

Japan consists of four main islands with about three thousand islets scattered around the main islands. Out of these islands and islets, four hundred and ten of the islands are inhabited.

The islands isolated from the mainland by the sea offer many interesting opportunities for biogeographical and human geographical studies. On the other hand, since remote islands lack traffic facilities and are generally far from markets, backwardness with regards to industries, income and general standard of living are common.

In Japan, "promotion of the development of remote islands" has been one of the nation's important administrative tasks.

The industry and social life vary greatly among the islands, often showing compli-

cated and multilayered variation resulting from different historical backgrounds and geographical conditions, such as influences from neighboring areas.

We are apt to think that fishery would be extensively carried out in islands because they are surrounded by the sea. It is, however, impossible to conduct fishery without a market for the catch and a good harbor for transport ships and fishing boats, even if there are many good fishing grounds around the island.

Katsumoto-cho, an administrative district on Iki Island, which we visited to collect information for this issue, is a fishing village with a prominent reputation for coastal fishery in Japan. Furthermore, angling, a traditional fishing technique, is being used

# Conditions for Developing Fisheries in Island Waters

as a main fishing method even today. This may seem to be a rather special case considering that the main principle of fisheries promotion is to increase productivity by introducing modern fishing methods, but it can be said, on the contrary, that the case of this fishing village clearly demonstrates the basic conditions necessary for developing fishery into a local industry.

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## Condiciones para el desarrollo de la pesca en islas

En el Japón la "promoción para el desarrollo de islas distantes" ha sido una de las tareas administrativas más importantes.

La industria y la vida social difieren grandemente de isla a isla, mostrando unos aspectos complicados y superpuestos que van acordes con sus tradiciones históricas y sus condiciones geográficas, incluyendo las relaciones existentes con las zonas cercanas.

Podemos pensar que la pesca se realiza extensivamente en las islas porque están rodeadas por el mar; sin embargo, resulta imposible realizar la pesca sin tener una ruta de mercado para la captura y un buen puerto para los barcos de transporte y de pesca, aunque haya abundante pesca en torno a la isla.

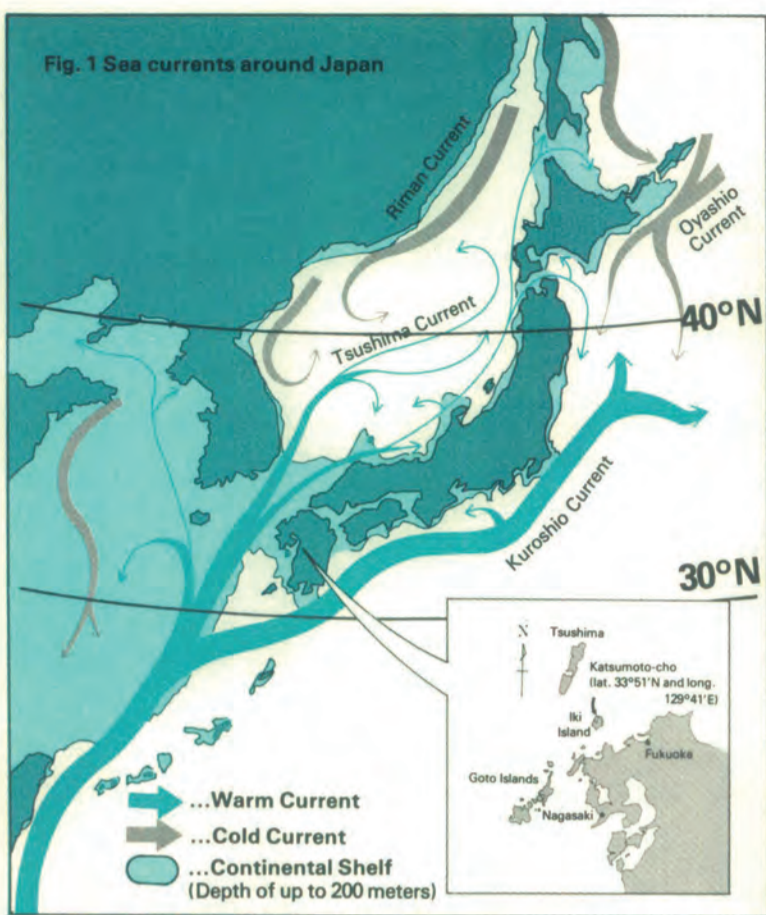
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## Conditions pour le développement des pêches dans les îles:

Au Japon, la "promotion du développement des îles distantes" est l'une des tâches administratives importantes.

L'industrie et la vie sociale varient grandement suivant les îles, présentant des situations compliquées et diversifiées en fonction des conditions géographiques et du contexte historique ainsi que des rapports étroits avec les régions voisines.

On pourrait présumer facilement que les pêches se sont développées naturellement de façon intensive dans les îles du fait qu'elles sont entourées par la mer; cependant, en examinant de plus près, on s'aperçoit que les pêches ne peuvent se développer faute de débouchés bien étayés pour le poisson et d'infrastructures complètes comme un port de pêche bien équipé pour les bateaux de pêche et navires de transport malgré que la zone de pêche autour de l'île soit très bonne.



