

Broadleaf Tree Plantation by the Fishermen in Yakushima Island

Tomohiro Oh

University of Tokyo

Introduction: the tree planting movement by fishermen

In the 1990s, forest plantations by fishermen were often reported as topical incidents in Japan. Such an activity was also implemented in Yakushima Island. The festival for the plantation was held during 3 years from 1996 to 1998. Over ten thousands of young trees, several kinds of broadleaf trees, were planted covering 5.6 hectares of the national forest where the trees had once been logged. The site is called “the Forest of *Yaku-saba* (Spotted mackerel)”. It was the obvious decrease of fishery resources that motivated Fishermen’s union to the plantation in the island supposedly rich in “nature”.

The Plantation by the oyster farmer at Karakuwa town of Miyagi prefecture was the critical momentum which propagated this movement throughout the nation. The Oyster farmer in the Moune Bay started planting the broadleaf tree, e.g. fagaceae (*Buna*), at the upstream of the Oo River from 1989. Before long, similar activities were taken place across the country, subsequently the integrated resource management has been discussed among the agriculture, forestry and fisheries industry at the regional scale (Tutatani, 1998).

Once in the postwar years of the recovery and following the period of high economic growth in the 1960s, the logging and the plantation of conifers from broadleaf trees were operated in the nationwide scale with the high demand for building materials. Meanwhile, the broadleaf tree became less valuable with the decreasing demand for fuel wood, as the energy revolution progressed. Today, fishermen re-appreciate the broadleaf tree because of its positive effect for fishery resources. These effects have long been known by the people. Such forests which attract fishes are called Uotsuki-rin (魚付き林) and have been existed from the Edo period and protected from cutting. Though further scientific research is required to explain the detail mechanism, functions of the forest, such as supplying nutritional substance into the sea or controlling the outflow of soil and rainwater were widely recognized.

On the other hand, from the stand point of the ecosystem conservation, the coordination among a sort of the cooperatives such as farmers, fishermen and forest owners are encouraged (Tutatani, 1998). Such a social linkage between forest resources and fishery resources which might affect each other are important but yet to be scrutinized.

Exceptionally, the study of Karakuwa town’s case indicated the existence of the local background in such conservation activity. The critical factor is the project of the dam construction in progress at the upstream of the Oo River at that time. The fact that the infrastructure development possible to segmentalize the ecosystem urges people to such a conservation movement is significant.

Though it implies the significance to discuss sustainable use of natural resources from the aspect of social linkage, these earlier studies are not accumulated so many enough to develop a kind of theory for explaining the effect between two resources system. So in this study I clarified the context in which the fishermen go beyond their familiar territory of fishery resources to manage the resource system including the forest. For that, first I described the history of the regional fishing industry in Yakushima Island,

focusing on the catch of mackerel. Second, I reviewed the cut of the broadleaf trees from the national forest in the past 50 years. Also I introduced some opinion of the local people about this planting. Then, I concluded that fisherman is the one of the actors who recognizes the value of the broadleaf tree. For the forest to remain valuable, fishery resources should be jointly managed in an integrated way in a specific circumstance. The management and the use of diverse fishery resources may be one approach to support the diversity of the forest.

Brief summary of Yakushima Island

There exist two administrative districts in Yakushima Island, Yaku town and Kamiyaku town. The socioeconomic conditions are different in each district within the island. It partly comes from the difference of the natural conditions, e.g. the marine products. In Kamiyaku town located in the northern part of the island, people catch spotted mackerel in the fishing ground off the island. Isso, one of the villages in Kamiyaku town, had long been the main fishing port along the history of the island. On the other hand, in Yaku town located in the southern part, they catch flying fish in the Tane-Yaku canal. Because the plantation mentioned above was carried out by the Fishermen's union of Kamiyaku town, this study focused on this district.

