REGULATIONS FOR *KOMBU* KELP COLLECTION IN HOKKAIDO, JAPAN

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Abstract

Kombu *tangle is a kind of* Laminaria *kelp growing wild in the coastal areas of northern Japan. It is indispensable for Japanese cuisine both for direct consumption and use as soup stock. High quality* kombu *is particularly valued and comprises a major source of income for local fishermen. In most Hokkaido fishing communities, men called* "hatamochi" *(literally meaning "flag holders") are responsible for regulating the collection of* kombu. *They announce by means of white flags the time when the fishermen are allowed to collect* kombu. *The decision to allow collection on a particular day is based on the observation of sea and weather conditions. This* hatamochi *system was probably established in the late nineteenth century, when the monopoly of fishing was prohibited and communal regulations were required. This system, together with the current law defining the local fishermen's collecting rights, has been contributing to the maintenance of a stable* kombu *resource base in Hokkaido.*

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DEMAND FOR *KOMBU* IN JAPAN

Kombu is one of the important ingredients of Japanese cuisine. There are two main uses for *kombu*: combined with dried bonito in stock for making soup and stewed with soya sauce for direct consumption. *Kombu* as soup stock is indispensable, in particular to *nabemono*, one of the most popular dishes served in Japanese homes during the cold season. For this reason, the demand for *kombu* increases in winter. One of the most favored recipes for *kombu* is *kombu-maki* or *kombu* roll, in which herring meat or cod roe is stewed and rolled in *kombu*. Another recipe is *tsukudani*, which is *kombu* chopped and stewed with soya sauce and spices.

Although *kombu* is very common and in high demand today, it was not until the 17th or 18th century that it became of commercial interest. The commercial exploitation of *kombu* can be attributed to two reasons: The first is the development of sea transportation networks which linked Hokkaido and other parts of Japan. By this network, the areas of *kombu* production and consumption were connected. The second was Japan's trade deficit with China, which forced Japan to increase exports to that country. Because *kombu* is also used for Chinese cuisine and dried *kombu* is preservable, it was suitable as export item to supplement Japanese deficit. Until recently, *kombu* was in high demand as an export as well as for domestic consumption. In order to increase the supply of *kombu*, the area of production in Hokkaido has been significantly expanded (**Figure 1**).

Some Japanese villages were also established in this period for the purpose of collecting *kombu* in a region which very few Japanese, except aboriginal Ainu people, had inhabited. Erimo, where I conducted my field research, is one of such villages originally established for the collection of *kombu*.

INTRODUCTION

Kombu (*Laminaria* spp.), a kind of seaweed belonging to the Laminariceae family, grows on rocky shores in northern Japan where the cold current prevails. It is indispensable to a variety of Japanese dishes, and therefore a highly valued marine resource in Japan. In Hokkaido, *kombu* has been collected for at least 200 years, and today its collection comprises one of the major sources of income in the regional fisheries.

In this paper, I would like to report on the regulations for *kombu* collection by local fishermen, and discuss their implications for resource management and cooperation in resource use.

Figure 1. Expansion of the Area of *Kombu* Production

KOMBU COLLECTING ACTIVITY

In this section, I will describe the *kombu*-collecting method. The information given here was obtained from research conducted in Meguro Village, part of Erimo City in Hokkaido (Figure 2). This village has a population of 300, two-thirds of which are fishermen and their families. Almost all of the fishermen in this village collect *kombu* in summer.

In Meguro Village, *kombu* collecting season starts in the middle of July and lasts until the end of October. Late July and August is prime collecting season because the *kombu* has grown to a good size and the weather is stable. However, even during this part of the season, *kombu* is not collected everyday. In every *kombu*-collecting village in Hidaka District, there is a man called "*hatamochi*", who announces by means of a flag whether the collection is allowed on a particular day, and no one can collect *kombu* unless the *hatamochi* permits it. The *hatamochi*, literally meaning "flag holder", is elected from among the *kombu* collectors in a meeting held just before the start of the collecting season.

Around 4:00 every morning during the collecting season, the *hatamochi* observes the weather and sea conditions. He makes the decision to allow *konbu* collection based on his own observations coupled with the weather report and information from other sources. The decision is usually made around 5:00 a.m., but it may be delayed if the weather is unsettled. If he decides not to allow the collection, a red flag is hung on the pole near the port. The other collectors eventually learn that collection is not permitted on that day. However, if the weather conditions are good, the *hatamochi* announces that collection is allowed by means of a white flag hung on the pole. As soon as the white flag is raised, all the collectors waiting offshore leave for the collecting grounds. In this case, one of the *hatamochi*'s family members raises the flag, and the *hatamochi* himself also starts to collect at the same moment as the other collectors.

