

Coastal Resources and Management in Japan: An Outline of Kaminada Fisheries in Futami District of Iyo city, Ehime Prefecture

George MATIYA*, Yoshikazu WAKABAYASHI*, Naruhito TAKENOUCHI* and Satoru ABE*

Abstract

The coastal waters of Japan have a wide diversity of fisheries resources. This poses a great challenge in terms of management. Therefore this study was aimed at outlining the fisheries resources and its management in the coastal area of Futami District in Iyo city. The fisheries production in the coastal waters of Futami as well as the number of boats and fishermen is on the decline. This might be attributed to aging of the fishermen and environmental degradation. However in terms of fisheries management, it can be said that Futami has a good fisheries management system as evidenced by the organization and operations of its Kaminada Fisheries Cooperative Association (FCA). The management has been successful because the fisheries management has always been community centred and there is a proper legal framework supporting the community based system. Fishing rights are well defined and assigned to the FCA to manage. All the fishermen belong to FCA which acts as both a management body as well as a marketing body. Good support system like insurance and credit system has made it possible for the FCA to be successful. The successful fisheries management system in Futami shows that local communities can manage fisheries resources properly with proper legal and organizational support. This community based management system is the most sustainable way of managing fisheries resource.

Key words: Coastal fisheries, fishery rights, decentralization, fishery cooperative association, Fisheries Law

1. Introduction

Fisheries and fisheries products are of great social and economic importance to the people of Japan. It is estimated that marine products contribute approximately 40% of animal protein consumed. The per capita consumption of fish for Japanese people is 66.2 kg being the sixth highest in the world (Japan Fisheries Agency, 2004). Apart from nutrition, fish and fisheries products are a source of income to the fishers' households.

The Japanese fisheries are divided into three categories namely coastal fisheries, off-shore fisheries and distant water fisheries. Coastal fisheries refers to capture fishery, which is run without boat, with the use of non-powered boat and powered boat of less than 10 gross tons, which are normally engaged in fishing by the family members of fishing household to sustain their livelihood. It also includes aquaculture. Coastal fisheries, which are also characterized by small-scale operators with strong community links, are of particular social and economic importance to the coastal regions. Although coastal fisheries production constitutes about 45% of the total fishery production, it constitutes about 60% in terms of

value of the total fisheries product sales. This is owing to a concentration on the capture and culture of high value species. The coastal fisheries also constitute about 95% of all fishery households (Wilhelm, 2004). On the other hand, off shore fishery refers a capture fishery which is run with the use of powered boat of 10 gross ton and above, excluding the distant waters fishery. It operates within the EEZ of Japan usually with hired labor. Distant water fishery if the capture fishery which operates in high seas and the EEZ of countries other than Japan.

Because of the importance of coastal fisheries, this paper outlines the fisheries of Kaminada Fisheries Cooperative (FCA) in Futami town in Japan. Particular emphasis is placed on institutional organization of the fishermen and the fisheries management practices. Japan has the oldest and most successful marine fishery management (Makino, 2004) and it is worthwhile to study the management practices with the aim of drawing lessons that can be applied when developing a sustainable fisheries management system.

2. Study Area

The study was conducted in Futami town in Matsuyama on Shikoku Island (Fig. 1). Kaminada Fisheries Cooperative was the focus for this study. The area was selected for its diversity in terms of target species and had fishermen using different methods. Hence it was interesting to find out how they managed to coordinate their activities. The area was also close to the researcher

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*Laboratory of Social Sciences in Fisheries, Faculty of Agriculture, Ehime University, 3-5-7 Tarumi, Matsuyama, 790-8566, JAPAN



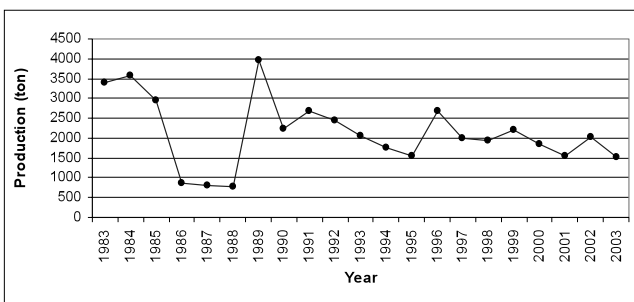
Source: www.TravelPost.com

Fig. 1: Location of Futami town

and the offered opportunity to visit it as many times as possible.

3. Fisheries Production

The total fisheries production has been decreasing over the years. In 1989 when the coastal waters of Kaminada FCA produced the highest fisheries production, the amount of fish caught was 2,230mt. However, the fishery has experienced a decline in annual catches from about 2230mt in 1989 to 1516mt in 2003 representing a 32% decrease (Fig. 2). The decrease can be attributed to many factors including over-fishing, pollution, typhoon and climate change. The reduction in fisheries production represents an economic loss to the fishermen consequently affecting their livelihood.