## Conditions for the Development of Small-Scale Coastal Fishery

# Progress in Techniques, Development of Production Methods, and Selective Adaptation of A Fishermen's Society

Iki Island is 140 kilometers in circumference and 139 square kilometers in area. Its topography, on the whole, is one of the gently-sloping places. The population of this island is about 50,000 and the island consists of four towns. Katsumoto-cho (one of the four towns) is located in the northwestern part of the island, and its population is about 9,000. The total number of households is 2,291 and of these 913 households are engaged in agriculture and 549 households in fishery. The population engaged in primary industry accounts for sixty percent. There are two fishing ports on this island, but the major port is Katsumoto-ura located at the island's northern extremity. Built along the V-shaped shoreline of a bay, this village has very little flatland along with some terraced land behind the village itself.

Fishermen have been settled in this village since around the 7th century, but evidence of an economically active fishing industry began in the 18th century when the number of fishermen greatly increased. In this section, we shall summarize the history of the development of fisheries in Katsumoto-ura until the present day.

### 1. Katsumoto has been blessed with good fishing grounds in the Tsushima Warm Current and has a good natural harbor.

The Tsushima Warm Current, a branch of Kuroshio Current, flows into the Japan Sea through the Straits of Tsushima. The waters around Iki, Tsushima and the Goto Islands and along the west coast of Kyushu have a complicated submarine topography. Therefore, eddy zones are formed in many places within this region. Furthermore, current rips are formed between the warm current and the coastal water along the continental shelf and Kyushu.

Because of the above-mentioned sea conditions, which are the basic factors in defining the fishing grounds, many kinds of migratory fish (sardine, common horse mackerel, mackerel, yellowtail, Japanese common squid, etc.) are abundant in the waters of the Tsushima Warm Current. It is well known that the productivity is especially high in the western region of the Japan Sea; because (1) the East China Sea adjacent to the water northwest of Kyushu is a spawning ground for various kinds of fish, (2) the Kuroshio Current and Tsushima Warm Current function to transport larvae and juveniles, and (3) the coastal sea is a good nursery ground for juveniles and young fishes. In the Western region of the Japan Sea, many kinds of fish from small plankton-feeding fishes to medium and large piscivorous fishes coexist.

Figure 2 shows representative surface fishes of the local fishing resources and catch conditions in the western region of the Japan Sea. For medium or large-sized fishes like tuna, skipjack, yellowtail and squid, angling fisheries (angling, trolling, long-line, and vertical long-line) have been developed, and for small or medium-sized mass-catch fishes like horse mackerel, mackerel and sardine, net fishing techniques (large/medium-scale purse seines and lampara nets) have been developed. In particular, more than half of the total national catch of yellowtail and horse mackerel is landed in this district. One characteristic of the northwestern coasts of Kyushu is that it is composed of a chain of submerged coasts and many good natural harbors exist here and there. Therefore, various types of small-scale fisheries have been developed in these coastal districts from old times. At present, about 32,000 small-sized powered fishing boats of under 20 tons (about 9% of the total in Japan) are concentrated in Nagasaki Prefecture.

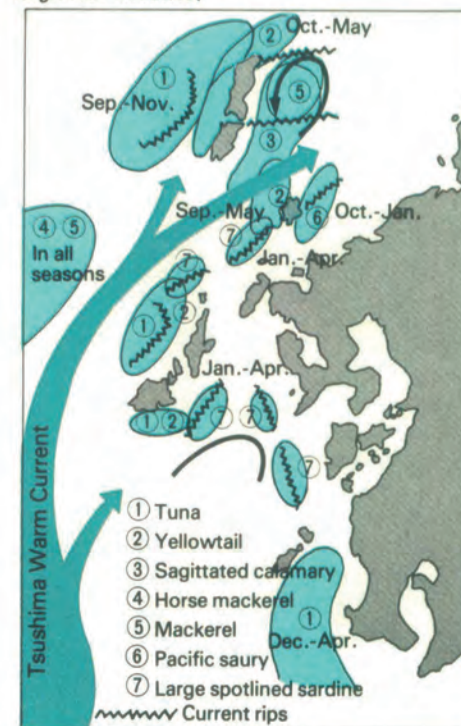
Fishing grounds with high productivity and a good natural harbor which makes it easy to go out fishing are the two primary factors for stimulating the development of fishing, and the Katsumoto-ura area meets these necessary conditions sufficiently.

### 2. Geographical conditions have compelled a tendency toward specialization in fishery supported by economic exchanges with the neighboring agricultural areas.

In Katsumoto-ura, a morning market is held every day. Farmer's wives come to this market from farming villages bringing their vegetables

Fig. 2 Distribution of current rips and fishing grounds in the western sea area of the Japan Sea

(Data from Fisheries Experimental Station of Nagasaki Prefecture)



and fruits to open street stalls, and the wives of fishermen and shopkeepers come to buy their goods. The farm products are sold out and the stalls are closed by the time the sun is high, and the farmer's wives leave for home after having bought marine products and other daily necessities.

This morning market was begun about three hundred years ago, and has continued until today. Although the morning market plays only a minor role in the sales of commodities nowadays, it was an important means of trade before the modern economic age.

Three islets are located in a row at the mouth of the bay opening toward the north, and large waves from the open sea are blocked by these islets. The fishermen have settled in a place with a good natural harbor, but there are steep cliffs just behind the coastline and thus no farmland. Because of this, people were not able to make a self-sufficient living by engaging "partly in agriculture and partly in fishery" as found in many other districts of Japan. Therefore, since early times, people here have had no choice but to depend on farm products from the neighboring agricultural areas, and, with the increased landing of fishes, economic exchanges with the farming communities were promoted.

This is not an unusual situation. In general, two processes can be recognized in the formation of a fishing community. i.e., (1) the community is formed by a social specialization in which some of the people in a farming community with high productivity begin to specialize in fishery, or (2) a community is formed by people who have come from other districts to settle in a certain place. In either case it is an essential condition for the continuation and development of a fishermen's community that a stable farming community exists nearby.