Kombu grows on rocky shores at depth of less than 10 meters. The collector catches a *kombu* leaf with an L-shaped stick and hauls the plants up one by one into his small boat. No other collecting methods are permitted. As such work is impossible unless the sea is calm and the boat is stable, the *hatamochi* will never raise the white flag when waves are high.

REGULATIONS FOR MANAGEMENT OF *KOMBU*

In this section, I will examine the management system of *kombu* as a resource. According to the Japanese Fisheries Law, sea resources fixed to the shore, such as seaweeds or shells, are to be managed by the local Fisheries Cooperative Association (FCA). *Kombu* is one of such resources; that is, the government permits a particular FCA exclusive use of a certain shore area. By this regulation, conflicts between different FCAs are prevented, and the FCA is motivated to manage local resources voluntarily.

Each FCA with the right to exclusive use of an area then enacts the rules for using resources under the guidance of the government (**Table 1**). These rules are intended to manage the *kombu* resource in several ways. First, by limiting the collecting season, they avoid the premature harvest of *kombu*, which would deteriorate the resource base. Second, the *kombu* resource base is also maintained by regulations for collecting method and tools, which together limit the size and amount of harvestable *kombu*. Finally, the number of authorized collectors is limited, which undoubtedly contributes to prevention of over-exploitation.

These regulations are observed by the collectors in the region studied and seem to be functioning well. **Figure 3** shows the change in the annual yield of *kombu* per collector, and while the yield fell sharply in 1984 because of unexpected drift ice, in other years it is almost constant around 2500 kg per collector. Therefore, it seems that the *kombu* resource base has not deteriorated, and this is probably due to the regulations enacted by both the government and the FCA.

While he is collecting *kombu* on the shore, the *hatamochi* always pays attention to the weather and decides the time collection will end. On a sunny day in summer, collection continues for as long as six hours, whereas on a cloudy day, it ends in only 30 minutes. This difference is mainly due to the lack of sun, because collected *kombu* should be dried during the day. When it is time to end, a member of the *hatamochi*'s family pulls down the flag and sounds a siren to inform the collectors that collection time is over.

Collected *kombu* is carried to a pebble-covered drying site. Each piece is stretched out carefully, and dried for two hours. Drying may take as long as five hours depending on weather conditions. As *kombu* dried in a day is of high quality and sold at a high price, the *hatamochi* will not raise the white flag on a rainy or foggy day.

