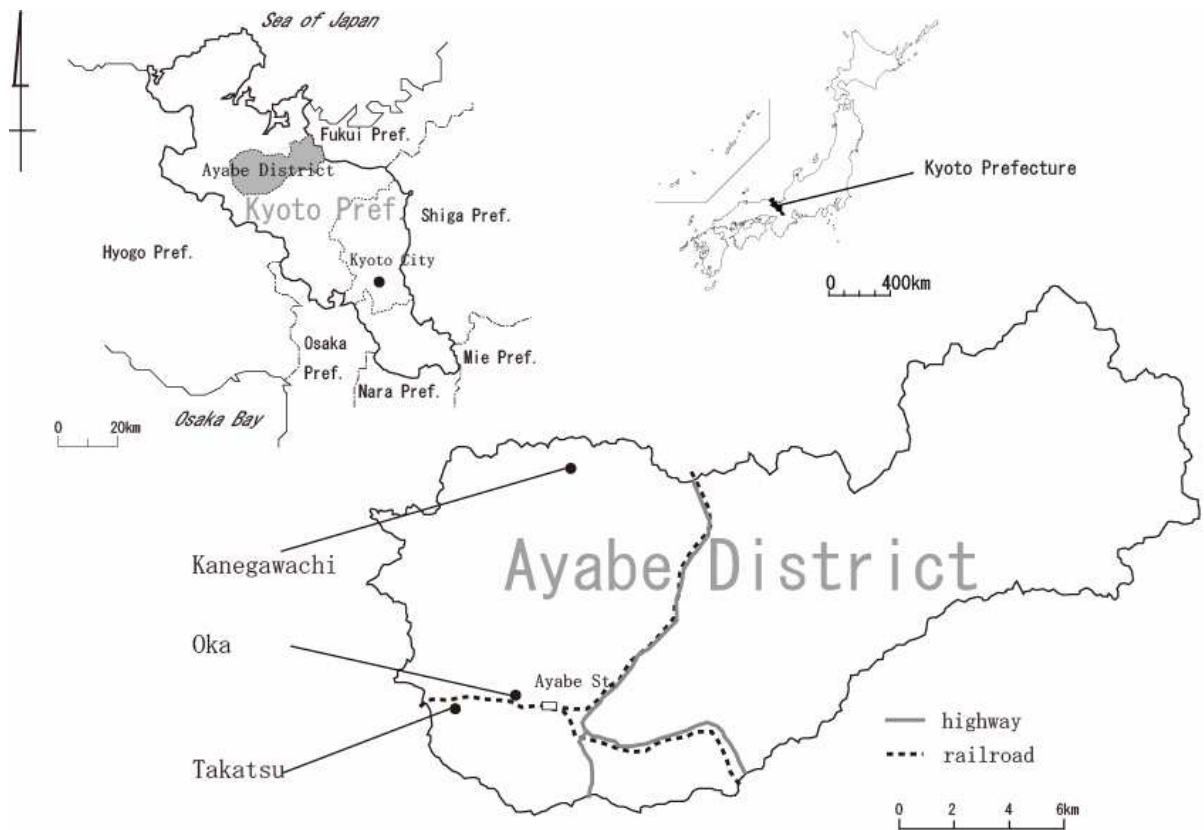


Fig. 3. Study site location

4-1. Case 1: Kanegawachi

Kanegawachi Village is located 10 km from the heart of Ayabe City (Fig. 3). All of its farmlands and forests are privately held, but administrative decisions concerning matsutake are made by the Kanegawachi-jichikai (*jichikai* is a residents' association) comprised of all 42 households in Kanegawachi.

4-1-1. Bidding System of Kanegawachi

Since there are no communal forests in Kanegawachi, all of the bidding is for gathering rights on private forests. There are approximately 40 parcels where matsutake grows in sufficient quantity to invite bids. Until the late 1990s, all of the forests were subject to a Whole Bidding System where landowners were not guaranteed the right to gather matsutake on their own lands. Instead the Kanegawachi-jichikai gave 60% of each winning bid to the owner of the property that was bid for.