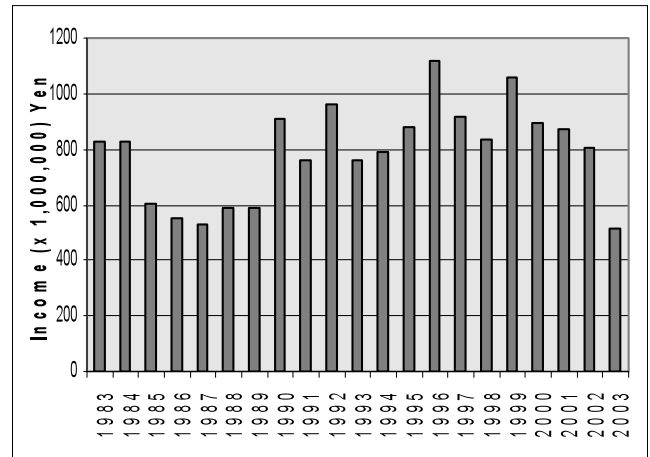


Data Source: Futami Town Office, 2005

Fig. 2: Total Fish Production by Kaminada CA

In terms of the monetary value, it was noted that the amount of money realised from the sale of fish have been declining over the years (Fig. 3).

In 1996 the total monetary value of the fish produced was 11,210,000 Yen but this has been declining and the value stood at 5,170,000 Yen representing about 54%



Data Source: Futami Town Office, 2005

Fig. 3: Total income for Kaminada FCA

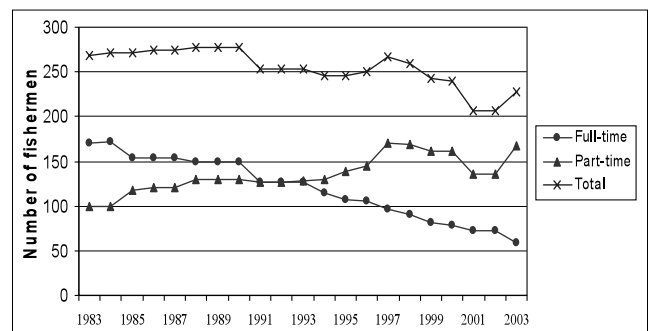
decrease in income. The decrease in total income can be attributed to the decrease in total fisheries production.

In Futami there are two FCAs (Kaminada FCA and Shimonada FCA) that form Futami Japan Fisheries (JF) which has banking and insurance services apart from offering marketing services. Futami JF sells the fish on behalf of the fishermen at Matsuyama Central Fish Market and a 5% commission is charged from the sales. JF also does provide rescue operations apart from selling fuel and other necessities on loan. These are paid after sale of their fish catch.

4. Fishing Effort in Kaminada FCA

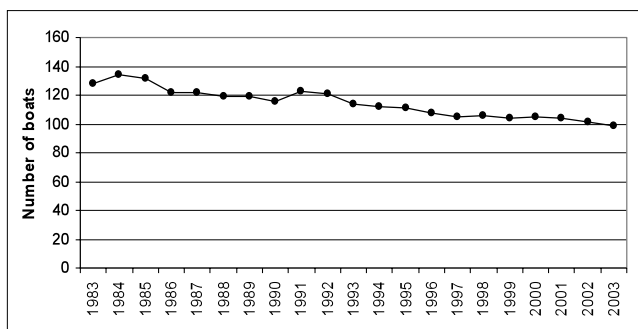
Kaminada FCA has a total of 227 fishermen. The number of full-time fishermen has been decreasing while the number of part-time fishermen is increasing (Fig. 4). As can be seen in the table, the number of part-time fishermen is increasing while that of full time fishermen has been decreasing. Some fishermen had decided to quit as they grew old while others found the business not profitable.

As a result the total number of fishermen has also declined. Aging of rural society has badly affected not only agricultural sector but also the fisheries sector. Young people are moving to big cities as urban living



Data Source: Futami Town Office, 2005

Fig. 4: Number of fishermen in Kaminada FCA



Data Source: Futami Town Office, 2005

Fig. 5: Number of boats in Kaminada FCA

standards are attractive to young people. Fisheries labour is seen as a so called “3 K” job (Wilhelm, 2004). The Ks stand for *kiken* (dangerous), *kitsui* (hard) and *kitanai* (dirty). In Kaminada the average age for fishermen was 60 years with the oldest being 77 years old. As a result the future of fisheries industry appears bleak.

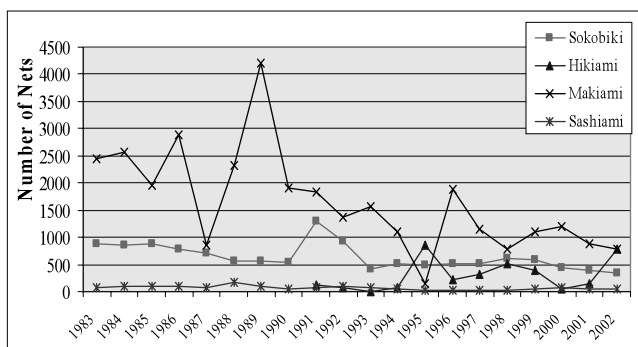
As a result of the decline in the number of fishermen, the number of fishing boats has been decreasing over the years. There were 99 boats operating in 2005 from 111 in 1995 (Fig. 5).

