

Forest Development and Firewood Shortage in Yakushima Island

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1 Introduction: The Shortage of Firewood in the 1980s

The shortage of firewood occurred in Yakushima Island around 1980. The manufactures of dried fish which is a traditional industry in the island suffered from the occasional difficulty to obtain it. The firewood of broadleaf tree is essential supplies to smoke their products. The pulp industry of the island also began to withdraw from the business due to the insecurity of raw material. This shortage means the decrease of broadleaf trees which are part of dominant vegetation in the island.

This island has been designated as a World Natural Heritage site in 1993, and since then, became well-known as an island of thousands-year-old cedar trees and rich natural environment. More than 100 thousand tourists visit each year to see the deep forest of the island (Hirata 2005). Having its rich forest in the Japanese sixth largest island (about 500 hectare) where over 90% of the area is mountainous and forest region, how could a shortage happen?

Although the shortage in a particular resource does not mean its depletion, natural resource that is not severely-depleted can be lacked. As Zimmermann has already pointed out in 1933, “natural resource” does not mean a natural thing itself, but the complex of culture, nature and human beings. He clearly indicated that it is important to focus on social aspects in “resource science” because “resource” could be enhanced or reduced by human activities (Hunker 1964). According to his suggestion, the context of this shortage once happened in this island seems to be worth studying to obtain a valuable insight for the paradigms about the sustainable use of forest resource and the conservation of forest diversity.

The firewood shortage was claimed by the manufacturers of dried fish around 1980 (Isso Brokers Union 1981). At that time, the island had been in the chronic shortage of broadleaf wood. There were two major industries utilizing broadleaf tree. One was the wood chip industry supplying hardwood chip as the raw materials of pulp, and another is the dried fish industry using it for smoking fishes. Even though both industries had suffered from the material insecurity, I focused on the latter, the manufactures of dried fish in this study. The reason of focusing more on the dried fish industry is because the main interest of this research is to examine the traditional utilization of broadleaf tree, which can give us more insights about the sustainable use of natural resources. From the past, the islanders had made their livelihood manufacturing the dried fish of mackerel or bonito and have utilized the broadleaf tree, i.e. oak, to smoke boiled fish (Miyashita 2000, pp.354).

2 The History of the Dried Fish Production

The dried fish of Yakushima Island have been a well-known commodity product since a long time ago. For example, Figure 1 shows the order of the ranking list of dried bonito of Japan in 1822 during the Edo period. The product from the island, called yakushima-bushi, was ranked the first grade, Ozeki. Clearly, this fact shows the tradition of the industry and also the competitiveness of its product, despite of

the disadvantages in locality condition and the economic backwardness of the island. Richness in several sorts of natural resources, such as forest, fishery and water, is the major reason for this industrial development. These factors are indeed the gift from natural conditions. Because the island is located on the stream of the Black Current, there were many excellent fishing grounds off the island. In addition, plenty of moisture brought by this warm current has fostered the rich and varied flora (Yumoto 1995).

The table is a grid with multiple columns and rows. At the top, it reads '表附番節經國諸' and '年五政文'. The columns are headed with '大', '小', '中', '大', '小', '大', '小', '中', '大', '小'. The rows contain names of locations and descriptions of bonito products, such as '志德四寶', '波德阿', '左德大', '伊羅', '八里', '志德', '波德', '左德', '伊羅', '八里'. The text is dense and written in a traditional style.

Fig. 1 The ranking list of dried bonito of Japan in 1822.

Source: Miyashita (2000, pp.315)

The average amount of the dried bonito production from 1878 to 1880 in Kamiyaku town, one of two administrative districts of the island, was calculated to be about 16.8 ton. Then in the Meiji period, their products eventually shifted from dried Bonito to dried mackerel because the catch of bonito started decreasing with fishing ground moving away from the island and the competition with the fishing vessels from the mainland. In 1919 of the Taisho period, the amount of production in Kamiyaku town was 149.4 ton for dried bonito, and 341.8 ton for dried mackerel, respectively (Committee of Kamiyaku Town History 1984, pp.463). According to this statistics, the production had increased by more than 10 times compared to that in the Meiji period.