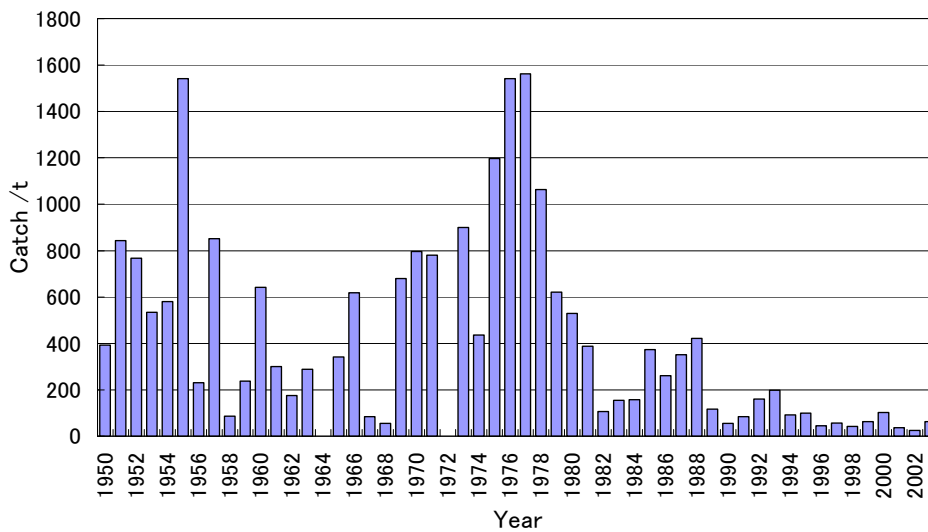
The decrease in the catch of Spotted Mackerel (*Gomasaba*)

Fig.1 shows the catch of mackerel from 1950 to 2003. Several characteristics can be immediately pointed out. First, the catch is inconstant and seems to have several peaks. Second, the decreasing trend in recent years is remarkable. After the catch marked the highest amount around 1977, it decreased sharply. In contrast, the total catch in Japan from the East China Sea has kept around 50,000 ton with yearly fluctuation. The catch fluctuation depends on two factors under the constant fishing effort, the population size, and the migration and the immigration of mackerel in the fishing ground. Even in consideration for the lowering of fishing effort as the result of aging of fishermen and depopulation, the decreasing fishery stock is serious problem to the fishing industry of Kamiyaku town. The plantation by the fishermen in Yakushima Island was carried out from 1996. In this term the catch kept decreasing without the tendency of recovery. Not only mackerel but other species living in the coastal zone are also decreasing. To realize the background of this drastic change in the catch, the local history was described in detail below.

The Fishing industry in Kamiyaku town has developed based mainly on fishing bonito, mackerel and flying fish. Until the middle of the Meiji period, bonito was the dominant target. The number of bonito fishing vessels had been about 50 in the beginning of Meiji period. Mackerel fishing became a substitute for bonito around 1900 because the fishing ground moved away off the island. The competition against the vessels from the main land also made it difficult to maintain. The fishing of mackerel had developed successfully with the motorization of vessels. The number of the power-driven vessels increased from 36 in 1926 to 80 in 1933 (Committee of Kamiyaku town history 1984). Around 1932, it was told that fishing ground shifted to near the island, and the catch of mackerel became active again. In this term, the amount of dried mackerel production was also increasing. There was the factory which produced about 4,500 ton in a year at this time. We can know that the annual fish catches were periodically changing since a hundred years

ago.

Fig.1 The transition for mackerel catch in Kamiyaku Town



In the Post war period, the fishing industry recovered against the background of food scarcity. The total amount of the fish catch in Kamiyaku town marked its maximum (2402.5t) in 1955. Also the population and the number of vessels increased in this period. But soon after the middle of the 1950s, the catch dropped sharply. It is considered that many vessels from the mainland gathered around the fishing ground off the island and the fishery stock deteriorated. It is pointed that the difference of the fishing method is the factor. As compared with the pole-and-line fishing carried out by the islanders, the outsider operated by the seine fishing. The motorization of the vessel and the improvement of the equipment became the disadvantage for the islanders. The end of the regulation toward the fishing area in 1952 was one of the factors that made this area very competitive.

During the period of the economic growth, the catch level stayed unstable, together with the decrease of the labor. From around 1955, the number of the people working away from the island started increasing. The number of the fishermen which increased over 600 in 1955 decreased down to over a hundred until 1975. The fishery industry which was one of the important means to earn cash was noticeably in decay during the economic growth. Against the background of the decreasing population and catch, the modernization of the fishery was in progress. The size of the vessel was getting larger and the equipment improvement was pursuit to rationalize the management. Before that, mackerel fishing is limited with the vessel condition. The increase in the catch experienced from 1970 owed partly to the investment toward the machinery and equipment. At the same time, the oil shocks of the 1970s lead to the concentration of fishing effort in the coastal and offshore fishery. This trend was also backed up by the decay of the deep-sea fishery, following the setting of 200 nautical miles economic zone. These factors are considered to affect the resource stock.