Fishermen in Kaminada FCA operate small boats with gross tonnage of less than 5 tons and can go less than 8 km from the shore.

5. Fishing methods in Kaminada

In the Kaminada waters, the most dominant net used to be *Makiami* (purse net) however its numbers have been decreasing over the years (Fig. 6).

In 1989, purse net constituted about 86% of the total nets used but this has decreased to about 39% in 2002. In early 1990's *Hikiami* (drag net), a conical fishnet dragged through the water at great depths, was introduced. Other fishing nets used include *Sashiami* (gill net), *Makiami* (Purse net), *Sokobikiami* (trawl nets) and *tsuri* (hook and line). Overall it can be noted that the number of nets have been decreasing over the years. This is as a result of the decrease in the number of fishermen due to old age and few people joining the industry. In Kaminada, the commonly used methods of fishing include;

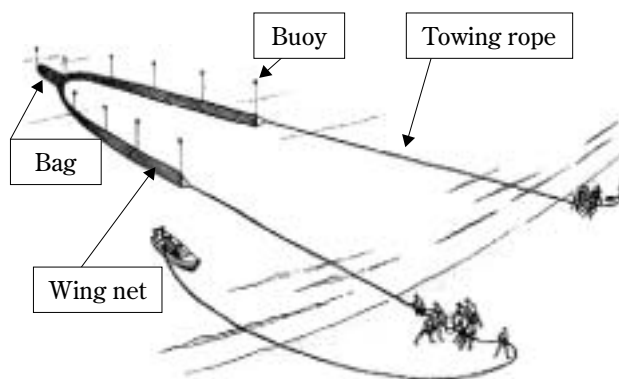


Data Source: Futami Town Office, 2005

Fig. 6: Number of fishing nets by type

1) Hikiami (Drag net)

This net which was introduced in 1991 is now the prominent net used in Kaminada. It is a very large heavy fine meshed net requiring the efforts of a large team of fishermen. One person would never go fishing with this kind of net. In fact some of the large nets would surround one half a square km of water. On the top edge are floats and on the bottom edge are weights. Once in place this net forms a wall stretching from the surface of the water, very often, clear down to the bottom. Two boats or two groups of people would draw each end into a large circle from which nothing could escape. Then they would pull in this net, and it gets tighter and tighter (Fig. 7).



Source: Amita, 1999

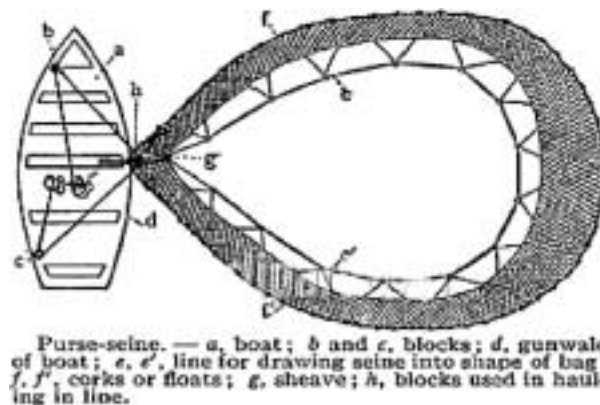
Fig. 7: Hikiami's operation

This used mainly for *Iwashi* (sardine). The nets now constitute about 40% of the nets used in Kaminada.

2) Makiami (Purse Seine)

It is a common type of seine which is basically a large fishing net that hangs vertically in the water by attaching weights along the bottom edge and floats along the top (Fig. 8).

It is named as such because along the bottom are a number of rings. A rope passes through all the rings, and when pulled, draws the rings close to one another, preventing the fish from “sounding”, or swimming down



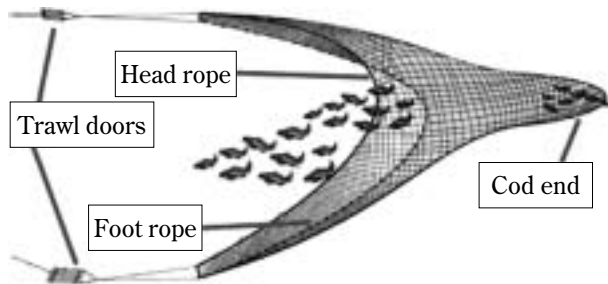
Source: Icelandic Ministry of Fisheries

Fig. 8: Makiami operation

to escape the net. This operation is similar to a traditional style purse, which has a drawstring. In Kaminanda, these are the second most prevalent nets accounting for about 39% of the total nets used.

3) Sokobikiami (Trawling)

This is a method of fishing that involves actively pulling a fishing net through the water behind one or more boats. There is a large net, conical in shape, towed along the sea bottom (Fig. 9).