However, complaints against this system surfaced in 1998, mainly by younger villagers who worked outside of the village. They expressed the view that it was not the village but the individual owner who should have the right to gather and sell the matsutake on his own private forest, and that the land owners would be more motivated to carry out habitat improvement for matsutake if the gathering and selling

rights were guaranteed to them. As a result of these complaints, the village decided to make changes in their bidding system in 1999. They replaced the Whole Bidding System with a variation of the Partial Bidding System mentioned above, wherein owners retained the exclusive right to gather matsutake on one parcel of their choice, while the Kanegawachi-jichikai invited bids for all remaining parcels belonging to that owner (Fig. 4). They also decided to raise the return paid by the Kanegawachi-jichikai to each *matsutake-yama* owner from 60% to 70%. In other words, personal property rights were enhanced at the expense of the traditional principle of *iriai*.

4-1-2. Communal Finance and Matsutake Production

In Kanegawachi there are now 14 owners of *matsutake-yama*, and 25 parcels for which bids are now invited. The Kanegawachi-jichikai supports itself by means of revenue from matsutake bidding income plus annual taxes of ¥26,000 per household and subsidies which is from Ayabe district for encouraging Kanegawachi to carry out public service such as road maintenances, snow removal and so on. The budget has typically been allocated to organizing and running a fire brigade and aiding in the establishment of infrastructure. Since the bidding system changed, bidding income has declined from ¥250,000 in the early 1990's to only ¥60,000 in 2004. Most of this decline is attributable to a decline in matsutake production. Recent discussions have focused on whether the annual household tax should be raised.

4-1-3. Habitat Improvement

As all the *matsutake-yama* in Kanagawachi are privately held, each owner decides whether or not to practice matsutake enhancement regimes; there are no collective habitat improvement projects. Kanagawachi Village anticipated that guaranteeing owners of *matsutake-yama* a greater share of the matsutake bidding income plus exclusive rights to one of their own parcels would result in the owners carrying out habitat improvement activities. Contrary to such expectations, however, there was no increase in habitat enhancement efforts by individual *matsutake-yama* owners and, in fact, there seemed to be a decrease. Under the Whole Bidding System, that is, before the bidding system changed, eight villagers had done habitat improvement on their own *matsutake-yama* even though they had no assurance that they would be able to harvest matsutake there. It was said that their improvement efforts arose not from the desire to increase their own income but from the desire to enhance the value of forests in their village, i.e., their actions were rooted in *iriai*. Unfortunately, their efforts were done without technical assistance, did not result in enhanced matsutake production, and were consequently abandoned.