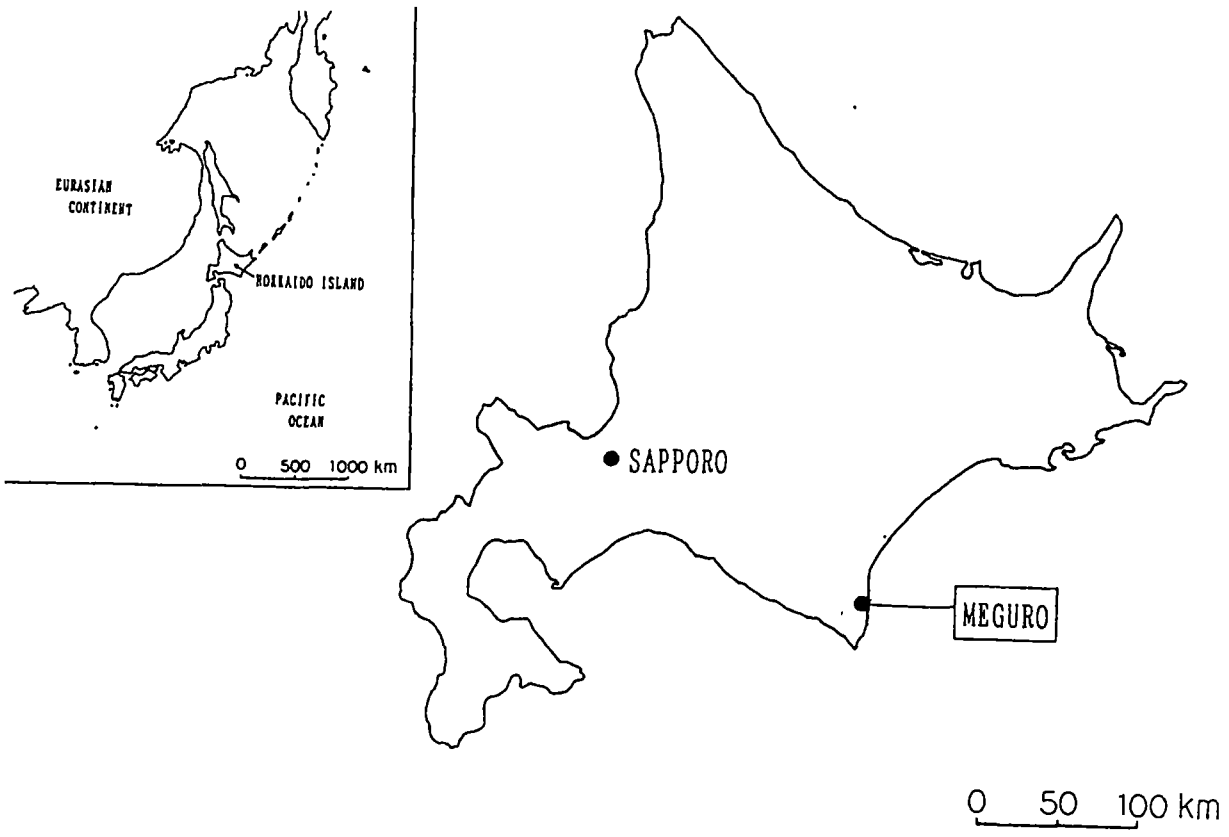

Figure 2. Location of the Study Area

COOPERATION THROUGH THE *HATAMOCHI* SYSTEM

Although the members of the FCA have a common right to the *kombu* resources, the so-called "tragedy of the commons" has not so far been observed in this area. I will examine the implications of the *hatamochi* in more detail, in order to understand why it has not occurred.

I propose here that the *hatamochi* system ensures all the collectors an equal opportunity of access to the resource. While no punishment is involved if this regulation is violated, it is customarily well observed by all the *kombu* collectors. When the *hatamochi* misjudges the weather and the *kombu* cannot be dried completely on the same day, other collectors may blame him for his failure. Even in such cases, however, no collectors would oppose his decision. The point is, therefore, that by strictly following the *hatamochi*'s decision, all the *kombu* collectors in the village keep pace with one another and have equal opportunities. This is, I think, a kind of cooperation among the collectors.

There are other interesting examples of such cooperative action. In a village next to Meguro, a boat was once capsized by a wave. Seeing this accident, the *hatamochi* immediately took the flag down to announce the end of *kombu* collection. Also in Meguro, the *hatamochi* once did not raise the white flag until a late riser had prepared himself for his work. The white flag is also not raised on a day when a funeral takes place in the village. While some collectors insist the white flag be raised even on a funeral day, the majority hold that the flag should not be hung.

Such cooperative regulation of *kombu* collection is associated with a strong motive for competition among the collectors. Figure 4 shows the change in collecting efficiency of a collector during the collecting season in 1992. It is clear that the efficiency falls as the collecting season proceeds, which is statistically significant. This is probably due to the decrease in the harvestable *kombu* biomass, although it will recover by the next year. Therefore, each collector tries to collect as much *kombu* as possible in the earlier part of the season. However, because the amount of harvestable *kombu* is

Table 1. Rules for using resources concerning kombu collection

Type of fishery	Kombu collection
Number of authorized fishermen*	Less than 230
Boats	Boats of less than two tons with or without motors
Tools	Kagi-zao (L-shaped #tools) or Nejiri-zao (T-shaped tools)
Area	Inside of the area for joint fisheries right no.1 of the Hidaka district
Period	From 10 July to 31 October
Size	Collecting mizu-kombu (kombu of small size) is prohibited

*: including those in Shoya Village and Meguro Village

(Source: Rules for conducting joint fisheries right no.1 and no.21 of the Hidaka district, enacted by Shoya FCA)

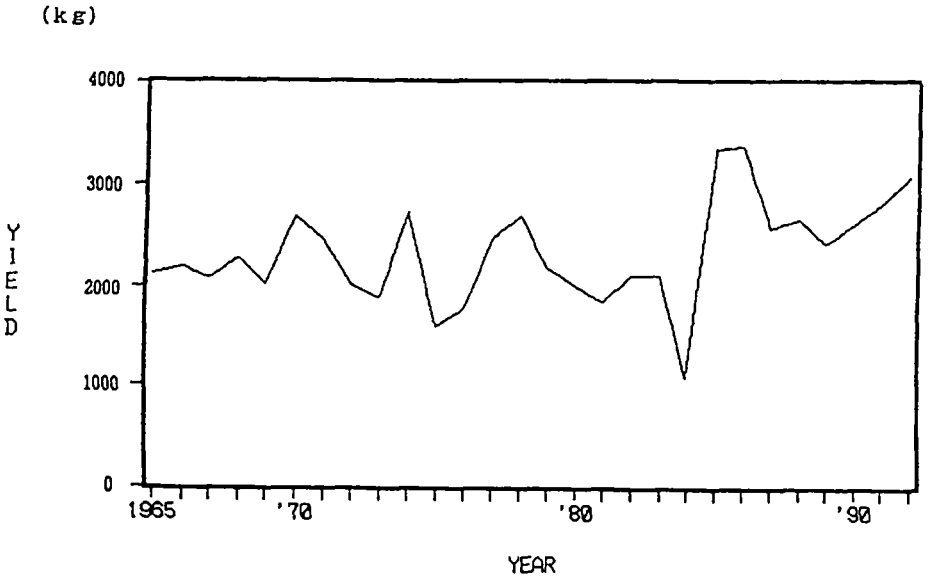

Figure 3. Annual Yield of *Kombu* per Collector

limited, there is also strong competition over the resource. Taking these complications into consideration, we can say that the *hatamochi* facilitates collection to ensure equal opportunities and conditions for all the *kombu* collectors in the village.