Also in Katsumoto-ura, with the increase in number and size of fishing boats, a custom of hiring farmer's sons as labor also began, in addition to their exchange of daily goods.

### 3. Powered fishing boats have brought about the exploitation of offshore fishing grounds which are a treasure-house of yellowtails, and many self-sustaining type fishermen have established themselves in commercial fishery by means of a loan system for modernization of fishing techniques.

When a fishing village begins to have contact with a large area beyond the surrounding farming area, through the development of a transportation system, fishermen are able to enter into the stage of a market economy, as commodity producers.

However, this stage must not be begun until the level of fishing productivity has become highly advanced.

During the 150 year period from the 18th to 19th century, whaling had flourished in Katsumoto-ura, but it rapidly declined after the political revolution in the late 19th century.



Since the Meiji era, free operation of angling fishery was permitted officially under the new fishery system, and fishermen began making a living mainly by hand lining of yellowtail, squid and sea bream as well as by gathering shore animals such as shellfishes and sea urchins. In those days, since all fishing boats were rowed by hand, fishing was restricted to the nearby waters close to land.

The most basic piece of equipment necessary in fishery is a fishing boat. The number of fishing boats in Katsumoto-ura has changed as shown in figure 3. The curve in this figure indicates, by itself, the ups and downs of fishery. But fishermen were induced to adopt an enterprise-type operation by the following three events, which have motivated the rise in productivity of fishery in the past one hundred years. This has caused a new development in the structure of the fishing community.

#### (1) Introduction of the Hot-bulb engine

In Katsumoto-ura, the hot-bulb engine was introduced for small fishing boats in the 1920's and 1930's. In this way fishing grounds became greatly enlarged. At first, it was the fishermen of the higher class who introduced the hot-bulb engine, but as soon as its power and fishing efficiency were recognized, many fishermen began to follow suit.

The next step was, fishermen, having obtained more funds, gradually began to use larger fishing boats and to employ a crew of several persons. As the cruising ability improved, good fishing grounds (reefs) in neighboring waters were found one by one and the constantly increasing yellowtail resources enabled the regular operation of yellowtail angling.

It is important to note here that a large reef which was designated later as "Shichiri-ga-sone" was found in the offshore waters. This reef has been known until the present as a good fishing ground which is considered a treasure-house of yellowtails.

This is a typical case where the introduction of power has led to the exploitation of previously unexploited resources, thus concentrating the style of production on a specific kind of fishery.

#### (2) Start of a loan system for modernization of fishing boats and the appearance of self-sustained fishermen (1957-present).

After overcoming the impoverished conditions that followed the Second World War, Katsumoto-ura gradually began to develop economically in about 1950. This was due to the fact that (a) it became possible to maintain a fixed level of catch by modernization of fishing methods, (b), the marketing route became stable, and (c) sales on credit by the fisheries cooperative associations became possible due to increased savings by fishermen, as the associations began to play a major role in the economy of the fishing community.

In 1958, a loan system for fishermen which is handled through the fisheries cooperative associations was started with official funds from the government, prefecture and bodies concerned with fishery. This system furnishes individual fishermen with funds on a low-interest and long-term repayment basis, on the condition that they are used for the "modernization" of boat hulls, engines, fishing gear and so on.

This measure produced striking results. That is, the number of new fishing boats built per year, which was about fifteen up to that time, greatly increased to a

Fig. 3 Changes in the number of fishing boats in Katsumoto-ura of Iki Island

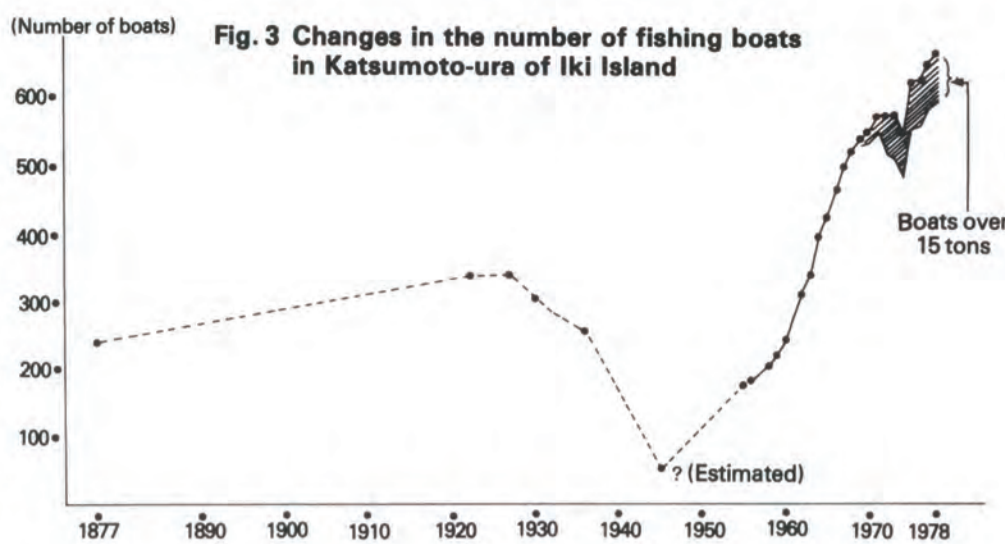
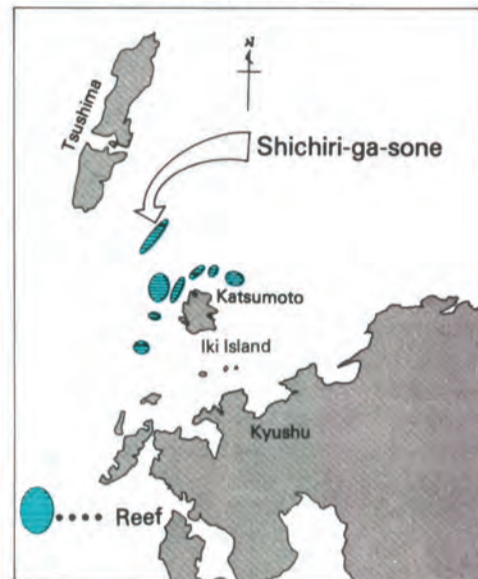