Source: Anilocra, 2005

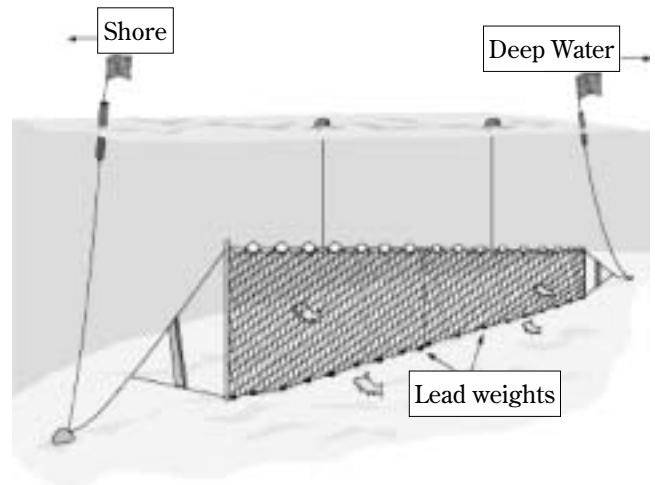
Fig. 9: Trawling operation

When two boats are used (pair trawling), the horizontal spread of the net is provided by the boats, with one warp attached to each boat. However, single-boat trawling is also possible. Here, the horizontal spread of the net is provided by trawl doors (also known as “otter boards”). Trawl doors are available in various sizes and shapes, and may be specialized to be in contact with the sea bottom, or to remain elevated in the water. In all cases, doors essentially act as wings, using a hydrodynamic shape to provide horizontal spread. As with all wings, the towing vessel must go at a certain speed for the doors to remain standing and functional. This speed varies, but is generally in the range of 2.5-4.0 knots. About 17% of the fishermen use trawling in Kaminada.

4) Sashiami (Gillnet)

It is a flat net suspended vertically in water to entangle fish by their gills. The net is designed so that the fish being targeted are able to get their head into the gap between the strands, but not their body. When the fish enters and then tries to get out, the net snags the gill covers or operculum, causing the fish to become trapped (Fig. 10).

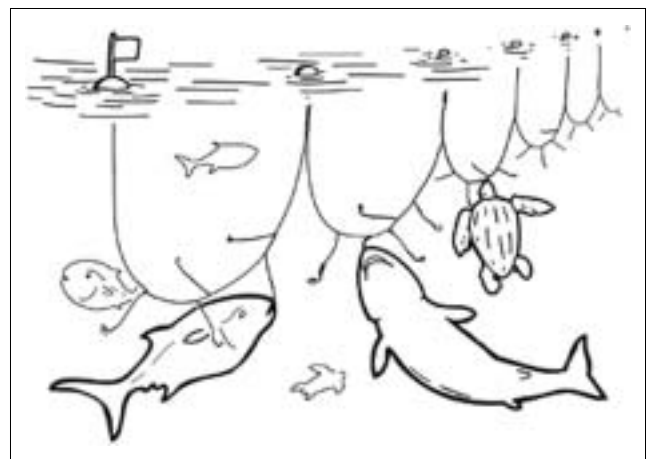
Normally, the net does allow smaller fish to pass through unharmed as a result of mesh size. However, as more fish are caught by the net, smaller fish may be caught as well, unable to pass through the tangled netting caused by the initial layers of larger fish. Because they can be so effective their use is closely monitored and regulated by fisheries and enforcement agencies. Mesh size, twine strength, as well as net length and depth are all closely regulated to reduce bycatch of non-target species. This method is not so common in Kaminada as only 3% of the fishermen use gill nets.



Source: Michigan Sea Grant, 2002

Fig. 10: Gill net operation

5) Long-line fishing is a commercial fishing technique that uses hundreds or even thousands of baited hooks hanging from a single line (Fig. 11).



Source: World Wide Fund for Nature (WWF)

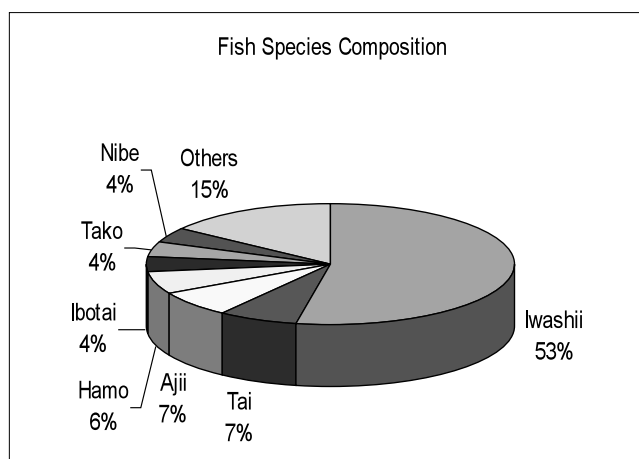
Fig. 11: Long-Line method of fishing

Small fish like sardine are used as bait. This method is used to catch many types of fish. For example, *Aji* and *Hamo* (*Muraenesox cinereus*) can be caught by Long-Line. One of the disadvantages of this method is that it may sometimes catch turtles and other endangered species.

6. Fish species around Futami coastal waters

The coastal areas around Futami are rich in terms of fish species diversity. *Iwashii* (*Pterothrissus gissu*) is the most predominant fish in the area (Fig. 12).