In 1981, the dried mackerel manufacturers asked the branch office of Forest Agency to supply firewood during their 4th local management plan on forest development, starting from 1982. According to the petition, there were eight processors in the island at that time and each processor was considered to consume about 400 m3 to 600m3 of firewood in a year (Isso Brokers Union 1981). And in total, about 3500 m3 to 4000 m3 was estimated necessary for the whole industry to run for a year. In order to maintain the sustainable supply, about 667 hectare of broadleaf forest was calculated to be needed. This area corresponds to just around 1% of the whole forest land in Yakushima Island. The production of dried mackerel was roughly estimated to be less than 700 ton in the early 1980s (Statistical Research Office of Kagoshima Prefecture 1981). Compared to that of the Taisho period, dried fish production had not been increasing very drastically. Therefore, the production itself could not have been the reason for the depletion of broadleaf tree.

Then what could have been the reason for this shortage? We have to scrutinize what happened in the forest resource which had provided goods to the islanders continuously up to that time.

3 The History of the National Forest Management and Change on the Value of Broadleaf Tree

Local people had experienced the drastic change of forest utilization in the Meiji period. Before that, they were allowed to use the forest resources of the mountainous region behind their villages routinely. While the Meiji government fixed the property right of forest area across the nation, large part of the forest area in Yakushima Island, including the place once available for the local, had been transferred under the government control in 1882 (Committee of Kamiyaku Town History 1984, pp.302-303). Therefore, in order to find out how local people adapted to this institutional change, it is necessary to understand the forest resource utilization of the national forest which covers almost 78% of the forest area in this island.

Figure 2 shows the amount of broadleaf timber yield from the national forest after the post war era between 1950 and 2000. Soon after the end of World War II, the operation in the national forest restarted from 1946. In the postwar years of the recovery, the logging of conifer was operated in the nationwide scale with high demand for building materials. Meanwhile, the broadleaf trees became less valuable temporarily as the demand for fuel wood decreased due to the progress of energy revolution. But in the late 1950s, the raw material of pulp began to change from pine tree to broadleaf trees with the technological development in pulp industries.

In 1963, Yakushima Forest Development Company was founded to operate logging to provide raw material for pulp. The pulp material replaced the dominant use of broadleaf tree from the fuel wood at this time. The yield of broad leaf timber doubled from the year before and started increasing in the middle of the 1960s, then marked its maximum during the late 1960s. In this term, the national forest was put under the operation of full-scale logging (Kumamoto Forestry Office 1982 & Makita 2005).