Fig. 4 Main fishing grounds in the neighboring waters of Katsumoto in Iki Island



pace of more than thirty boats a year since the 1960's. The increase in number of boats has been accompanied by an enlargement of boat size as well. The elite among the fishermen sold their fishing boats of under 3 tons, which had been used until that time, and constructed fishing boats of 3 to 5 tons. At the same time, they replaced their hot-bulb engines with diesel engines which are superior in reliability and performance. On the other hand, lower class fishermen who had been employed as crew began to engage in fishing independently as ship owners by buying up the secondhand fishing boats which were sold by the elite fishermen.

#### (3) Exploitation of squid resources in offshore waters of the Japan Sea.

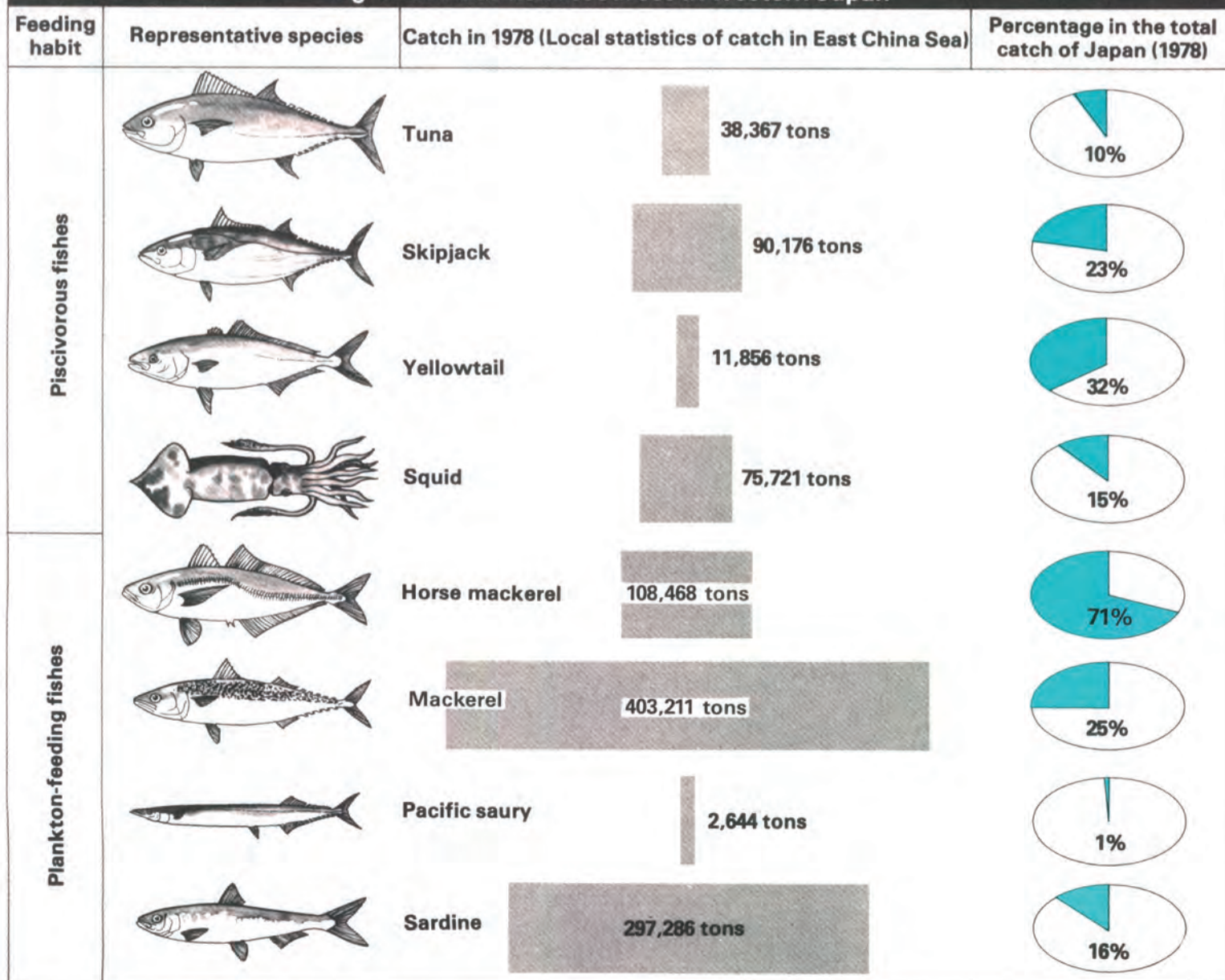
Squids are widely distributed in the waters off Iki Island. Since they are abundantly caught at almost any time of the year, squids along with yellowtail have been considered as the important catches in Katsumoto-ura.