Tai, *Ajii*, *Hamo*, *ibotai*, *Tako* and *nibe* are also dominant species in the area. The predominant species are described below;



Source: Survey Results, 2005

Fig. 12: Fish species composition in Futami

1) *Iwashi*

Iwashi (Sardine in English) is the most predominant species in the coastal waters of Futami. About 53% of the fish caught is *iwashi*. *Iwashi* is a group name of fish consisting of *Ma-iwashi* or Japanese pilchard (*Sardinops melanostictus*), *Katakuchi-iwashi* or Japanese anchovy (*Engraulis japonicus*), and *Urume-iwashi* or Pacific round herring (*Etrumeus teres*). It is small fish with a body length of about 10-15 cm (Fig. 13). It occurs in large schools near the surface, mainly in coastal waters but can also be found off-shore. Spawning season is all year round but especially between spring through summer.



Source: Fishing forum

Fig. 13: *Katakuchi-iwashi* (*Engraulis japonicus*)

Juveniles associate with drifting seaweed. It feeds on copepods, but also on other small crustaceans, mollusc, larvae, fish eggs and larvae and diatoms. It is usually marketed fresh, salted and sometimes processed into fishmeal and oil.

2) *Tai*

This is a group of sea bream fish (Fig. 14). It comprises of *Madai* or red sea bream (*Pagrus major*), *Chidai* or Japanese red bream (*Eynniss japonica*), *Kurodai* or Black sea bream (*Acanthopagrus schlegeli*), *Aka-amadai* or Red horsehead (*Branchiostegus japonicus*), *Shiro-amadai* or White horsehead (*Branchiostegus argentatus*) *Kidai* or yellow back sea bream (*Dentex tumifrons*).

Seabream can be found at depth range of about 50m-250m. It inhabits in muddy and muddy-sandy bottoms and feeds on a wide range of benthic invertebrates and on



Source: Fishing forum

Fig. 14: *Kidai* (*Dentex tumifrons*)

fish. It has spawning seasons, early summer and autumn. This species can grow up to 40 cm in length and caught mostly by trawlers. In Japan it is regarded as a special fish for ceremonies. In Futami, it makes up a total of 7% of the fish catches in the coastal waters.

3) *Aji*

This is another group of fish that is caught in Futami coastal waters. This consists of *Oni-Aji* or Finny Scad (*Megalaspis cordyla*) (Fig. 15). *Ma-aji* or Japanese jack mackerel (*Trachurus japonicus*), *Maru-aji* or Japanese scad (*Decapterus maruadsi*), *Shima-aji* or striped jack (*Pseudocaranx dentex*).



Source: Fishing forum

Fig. 15: *Oni-Aji* (*Megalaspis cordyla*)

Aji is a streamlined, countershaded fish which resembles other fishes in the Family *Carangidae* (trevallies, scads etc). It can be recognised by the long pectoral fin, by the prominent scutes (51-59) on the straight part of the lateral line on the side of the body. They are pelagic species although they are also found near the surface of coastal waters. They form schools and feed mainly on fish. The reported maximum length is 80 cm total length; but commonly attains 30 to 40 cm total length and 3 to 4 kg. They are caught on hook and line, beach seines, trawls, purse seines and traps. Generally marketed fresh and dried salted. In Futami they comprise of 7% of the total fish landings.

4) *Hamo* or Pike eel (*Muraenesox cinereus*)

Hamo is a small eel-like fish, sometimes referred to as a pike eel and is very bony. It is another important fish caught in Futami. It accounts for about 6% of the fish catches (Fig. 16).

It is a long but slender fish with very sharp teeth. The teeth of *Hamo* are so suitable for catching its prey. The s



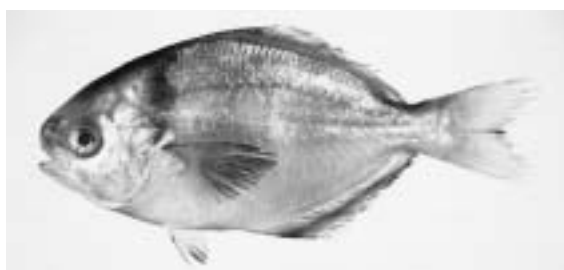
Source: Fish Base

Fig. 16: *Hamo (Muraenesox cinereus)*

kin is smooth without scales and grey to brown in color with black line on the edge of dorsal, anal and caudal fins. It usually feeds on fish, Crustacean and Cephalopod. It is so dangerous to handle a live fish. It can grow up to 2 m and live usually on muddy, sandy or rocky sea bottom in the central and southern part of Japan. Its spawning season is May-Aug. It can be caught by long-line and trawl net.

5) *Ibodai* or Japanese butterfish (*Psenopsis anomala*)

This fish is well compressed with a robust snout and small mouth. Its body is whitish in the adult while the young have a pale brown or blackish brown body. The spines of dorsal fin short are not separated from soft-rayed portion at the back (Fig. 17).



Source: Fish Base

Fig. 17: *Ibodai (Psenopsis anomala)*

It is usually found in the foreshore shore bottom quality sandy area with depth of water of about 10 to 370m. Adults inhabit bottom layer but migrate upward at night. It is caught by trawl and has a full length of about 18 cm. In Futami makes up about 4% of the fish catch.