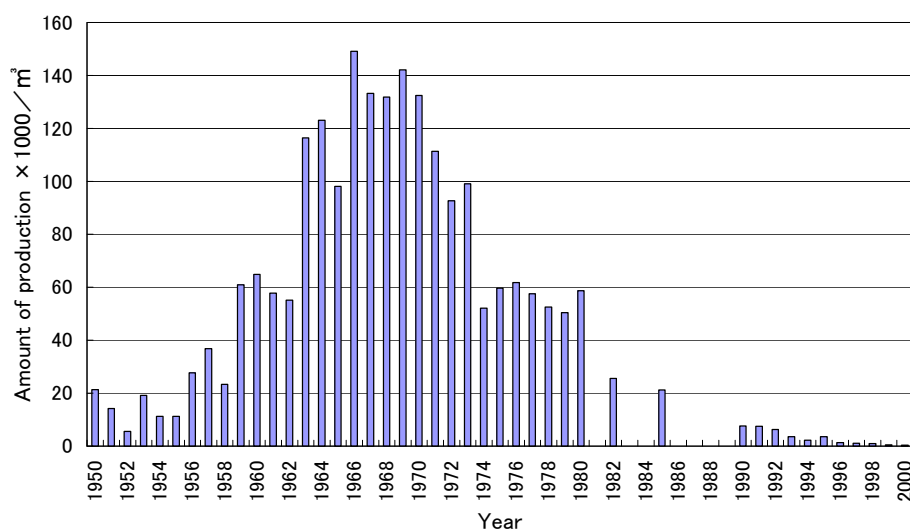


Fig. 2 The transition of the broadleaf tree production from the national forest

Source: Forest management office data

After 1970, the amount of broad leaf timber production started to decrease rapidly. This is partly because of the rise of the environment conservation movement in Japan. Forest Agency gradually changed their operation policy to selective cutting from full scale logging. Under the severe pressure of the movement, the island also re-examined the operation plan, which resulted in changing the target amount of logging. For example, compared with that of the 3rd management plan, 168×10^3 m³ between 1967 and 1971, the average amount of annual target decreased drastically to 41×10^3 m³ in the 4th local operation plan starting from 1981. Later, it became 19.4×10^3 m³ in the 5th local operation plan (Committee of Forestry History of Kagoshima Prefecture 2003). This drastic fall in the amount of broadleaf timber yield caused the price of broadleaf timber to increase in the market of the island.

4 The Progress of Cedar Plantation and the Fluctuation of Fishery Resources

During the drastic increase of the broadleaf timber yield, cedar plantation was also carried out intensively, following the establishment of the public corporation to manage the plantation (Committee of Kamiyaku Town History 1984, pp.506-507). Figure 3 shows the transition of the forest area behind Isso village where most of the manufacturers of dried mackerel are located. This result indicates the increase of cedar plantation which is equal to the decrease of broadleaf tree. The cedar plantation began gradually after 1960 and progressed intensively between 1967 and 1975. These plantations were implemented at a kind of community forest (Kyoyo-rin) behind the villages. This kind of community forest had been allocated by the Meiji government as a compensation for the nationalizing the forest. In this area, local people could obtain timber or fuel wood with a cut rate price through the management of Forest Agency.

Then after the energy revolution, local people decided to plant cedar for selling as building material in the future, instead of leaving it as the secondary forest which could provide the firewood of broadleaf tree. The demand for pulp material also enhanced the transition from the secondary forest of broadleaf tree (Committee of Kamiyaku Town History 1984, pp.507-508). After all, the area of cedar plantation had increased to 317 hectare by 1980. The places where were able to access easily had turned into the cedar forest in the 1980s.

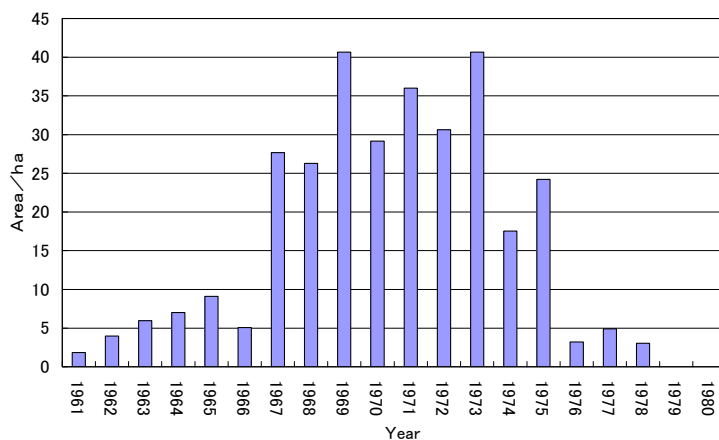


Fig. 3 The transition of cedar plantation area behind of Isso village.

Source: Committee of Kamiyaku Town History (1984, pp.511-512)

In such a circumstance, the islanders have experienced the transition of mackerel catch during the past century (Committee of Kamiyaku Town History 1984, pp.522). Figure 4 shows the statistics of mackerel catch and dried fish production between 1950 and 2003. The ups and downs of the catch have repeated periodically. The annual amounts of dried mackerel production are shown together with mackerel catch mainly after 1979. The figure shows the tendency of correlation between the catch and the production. It could be said that the amount of the firewood which is demanded for dried fish production was also not constant. When the catch became the maximum around the 1970s, it is reasonable to guess that both of the dried fish production and the consumption of firewood was increasing.