From 1961 to 1963, the Fisheries Agency and fisheries experimental stations of several related prefectures made surveys on the aquatic resources in the Japan Sea. As a result, many good fishing grounds for Japanese common squid were found one after another in the offshore waters of the Japan Sea. In order to get out to these fishing grounds, medium and large sized fishing boats equipped with automatic squid angling machines appeared, and as the high payability of this fishery was realized, many fishermen began to use such fishing boats and machines in other districts. Thus offshore squid angling fishery by medium-sized fishing boats was organized within several years. Also in Katsumoto-ura of Iki Island, the style of operation of squid fishery shifted from fishing in nearby waters to offshore fishing staying out for long periods to follow migrating schools. In 1970, ten newly constructed boats over 15 tons equipped with fish finders and loran went out fishing for the first time to the Yamato Bank (located in the central part of the Japan Sea) which is about 700 Km from Iki Island. Since then, fishing has been conducted throughout the year by this new-type of fishing boat, which now numbers over 60.

From the already-mentioned article, we can say that the following items are basic conditions necessary for developing small-scale coastal fisheries:

- (1) There are sufficient available aquatic resources.
- (2) There exists nearby a large economic community to serve as a market for the catch.
- (3) The fishermen are equipped with powered fishing boats to enable them to make catches selectively.
- (4) For promotion of the modernization of fisheries, a system of low-interest loans with long-term repayment must be established to enable fishermen to buy fishing boats, fishing gear, engines and other essentials.
- (5) Exploitation of unused coastal and offshore resources is continuously encouraged and advanced by the government and local community bodies.

Fig. 5 Surface fish resources in western Japan



#### Condiciones para el desarrollo de la pesca en zonas costeras a pequeña escala

El contenido de esta publicación muestra que los puntos siguientes son condiciones esenciales para el desarrollo de la pesca a pequeña escala en zonas costeras.

- (1) Suficientes recursos acuáticos disponibles.
- (2) Una zona grande, en cuanto al aspecto económico, para poner en el mercado el pescado capturado.
- (3) Pescadores que capturen selectivamente los recursos siendo propietarios de barcas de pesca a motor.
- (4) Para la promoción de la modernización de la pesca, se establece un sistema de préstamos con interés reducido y de pago a largo término para que los pescadores puedan adquirir sus barcas de pesca, utensilios de pesca, motores, etc.
- (5) La explotación de los recursos no utilizados costeros y de mar adentro se realiza continuamente bajo control gubernamental y de una corporación social local.

#### Conditions pour le développement des pêches côtières de moindre importance.

Conditions de base pour le développement des pêches côtières de moindre importance.

- (1) Ressources aquatiques disponibles et suffisantes.
- (2) Débouché économique bien en place pouvant satisfaire l'offre dans le marché du poisson.
- (3) Pêcheurs parfaitement équipés de bateaux motorisés pour la prise sélective du poisson.
- (4) En vue de favoriser la modernisation de l'industrie des pêches, il doit exister des moyens de prêt à long terme avec faible intérêt afin que les pêcheurs puissent acquérir facilement les bateaux de pêches, moteurs, engins et appareils divers nécessaires.
- (5) L'exploitation des ressources de pêches côtières et au large doit être conduite rationnellement et continuellement avec l'aide des pouvoirs publics et locaux.

# One Technical Induces Collec Experienced Fishermen



**Hand lining:** The boat is stopped, and a fishing line is dropped in and lowered gently as its sinker sinks. Once the sinker touches the bottom, the line is rapidly pulled up hand over hand. If a fish does not take the bait after hauling the line for ten-odd meters, the line is again lowered and the above-mentioned action is repeated. The pulling up of a line is meant to make the bait look like a live fish and to induce a yellowtail to take the bait.

Yellowtail fishing is carried out by a primitive fishing method using a simple fishing gear; however, since it requires a deep knowledge of the fishing grounds and sea conditions and a highly skilled angling technique, it has continued as an profitable occupation.

The coastal fishing village is a territorial society based upon the principle of mutual cooperation, and it is also a society of competition in which only these excelling in fishing can assume leadership. The knowledge and techniques of yellowtail fishing acquired from many years of experience is not an easy thing to impart to another person even if he is a friend.

One technical innovation which occurred in the 1960's has brought about a dramatic change in the fishing system of Katsumoto-ura. That is, the use of transceivers in small fishing boats which has become prevalent among many fishermen. At first, they were used only for communication on the sea for safety's sake; however, they gradually came to be used also for exchanging information on fishing conditions, and this use came to be an important means for finding good fishing grounds.

With the increase in the number of transceivers in use, a system in which a small fleet consisting of ten-odd boats was organized in each town (or village), with each

The major premise of angling fishery is that the fish is induced to take a bait. Therefore, the core of fishing technique is to select an appropriate fishing bait according to the feeding habits of the particular fish. An experienced fisherman will sometimes cut open the abdomen and examine the stomach contents of a fish he has caught to see what it is eating. The basic angling method is hand lining as seen in the photograph. In trolling, three different methods are used depending on the season. Therefore, fishing can be carried out throughout the year by selecting an appropriate combination of fishing methods and baits as shown in the diagram.