6) *Iidako* or Octopus (*Octopus ocellatus*)

Iidako, also called “*Tako*”, is one of the species in the group of Octopus (Fig. 18). It contributes a significant



Source: Fishing Forum

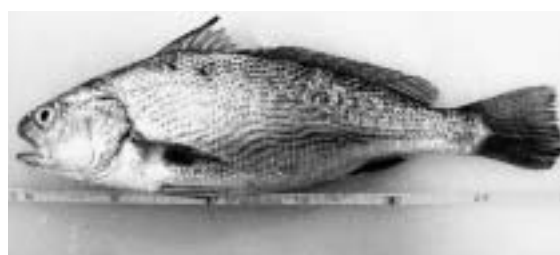
Fig. 18: *Iidako (Octopus ocellatus)*

amount to total production in Futami. It accounts for 4% of the total catch. It is a benthic, neritic species occurring from the coastline to the outer edge of the continental shelf (in depths from 0 to 200 m), here it is found in a variety of habitats, such as rocks, coral reefs, and grass beds.

It is inactive in waters of 7° C and colder. It can grow up to full length of 20.0cm. It is taken mainly with lures, hook-and-lines, pots, spears and otter trawls. This species is marketed fresh, frozen and dried salted, mostly for human consumption.

7) *Nibe* or *Nibe croaker (Nibe mitsukurii)*

It is also called Nibe Croaker in UK and USA. This fish has a big otolith in the head and sing on angling (Fig. 19).



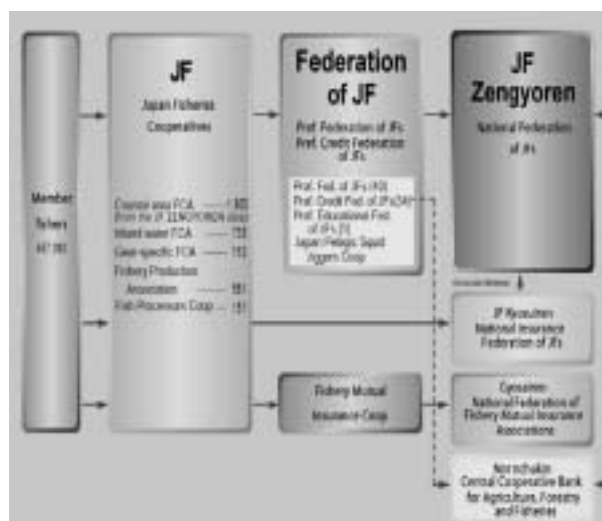
Source: Fishing Forum

Fig. 19: *Nibe (Nibe mitsukurii)*

So, it is called “*Ishimochi*” (stone holder) in Japan. There are black spots on the head. It is normally found in the beach bottom quality sandy area of depth 2m. It can be caught by long-line (night fishing). This fish can grow up to 75 cm.

7. Fisheries organisation in Japan

All coastal fishermen in Japan belong to a fisheries cooperative association (FCA) in order to be allowed to



Source: Zengyoren, 2003

Fig. 20: Organisational Structure of institutions in Fisheries Management

fish. Fisheries cooperative Association in a particular geographical area form Japan Fisheries (JF). In turn a number of JF form a federation of JF in the prefecture and these have JF Zengyoren as the national federation of JF (Fig. 20).

8. Fisheries management in Japan

In order to understand fisheries management in Kaminada FCA, it is important to understand Fisheries Law in Japan. The following section describes the evolution of the Fisheries Law in Japan and how Cooperative Associations fit into the fisheries management structure. It must be said on the on-set that all coastal fisheries in Japan are under the local government (prefecture) which grants fishing rights to FCA. Licenses for off-shore and distant water fisheries are granted by the central government.

8.1 History of fisheries management

1) Until feudal era

Even in the feudal era the coastal fisheries resources were managed by the local communities around (Makino, 2004). In 701 (Taiho era when Monmu reigned the country), the “Taiho Ritsuryo Penal code and Code of Government Administration” was established. One of the articles of this code was that “Mountains, rivers, bushes and marshes belong to the nation and shall be commonly used without prejudice to whether or not the user is a public person or private person.” This implied that it was a generally accepted concept and recognition that mountains and rivers outside the realm of private ownership were the common property of the people and the nation. This meant fisheries resources were a common property and the local communities had a strong say on its management.

During the Edo Era (Tokugawa Dynasty: 1603-1867), the then feudal lords allowed head of fishing hamlets/communities to act as tax collection agent from local fishers and, in return, granted him prerogative privilege to manage certain sea areas adjacent to the fishing hamlet/communities. The head also undertook co-ordination of different fishing interest in the fishing hamlet. Therefore, it can be said that control or management of fishing activities were in the hands of the feudal lords. There were organisations called “Urakumi (coastal communities) to which the feudal lord granted the right to fish in adjacent waters. There were traditional and customary rules for each fishing community across the country and fishers had their own form of organisations which served to provide services common to their interest but not granted any legal status. This basic policy was passed down to and adopted by successive rulers.