Until the beginning of the bumper years of the catch around 1970, the logging at the national forest had been carried out eagerly, and there must have been no worry about the shortage of broadleaf timber during those years. The logging from the national forest was plenty enough to ensure the needs of the pulp companies and the dried fish manufactures. As a result, it led to the forestation of cedar tree from broadleaf tree for future income of the villages. This means that the forest resource of the community was exchanged to the specific property, not kept as “resource” to be ready to supply the material for their traditional industry. It was hard to expect the future shortage of broadleaf timber due to the shrinkage of logging in the national forest.

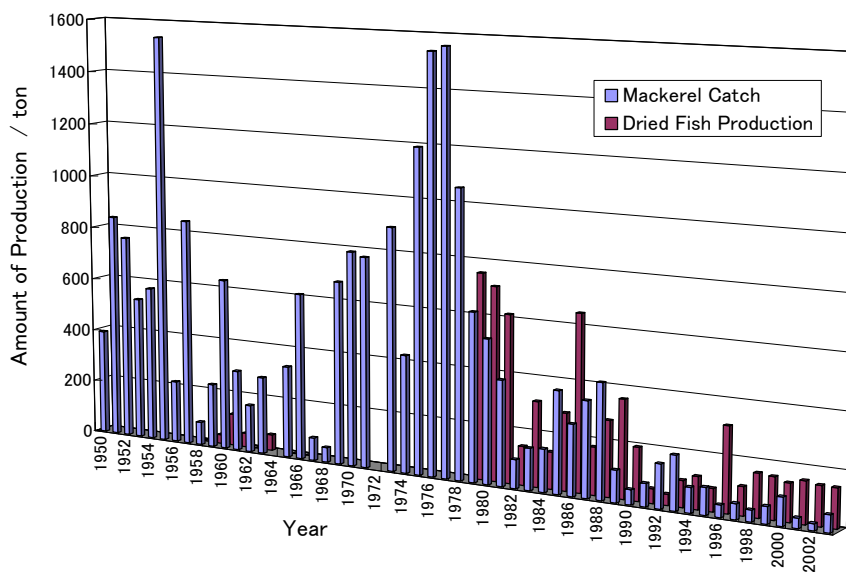


Fig. 4 The transition of mackerel catch and dried fish production in Kamiyaku town.

Source: Statistical Research Office of Kagoshima Prefecture & Tsutsumi (1959)

5 Sustainable Use of Broadleaf tree in Dried Fish Production

As described above, the shortage of broadleaf tree was induced by the logging of broadleaf forest and the plantation of cedar tree in the national forest. Focusing on the dried mackerel production, two major rich natural resources of the island is used for dried fish production. The sustainable use of resources means the sustainable supply of broadleaf tree and mackerel. By the historical perspective, it could be said that this traditional industry was easily affected by the changes occurring to natural resources. In this case, the value of broadleaf tree has been affected by the change of the national and local demands. The villagers once had

managed their forest utilization themselves, started relying on the resource distribution system covering the national forest after the Meiji era. As a result of that, the shrinkage of the logging in the national forest induced the shortage of firewood and had left them cedar forest which is unsuitable to smoke. This event clearly shows the social aspect of “resource” which is needed to provide a particular good from a natural thing. And it is casting doubt on the sustainability of national forest management, suggesting the better management of “local” resource.

We could also point out that the sustainable use of broadleaf tree could be affected by marine resources in this case. Because the need for broadleaf tree is correlated with the catch in mackerel in terms of dried fish production, so the decrease in the catch might induce the immediate decrease in the value of broadleaf tree, just as the energy revolution induced the abandonment of the firewood once in the past. If we consider that the variety of forest use which demand many kinds of tree species is the basic condition to enhance the conservation of forest diversity in a society, this case implies the marine resources is one of the critical factors to keep the diversity of the forest use through the traditional industry in this particular circumstance. This expanding causal linkage among natural things and social development indeed shows what “resource” is. It suggests that forest policy needs to be discussed together with marine resource conservation somehow in a particular situation.

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