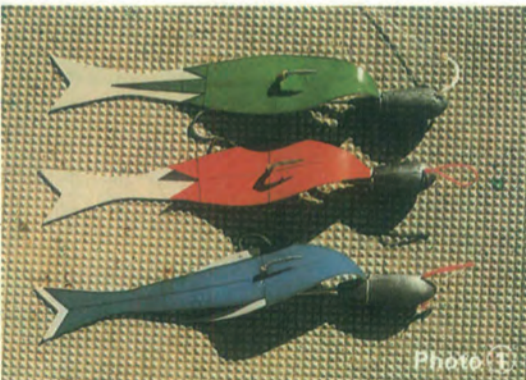
fleet using a certain frequency. This system was naturally adopted because of the fact that simultaneous communication by hundreds of fishing boats using the same frequency is impossible. As fishing by small fleets became a widespread practice, it gradually became difficult for anybody who was having a good catch to keep information about his success (details of fishing ground, fishing gear, and baits) a secret. When it became impossible to succeed individually, the consciousness of fishermen underwent a big change. They began to think about elevating their fishing techniques mutually by actively exchanging information.

Younger fishermen initiated the habit of holding study meetings about fishing gear and fishing methods on days when they couldn't fish due to stormy weather, and

as a result it is said that techniques of yellowtail fishing in Katsumoto-ura made great progress from the 1960's into the 1970's. Fishermen of Katsumoto-ura pride themselves in being the best yellowtail fishermen in Japan. Listening to their boastful talks is always interesting. They say that they have devised only a few of their own improvements in fishing gear and fishing methods, but they have a distinct ability to take fishing gear which they have brought from other districts, and by careful study to adapt to their own fishing grounds. It is said that there are some new fishing gear which could not be mastered in other districts but are mastered only by the fishermen of Katsumoto-ura.

**Fig. 1 Season and methods of yellowtail fishing in Iki Island**

Month	Fishing season	Fishes eaten by yellowtails	Kind of fishing method and bait			
			Hand lining		Trolling	
Jan.	Fishing season	Spotlined sardine Anchovy	Artificial bait (rubber) Photo ①	Artificial bait (rubber) Photo ②	[Type ③] Fig. 2 Artificial bait Photo ⑧	
Feb.						
Mar.						
Apr.						
May	Off-season	Sword-shaped squid Pacific saury	A slice of squid meat Pacific saury Photo ③, ④	A slice of squid meat Pacific saury	[Type ②] Fig. 1 Artificial bait Photo ⑦ [Type ①] Fig. 2 Artificial bait Photo ⑤, ⑥	
Jun.						
Jul.						
Aug.						
Sept.						
Oct.						
Nov.						
Dec.						



\*See Fig. 2 for types ①, ② & ③

# Innovation tivation by

## Una innovación técnica indujo a la colectivización dirigida por los pescadores expertos

Es una condición esencial para la pesca con caña que el pez muerda el anzuelo. Por eso, el fundamento de la técnica de pesca es la selección de cebos apropiados según lo que los peces estén acostumbrados a comer. Los pescadores expertos examinan a veces lo que contiene el estómago de los peces cortando el abdomen de un pescado.

El método de pesca con caña y sedal es de pesca manual con sedal tal y como se puede apreciar en la fotografía. Para la pesca a flor de agua desde un bote en movimiento existen tres métodos, los cuales se utilizan según la temporada. De este modo, la pesca se realiza durante todo el año seleccionando la combinación apropiada del método de pesca y del cebo tal y como se muestra en la ilustración.

## La colectividad profite de innovaciones técnicas por los pescadores chevronnés.

C'est un lieu commun de dire que l'appât sert à prendre le poisson. Mais le stratagème dans la technique des pêches consiste à choisir l'appât approprié en fonction du mode alimentaire de chaque poisson. Les pêcheurs chevronnés, examinent parfois le contenu de l'estomac des poissons en ouvrant ceux qu'ils attrapent.

La méthode de pêche à la ligne et à la perche est montrée sur la photo. Dans la pêche à la cuiller, on compte trois méthodes qui s'appliquent suivant la saison. Ainsi, la pêche peut se dérouler toute l'année en sélectionnant ou en combinant les méthodes de pêches appropriées et le genre d'appât comme il est illustré.