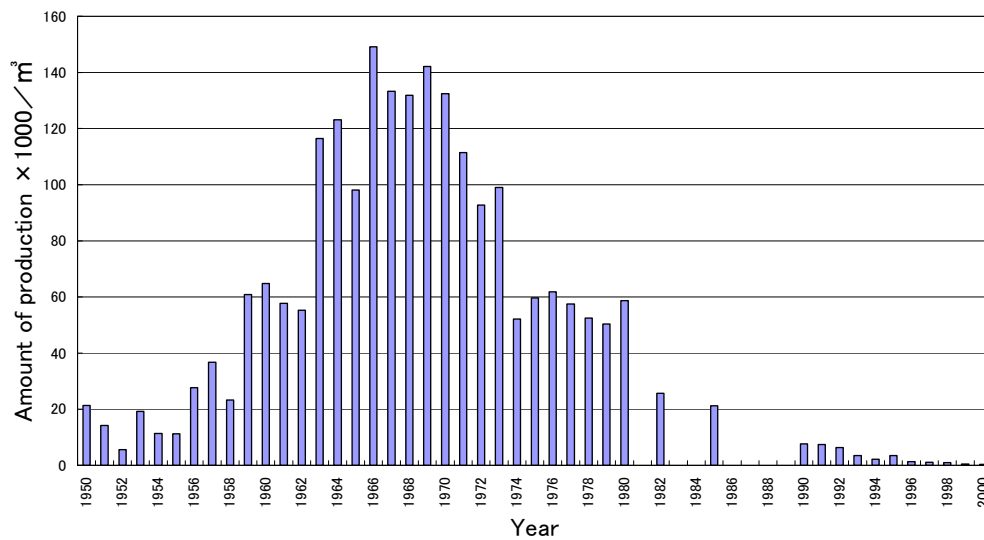
The transition of the Broadleaf Tree Logging in the National Forest

Figure 2 shows the amount of broadleaf tree yields from the national forest. Soon after the end of the war, the operation restarted from 1946, the government enacted the legislations and planed the program to meet

the sudden expansion of the national needs for timbers. The yield started increasing especially after 1960s and marked its maximum during the late 1960s. This production increase was followed by the establishment of the public corporation to manage the conifer plantation, and the private company to product the raw material for pulp utilizing the broadleaf woods from the national forest.

In this term, the broadleaf tree was considered as “low quality” and put under the operation of full-scale logging. The effect of this operation can be known by the interview of the elder. When it rained, the muddy stream induced by the clear cutting had colored the mouth of the river in red. It is pointed out that the disappearance of “jiki-tobi”, the flying fish which periodically immigrate to the coast to spawn, is attributable to the deterioration of the forest environment.

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



Source: Forest management office data

Forest and the Fisherman

Figure 1 and 2 indicate that the forest and fishery resources have experienced drastic disruption by the economic activity. But the mutual relation between mackerel catch and the amount of the broadleaf tree logging are not obvious. In fact, one interviewee recognized the positive effect of the broadleaf tree toward fishery, but he doubted its effect toward mackerel which is not inhabitant ashore.

Together with the natural fluctuation, current and water temperature variation, over fishing are supposed to be the critical factor to the decrease of the mackerel catch. The decrease of the man power is also one factor affecting the catch. Additionally, the import of the fish decreases the price of domestic fishes. Due to such circumstances, the fishermen directed their attention to the coastal fishery rather than the offshore fishery.

To keep the forest valuable, it is critical to retain the human resource supporting the ecological function. Fishermen are one of the stakeholders who regard the broadleaf tree valuable. The diversity of the stakeholders, especially those who live on the eco-system might keep the diversity of the forest. For that,

fishery resource management is essential to forest resource management in Yakushima Island. As the local fishermen know the complicated factors existing in the background of the mackerel decrease, integrated resource management is suitable idea in such a circumstance.

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