2) Meiji era (1868-1945)

In 1868, when the feudal regime ended by the Meiji Restoration, the new Meiji government endorsed the traditional rights of the fishery as they had been during

the feudal government. In 1886, the government established the “Standard Rules for Fishery Associations” Article 1 of the Standard Rules provided that “those who are engaged in fishing shall define the area, set up fishery association, prepare by-laws (articles of the association) and apply to the competent authorities for registration and authorised permit. It can be said that the establishment of Standard Rules for Fishery Associations in 1886 was the start of the prototype fishery co-operative associations that are presently there in Japan.

The Fisheries Law, a basic law in fisheries, was finally promulgated in 1901 and enacted in 1902. The law has provisions that granted fishing right to fishery association and fishing licenses to individuals operating in off-shore and distant waters. The fishing rights were such that it was effective for 20 years after approval and renewable. The fishing rights were classified into four categories as follows;

- a) set-net fishing rights
- b) specific fishing rights for beach seines, boats seines, etc
- c) aquaculture rights for oyster, seaweed, pearl, etc
- d) exclusive fishing rights for capture fisheries in coastal water

In 1910 the law was amended which enabled fishery associations to establish common service facilities for their members. The revision also paved the way for establishing federations of fishery associations if the associations wished so. Fishing rights became exclusive, real rights that could be sold, leased, transferred and collateralized. During this period technology advancement in the fishing was rapid (cotton nets and boat mobilization). In 1938, an amendment to the Fisheries Law allowed the fishery associations to include economic activities.

3) Current Fishery Law (Shouwa Fishery Law)

After the Second World War in 1945, the government amended the Fisheries Law to move towards democratisation of the fishery regime. In December 1948, the Fishery Co-operative Association Law was promulgated and enacted on 24th February 1949. In the Fishery Co-operative Association (FCA) Law, a Fishery Co-operative Association is basically defined as an economic organisation in fisheries industry. It was allowed to run business like selling nets and engine parts apart from engaging itself in fisheries management. Each FCA must have its address in the local area and in which at least two thirds of the members are households engaged in coastal fisheries for at least 90 days. The Law also introduced new provisions different from the old Fisheries Law. For example, establishment of fish processors’ co-operative associations were provided for. Associate membership, where one has no voting right was included in addition to full-fledged membership in which one has voting right. Gear specific fishery co-operative associations were included in the new Law. Three types of fishery rights were established in coastal fisheries;

(1) Joint fishery rights (*kyodo gyogyoken*)

Joint Rights are issued for the coordinated use of a fishing area and its aquatic resources by all members of an FCA. Three categories are recognized; those for the benthos catch, those for small stationary gear set at a depth of less than 27 m, and those for beach seines. The allocation of a fishing territory among these types of gear and the fishermen to be engaged in their operation is internally decided by an FCA. Only local fishery cooperative association (or associations affiliated to them) are eligible for these rights.

(2) Demarcated fishery rights (*kukaku gyogyoken*)

These rights cover demarcated fisheries (namely aquaculture). They are conducted with fishery or fishing ground entry rights. There are three types of these namely; special demarcated fishery rights for cage culture and seaweed aquaculture; Pearl demarcated fishery rights for pearl production; and other demarcated fishery rights for any other aquaculture operations.

(3) Set-net fishery rights (*teichi gyogyoken*)

These are rights to conduct set-net fisheries. These are granted to both FCA and private individuals.

The fishing rights system, which basically continued historical practices, is intended to protect coastal fisheries and fishermen against the encroachments of other fisheries and other economic sectors by granting them property rights which are legally protected in full against third parties. These rights cannot be loaned, rented or transferred to others, nor can they be mortgaged. Such rights are regarded as the exclusive property of the fishermen to whom they are granted. The rights however can be passed on to a family member (e.g. son or brother) when the fisherman retires or dies.

4) Recent Amendments

The “Marine Fisheries Resource Development Promotion Law of 1971” was amended in 1990, and the “Resource Management Agreement System” was established. This system encouraged autonomous agreements among fishermen for the purpose of conducting resource management. When agreement prevails at a certain level within the area, the government can affirm the agreement, and it becomes an official rule. It constitutes an official support system for autonomous resource management by fishermen. In 1996, the “Law Regarding Preservation and Management of Living Marine Resources” was enacted under the United Nations Convention on the Law of Sea. With this law, a total allowable catch (TAC) system was introduced for seven species. A total allowable effort (TAE) system was also introduced, following an amendment in 2001. The central government sets TAC and TAE for each species, and supervises and controls total fishing levies, while the allocation of quotas and the determination of access rules are the responsibility of fishermen’s organizations. At present, seven species are subject to TAC.

In 2001, the “Basic Law on Fisheries Policy” was enacted in order to deal with the changes in the

circumstances surrounding Japanese fisheries, such as the establishment of the 200 nautical-mile exclusive economic zone, the decreasing self-sufficiency, or advancing age of fishery workers. This law aims to achieve a symbiosis between producers and consumers, and between cities and fishing communities, by establishing a new policy framework for the 21st century. There are two basic principles in this law: (1) securing a stable supply of fishery products, and (2) healthy development of fisheries. The government is to formulate a Basic Plan for the Fisheries Policy to set out the basic principles, where the targets for self-sufficiency in fishery products are included. The plan will be reviewed, basically, every 5 years.