Hand-line fishing boats in operation

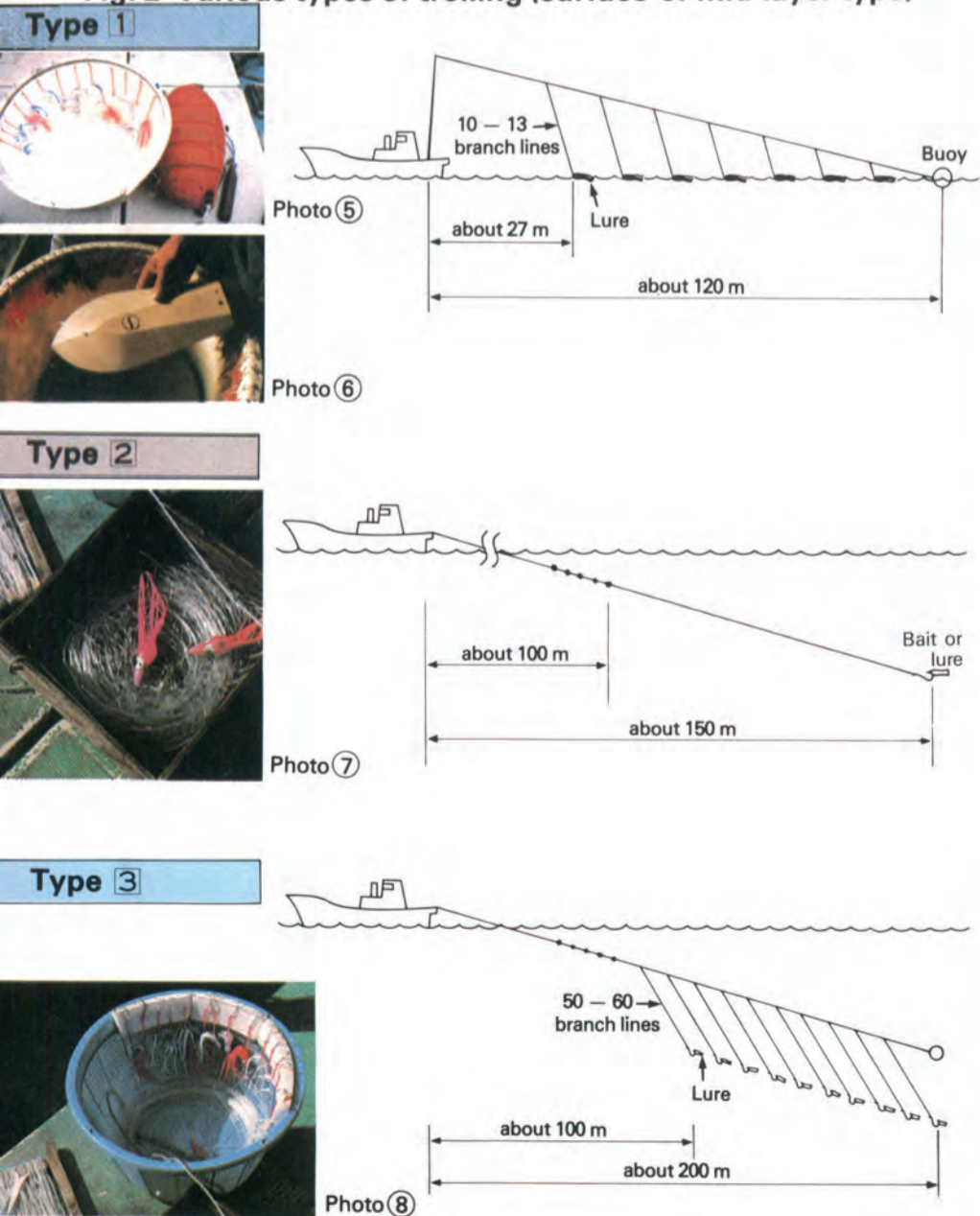


Fishes are wrapped in plastic sheets one by one, and shipped after packing in ice.

◀ A landed fish is killed on board by striking it with a hook, i.e., by the method called "Iki-Shime".

(Remarks). "Iki-shime" is a special method to keep freshness, i.e. a live fish is instantaneously killed by destroying the medulla oblongata and the duration of death rigor of the fish meat is thus extended.

Fig. 2 Various types of trolling (surface-or mid-layer type)



## Winter's Festive Fish



In the Hida district (a mountainous region of central Japan), people have a time-honored custom of holding a New Year's feast with salt-preserved yellowtail which are ① boiled with vegetables, ② broiled and ③ served raw as the best delicacies on a table. These fish come all the way from the far away fishing villages.

When winter comes and the year-end approaches, the number of yellowtails arriving at a fish market increases rapidly. From early times the yellowtail caught in winter, which is called "midwinter yellowtail", has been ranked among the finest delicacies, as this is the prime time for yellowtail meat to be eaten. Especially in the western part of the Japanese Islands, the yellowtail has been treated as a "festive fish" for gift-giving or as a New Year's food. This is due to the fact that yellowtails are easily obtained during the cold season when they

have the best flavor. (Remarks: In eastern Japan, salmon from the cold currents are highly esteemed as a "festive fish".)

Since about 20 years ago, yellowtail culturing has been carried out regularly and consumption of these fish has been popularized. At present, the yield of cultured yellowtails exceeds the catch of natural ones. The yellowtail is a high-priced fish these days, as in the past, and the price is maintained on a high level, equal to that of tuna, shrimp and crab, throughout the year.

Fig. 5 Amount of yellowtails arrived at central wholesale markets in six large cities (1978)

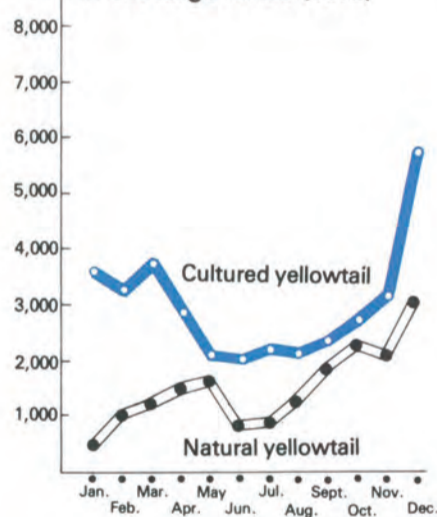
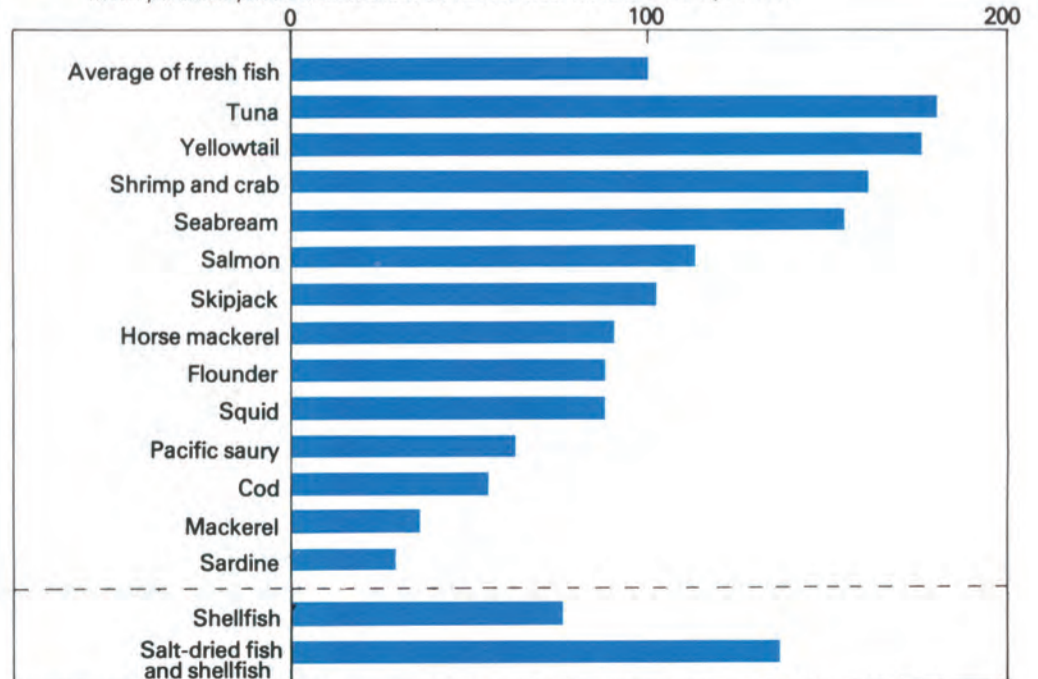