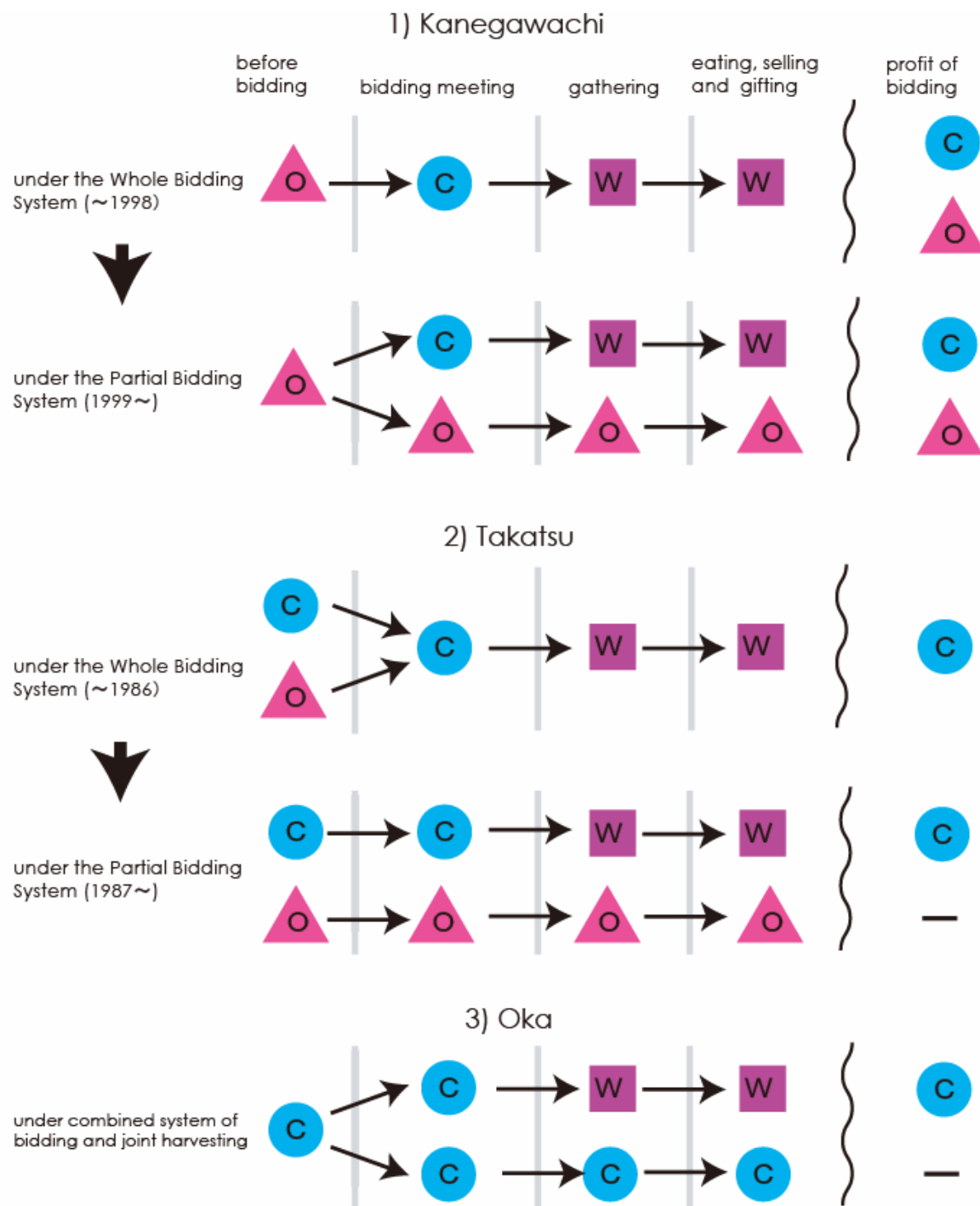


Fig. 4. Right shiftings around the bidding and gathering process in each study site, 1)Kanegawachi, 2)Takatsu, 3)Oka.

After the change in the bidding system, five owners out of 14 tried to perform the habitat improvements, but four of those five owners subsequently gave up after 1 or 2 years. Only one owner among the five, continues the practice with technical advice from a private expert. It is unclear whether the other four owners gave up because they were too impatient (it can take several years for the effects of matsutake

improvement efforts to manifest) or because they were unable to adequately perform the required tasks (the tasks might have been too much work for the individual landowners), but in any case there was a high cessation rate for individual owners trying to perform the enhancement regime alone.

4-2. Case 2 : Takatsu

Takatsu Village is located only 4 km away from the center of Ayabe (Fig. 3). Perhaps as a result of its close proximity, there is a high percentage of new residents (100 households or 36%) compared to native inhabitants (180 households). The new households do not own any forests or paddy fields.

4-2-1. Bidding System of Takatsu

There are both communal forests and private forests in Takatsu Village. The former are owned and managed by the Takatsu Agriculture and Forestry Association. This association consists of the native inhabitant households and was established in order to maintain the production base for those engaging in agriculture and forestry. Historically, the budget has been derived mainly from matsutake bidding income. Membership fees or taxes have never been collected. The Association has used its budget to repair paddies, water channels and forestry roads and to manage communally-held artificial forests. In the wake of disasters it has also played an important role in reviving the production base.

Takatsu formerly used the Whole Bidding System wherein the Association received all the matsutake bidding income and the owners of the *matsutake-yama* received nothing. However, complaints about the system surfaced as early as the 1970s, when a request was submitted to the Takatsu Agriculture and Forestry Association by several villagers demanding that the Whole Bidding System be overhauled. As in Kanegawachi, those who complained were mostly younger villagers who had outside work other than agriculture and forestry and they insisted that the owners of *matsutake-yama* should have guaranteed gathering rights. They also demanded that a part of the bidding income collected by the Association should be returned to *matsutake-yama* owners. Moreover, they argued that the Whole Bidding System discouraged them from undertaking habitat improvements on their own forests by denying them the right to gather matsutake from those same forests.

The Takatsu Agriculture and Forestry Association responded by pointing out that if the bidding system was changed from a Whole Bidding System to a Partial Bidding System, that the village would lose its budget for maintenance of production base. In other words, the matsutake bidding income was indispensable to the Association's budget, and therefore, to the welfare of the village.

The discussion went on for years without being resolved. Emotional conflicts among the villagers increased until finally, in 1987, the head of the association decided to change to a Partial Bidding System with the hope of reducing conflicts and promoting habitat improvement. Under the new system, the exclusive right of gathering matsutake is now vested in the individual owners of *matsutake-yama*. The bidding has been reduced in scope from 40 parcels to 20, and applies only to communal forests (Fig. 4).