This *hatamochi* system was established no earlier than 120 years ago, when the fishing grounds in Hokkaido were opened to tenant fishermen by the fisheries reformation. The fishermen were, then, probably confronted with such social dilemmas as keen competition or resource depletion. To solve these dilemmas, local system to make collective decisions were required. Although *hatamochi* system is not of ancient origin, it is functioning well as traditional practice.

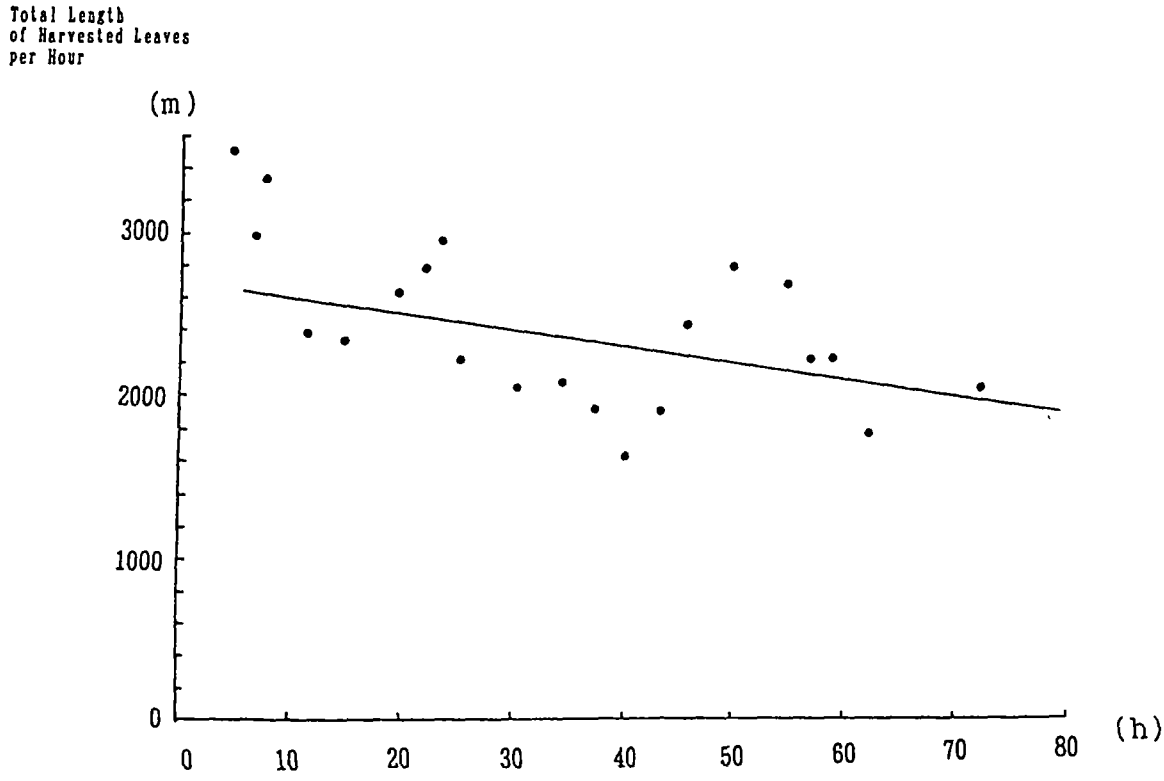

Figure 4. Change in Collection Efficiency

CONCLUSION

As *kombu* is easy for anyone to find and collect, and an important source of income for local fishermen, the competition over this resource may be heated. Severe competition over resources has caused the so-called "tragedy of the commons", the depletion of the resource base, in various places throughout the world. However, in the *kombu* collection area of Hokkaido, the competition does not become so intense that local regulations will be violated. This is largely due to the fact that all the *kombu* collectors in the village are afforded with equal opportunities and conditions by the *hatamochi* system. Such cooperation also enables resource management on the local level.

The illustration of Meguro *kombu* collection provides us with an interesting example that local systems can play an important part in sustainable use of a common resource, even when the resource is commercially exploited.