9. Fisheries Management Strategies in Kaminada FCA

Kaminada FCA has joint fishery rights that were granted by Ehime Prefecture governor (local government) which in turn were distributed amongst its members. The rights allows; the gathering of seaweed, shell- fish and other benthos; operation of specific small-scale net fisheries and beach seines; and unmotorized trawling. However registration of fishing boats is done by Ehime Prefecture which has the technical expertise to determine sea-worthy of the boats. The prefectural governor may order the revocation of the fishery rights on the grounds of public interest.

Kaminada FCA has 68 full time members and 168 part-time members. These fishermen have a total of 365 *sokobikiami* (trawlers), 1,020 *hikiami* (Drag net), 55 *sashiami* (gill nets) and 70 people practice aquaculture (*youshoku*). Within the Kaminada FCA there are specific gear and specific target species associations like *Iwashi* (sardine) fisheries association.

In order to become a fisherman, a person must reside within Futami area. It is expected of him/her to fish for more than 90 days per year to be recognized as a full time fisherman. A membership fee is expected to be paid to be accepted as a fisherman. Detailed regulations to control fishery operations and to ensure the conservation and rational exploitation of living aquatic resources are established, as required by local conditions, by the prefectural (local government) Fisheries Agency.

Some of the rules in Kaminada FCA include;

a) Voluntary fishing abstention day

The FCA agreed not to fish on Sunday and holidays. This is done for two reasons namely; as a resource management measure and to avoid over flooding the market with fish which might affect the price.

b) Limited number of specific fishery boats

The number of boats for specific fishery is limited in order to prevent over fishing. For example at the moment, additional boats for crab, sardine, octopus and Japanese jack mackerel are not allowed.

c) Establishment of closed area around artificial reefs

Artificial reefs are put in designated areas and fishermen are not allowed to fish around these areas as

they are reserved as nursery grounds for fish.

d) Minimum exploitable size fish caught

Minimum size of fish to be caught was set by the FCA as a resource management measure. For example, no one is allowed to catch *Hamo* fish of less than 25 cm and crab of less than 8 cm in carapace is not allowed to be caught.

e) Quantitative catch limit

The FCA agreed that the maximum amount of fish to be caught by one fisherman per day is 700 kg. To ensure compliance, fishermen (trawlers) are only allowed one trip per day to go fishing.

f) Closed seasons

Fishing for specific fishery has its own time. For example clam dredge is allowed from June-January. Boat seine is allowed in March-May and August-November mainly targeting sardine. Collection of littoral such as abalone (*awabu*) and sea urchin (*uni*) is done in May-August.

h) Agreement on fishing arrangements

There are self-imposed rules on the use of fishing grounds between trawlers and bottom gill-netters. Trawlers are not allowed to operate 200m from the coast to preserve sedentary fisheries resources.

These regulations are approved by Ehime prefecture and become by-laws.

10. FCA executive members' selection

The FCA executive members are chosen by election and can serve for 3 years. After 3 terms they are not allowed by constitution to stand for election. These are representatives of the fishermen. The executive is comprised of a representative from each fishing gear and is responsible for the smooth running of the fisheries business. They lobby to government, on behalf of its members, for fisheries development in their area like maintenance of the harbour. Futami JF always consults with Ehime Prefecture JF (which is an umbrella association for all JF in Ehime) on issues affecting their JF. They may also consult with Ehime Insurance Organisation and Ehime Banking on issues concerning insurance and banking. Futami JF has five to six meetings a year to discuss resource management. The most important is the general assembly which all fishermen take part.

11. Lessons Learnt from the management system in Kaminada

The fisheries management in Kaminada has been successful because of a number of factors. These factors include;

1) Community-centred: Fisheries management has been the responsibility of the community since time immemorial. Recognizing the role of communities in fisheries the government never tried to change it but enforced the system. This is an example of

democratization and empowerment of local communities and has fitted well into the local culture of the communities.

2) Decentralization: There is decentralization of government in Japan. The local governments (prefecture government) have power and authority to manage issues in their areas. As a result they provide the best services to its communities. Fisheries management groups get adequate support from the local government.

3) Proper legal framework: There are laws and regulations that recognize the role of the local management institutions (FCA). Fishing rights are assigned to a group of people changing the open access regime to common property access with responsibility. By law every fisherman must belong to FCA and this has made management easy.

4) Proper organization and representation in FCA: The fishermen have a good organisation that has led then to be successful in their fishing business. The FCA is not only a management group but also a marketing, banking and insurance entity. Because of the benefits that fishermen from FCA, they are not bound to cause problems as they know the consequences are severe. There is deliberate effort to get views from all fishermen by allowing gear specific association within an FCA.

5) Good support system: The government has supported the development and management of fisheries by providing support to the fisheries industry. The landing ports were built and maintained by government in addition to linking up the fisheries sector to other services providers. The establishment of Central Cooperative Bank for Agriculture, Forestry and Fisheries (Norinchukin) and National Federation of Mutual Insurance Association (*Gyosairen*) has helped in the development and management of fisheries in Japan. Rescue services also underline the importance of the cooperatives.

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