4-2-2. Communal Finance and Matsutake Production

Bidding income declined sharply in Takatsu after the bidding system was changed in 1987. In 1985, bidding income was around ¥5,000,000 but in recent years it has been approximately ¥1,000,000 – a decline of 80%. The reasons for the decline can be attributed to the reduced number of parcels open to bidding and a continuing downward trend in matsutake production. The Takatsu Agriculture and Forestry Association is now considering whether to start collecting an annual membership fee, i.e., a tax.

4-2-3. Habitat Improvement

In order to manage Takatsu's communal forests, compulsory work called *deyaku* had traditionally been required from each villager several times a year. However *deyaku* was intended for artificial cedar (*Cryptomeria japonica*) and cypress (*Chamaecyparis pisifera*) forests only, not for *matsutake-yama*. Just as in Kanegawachi it was anticipated that the change of bidding system would encourage private owners of *matsutake-yama* to carry out habitat improvement for matsutake. But despite the greatly increased economic incentives for *matsutake-yama* owners, habitat improvement was not done nor were any private matsutake profits handed over to the Association to do it.

In other words, just as in Kanegawachi, the increased emphasis on private ownership rights to matsutake didn't contribute to the promotion of habitat improvement. No one had begun improvements after the change in bidding system. One interpretation of these events advanced by two representatives of the Association is that the landowners who originally pressed for exclusive rights to the matsutake on their lands never intended to practice a matsutake enhancement regime, and that their concern was only for the immediate profit from their own land or for the principle of private ownership (versus *iriai*). Once they had secured the exclusive right to the matsutake on their land, their interest in matsutake production waned and they abandoned forest management completely.

4-3. Case 3: Oka

Oka Village is adjacent to the heart of Ayabe (Fig. 3) and has been highly

developed as a residential area. Only 32 original inhabitants remain, against 500 new residents, and even among the native population most have quit agriculture and forestry. There are only communal forests in Oka, owned and managed by the Forest Producers' Cooperative of Oka. In principle, any resident of Oka can join the Cooperative by paying an entrance fee or "investment" of ¥3,000. In practice, the membership consists only of the 32 original inhabitants.

4-3-1. Bidding System of Oka

Oka's *matsutake-yama* is divided into five parcels, and the Cooperative administers a unique matsutake gathering policy. Matsutake gathering rights for three of the five parcels are auctioned off just as in other villages, but the other two parcels are reserved for weekly gathering expeditions by members of the Cooperative. These two types of parcels are rotated, not fixed, from year to year; that is, a parcel that is bid out one year may be reserved for joint harvest the next.

Only the Cooperative's members are allowed to participate in the bidding meeting and joint harvesting. All income from the bidding goes to the Cooperative and is spent on services for members and on the purchase of tools for habitat improvement.

The activity of joint harvesting is held every Sunday during the matsutake season at one of the two designated parcels. All participants climb up to the forest at the same time and gather matsutake together. In 2003, the highest daily amount harvested jointly was 28 kg. Afterwards the harvested matsutake are assembled and distributed to all participants in equal amounts, except when they are reserved for a joint feast that is held after the harvesting. This latter practice is notable because it is highly unusual in Japan for villagers to maintain matsutake rights collectively during both the gathering and disposal or consumption phases (Fig. 4). No complaints have been made about these customs in Oka.

4-3-2. Communal Finance and Matsutake Production

Since the Forest Producers' Cooperative of Oka doesn't engage in managing artificial forests, almost all of the Cooperative's revenue comes from matsutake bidding income. There has been no remarkable decline in bidding income in recent years because matsutake production is stable thanks to ongoing and continuous habitat improvement efforts over the years. The Oka cooperative gained ¥329,000 in 2003 from bidding income. Instead of distributing this income to each member in cash, the Cooperative uses the bidding income to plan a group tour each year and pay part of the tour's cost.

4-3-3. Habitat Improvement

Habitat improvement in Oka began before the "Kyoto method" was developed

and introduced. Matsutake production has been the Cooperative's main focus since its inception in 1959. Habitat improvement by *deyaku* (compulsory work days) has been practiced since 1962.

It is prescribed that a member who doesn't participate in *deyaku* must pay a ¥7,000 penalty, which is added to the Cooperative's revenue. Members can choose a preferred day to perform *deyaku* from two designated days. Although almost all members are no longer involved in agriculture and forestry, the majorities take part in *deyaku*; therefore, the Cooperative gains only a little income from nonparticipation penalties.

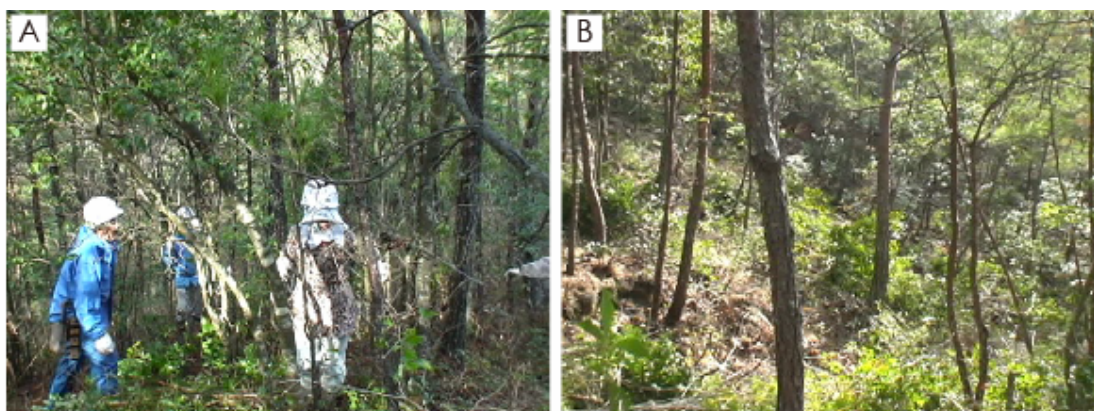


Fig. 5. Operation of habitat improvement by compulsory labour 'deyaku' in Oka. Villagers cutted bristling broad leaf trees and understory brushes (A). During three hours of morning work, trees were removed except for Japanese red pines so that light penetrated to the forest floor (B).

The senior author observed and participated in Oka's *deyaku* on December 5, 2004. 12 out of 14 who had showed they attended the *deyaku* actually participated. Most of the participants were in their sixties or seventies; eight of them were male and four were female. First the goals and work methods were discussed; then the participants walked up to the day's work site together. The work consisted of cutting small trees, for example, holly (*Ilex pedunculosa* Miq.), which is 1-3m high and whose trunk is less than 5cm in diameter, and ericaceous shrubs that covered the ground, and then assembling them for clearing the forest floor (Fig. 5). Only light tools were used such as hatchets, sickles, and saws; chainsaws were not needed. Owing to the matsutake enhancement regime continually practiced since 1962, the work that day was easy and a sociable atmosphere prevailed -- the female participants especially enjoyed talking to each other, and a break was held every 30 minutes.

In Oka, *deyaku* provided a congenial, knowledgeable, and effective

year-to-year work environment that overcame many of the obstacles to habitat improvement that individuals in Kanegawachi found so discouraging.

5. Discussion

To gain insight into matsutake production in Japan's traditionally productive areas one must take into account the *iriai* system of resource management. Bidding systems for matsutake in Japan's traditional production area are but one expression of *iriai*. The village bidding systems were mostly established by villages during the dramatic socio-economical changes after Meiji Period. As the commercial possibilities for matsutake were rapidly expanding, the villages were still deeply influenced by *iriai*; as a result, matsutake came to be viewed as a common property yielding common profit.

As communal forests were divided and privatized after the Meiji Period, many villages adopted a Whole Bidding System for matsutake. Even though this system conflicted with modern concepts of private ownership, it was entirely reasonable from a traditional viewpoint that the village control all rights of matsutake gathering and use proceeds from the bidding process to finance local forestry or infrastructure projects.

Thus a Whole Bidding System has played a great important role in autonomy and economy in rural society. This system has existed on the consciousness of property rights and actual use (management). The Japanese traditional sense of property rights in village can be illustrated as Fig. 6, which has been paid attention increasingly after 1990's by environmental sociologist (e.g., Torigoe 1997, Kada 1997) as a suggestive concept for future natural resource use (Suga 2004). In this sense, even private lands are also property belonging to the village as a whole. Therefore it is entirely reasonable that the village controls all rights of matsutake gathering and adopts the Whole Bidding System for the community's benefit.

However, the *iriai* principle has become increasingly unacceptable in recent times the last two decades, particularly for those that own *matsutake-yama*. For example, many villagers in Kanegawachi and Takatsu think it unreasonable that rights related to matsutake are separated and different from ownership rights over other facets of the forest. In their view, every landowner has the right to the fruits of his or her land on the one hand, and ought to pay a fixed asset (property) tax on the other. It has also been argued that the older customs, by not guaranteeing enough rights to *matsutake-yama* owners, acted as a disincentive to landowners to carry out the habitat improvements needed to enhance matsutake production.

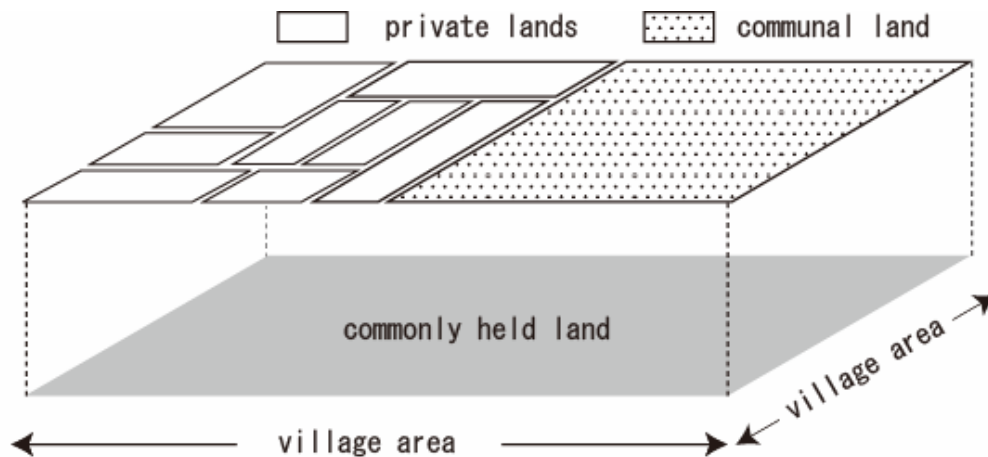


Fig.6. The Japanese traditional sense of land owing in a village. In this sense, although village land is divided into communal land and private lands actually, on the subconscious level, whole land within village area belongs to village fundamentally. Therefore villagers can't have perfectly exclusive right even on their own lands, and they have to treat their own lands in a way that will be accepted by all villagers unanimously. All lands including private lands have been in control under their village.

However, it should also be pointed out that the single-minded extinguishing of the *iriai* land use system has actually had negative effects on both village finances and matsutake productivity. The villages of Kanegawachi and Takatsu both faced financial problems since ceding collective use of *matsutake-yama* under the Whole Bidding System in favor of private (or mostly private) use under the Partial Bidding System. They have now had to introduce membership fees or other taxes in order to overcome the shortfall. Furthermore, in these villages, the forest doesn't seem to benefit the villagers any more, nor does it function as a source of capital for local projects in the way it once did. Thus villagers, though they may have guaranteed rights to the matsutake on their property, seem less and less concerned with their forests, and their motivation for (and actual practice of) matsutake enhancement is apparently in decline. In summary, there is vicious circle: less financial autonomy leading to decreasing allure of forests leading to decreasing motivation for matsutake enhancement, leading to even less financial autonomy, etc.

On the other hand, the case study of Oka Village shows a different result based on a surviving *iriai* land use system. By holding joint habitat improvement work sessions (*deyaku*) and designating days when everyone can harvest the matsutake together, the benefits of the matsutake return to the villagers directly, and in more tangible ways: actual matsutake to be hunted down, picked, handled, divided up and feasted upon, and group trips financed in part by the bidding out of some parcels. The social aspects of joint harvesting, feasting, *deyaku* and group

trips must surely strengthen community ties as well as raise motivation for continued *deyaku* aimed at ensuring matsutake production into the future. The result is a virtuous cycle: villagers participate in *deyaku* for ongoing habitat improvement, productivity of matsutake doesn't decline, villagers benefit from the matsutake, the forest continues to have allure, and villagers continue to participate in *deyaku* to keep the forest productive, etc.

Ironically, of the three villages studied it was Kanegawachi, the village farthest from Ayabe and the one which relies most heavily on agriculture and forestry for its livelihood, that was most affected by the modern privatization of land while the *iriai* tradition was strongest in Oka, the village nearest Ayabe where there is little or no reliance on agriculture and forestry for income. As a result, the matsutake enhancement activities and harvest provides the original, aging residents of Oka with opportunities for work and leisure together, giving them a sense of community and shared history in a rapidly changing world. To sustain this virtuous circle, participating of younger generation is a challenge for Oka, as well as for all forest management in Japan.

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