Fig. 4 Comparison of prices among sea foods

Mean purchase price index of the total households. (Fresh fish is equal 100)



Source: "Annual Report on Household Income and Expenditure Survey" (1978) (Issued by Prime Minister's Office)

## Pescado para los días festivos de invierno

En las zonas de la mitad oriental de las islas japonesas, se considera la cubera como "pescado festivo" para ofrecerlo como regalo o comerlo en Año Nuevo. Esto se debe a que las cuberas se obtienen con facilidad durante la temporada del frío, época en que son más sabrosos.

(Observaciones: En la parte este del Japón, los salmones de corrientes frías se consideran como "pescado festivo".)

## Pêches pendant les festivités en hiver

Dans les îles de la moitié occidentale du Japon, les sérioles sont traitées comme "poisson des réjouissances" pour les cadeaux du nouvel an ou le repas des fêtes. Cet usage est très répandu au Japon, parce que les sérioles sont des poissons abondants durant la saison froide et qui sont alors très délicieux.

(Remarque: Dans la partie "est" du Japon, on se procure plus facilement des saumons qui prolifèrent dans les courants froids du Pacifique et dont la chair est hautement estimée aussi comme "poisson des réjouissances".)

# Economy of Remote Islands



During the age of mercantilism, many island regions around the world flourished as stepping-stones for transoceanic trade. When age of sailing ships came to an end, however, with the appearance of the steamship, and as the railway has become a main means of transportation, the islands again became isolated. Being left behind in the development of capitalistic economy, the industry and economy of islands has had to depend mostly on the mainland.

Figure 1 shows the recent conditions of catch by five fishery cooperative associations on Iki Island. As regards the Katsumoto Fisheries Cooperative Association, it is noticeable that among various fisheries squid hand line and other angling methods are mainly carried out.

It can be said that the catches of fishermen in Katsumoto-ura are limited almost entirely to squids and yellowtail, and the sum of the catch of these fishes reaches 88% of the total catch. Since both squids and yellowtail are high-price fishes, they account for 95-96% of the total fishery yield (about 1.4 billion yen) in Katsumoto-ura. Squid fishery, which is a nucleus of fisheries in Katsumoto-ura, includes two types: (1) by offshore fishing boats which follow schools of Japanese common squids migrating extensively along the coasts of the Japan Sea, and (2) by coastal fishing boats catching from the local stock of Japanese common squids and sword-shaped squids inhabiting the coastal waters of western Japan.

Especially, since sword-shaped squid is the highest valued among squids, it has been processed by drying since early times. It is an important source of income, together with yellowtail for coastal fisherman.

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It can be said that Japanese coastal fishermen aim in principle at increasing their annual number of fishing days by adopting as

many fishing methods as conditions make appropriate, and they specialize in catching various kinds of aquatic products in a balanced schedule throughout the year. Why have fishermen of Katsumoto-ura concentrated their fishing activities on a few specific resources, contrary to this general principle?

The economy of a remote island is under two disadvantageous conditions (a). Because the island is far from the markets, transportation fares must be added both in the sales of products made on the island and in the purchase of products from outside the island. (b). Because of the small area and small population, investment brings small rewards even if a new industry is set up. That is, an article for sale must be sold cheaply and an article to be bought becomes expensive. Besides, even if capital is invested, most of the added profits will eventually flow outside the island, and it will have very little effect in raising the income of local inhabitants. These are the reasons for the economic backwardness of the remote island. In order to overcome this economic backwardness, it is necessary to make the community economically competitive by either increasing productivity or holding the cost of production to a minimum, and to secure a market for shipment: But how can this be achieved?

The main conditions necessary for developing the economy of the remote island can be summarized in the following three points:

## Total catch by Katsumoto Fisheries Cooperative Association (1977): 4,927 tons.

[By fish species]	[By fishing method]
(1) Japanese common squid 3,266 tons (66%)	(1) Squid hand line 3,913 tons (79%)
(2) Other squids 657 tons (13%)	(2) Pole-and-line for fish other than squid 503 tons (10%)
(3) Yellowtail 420 tons (9%)	(3) Others 511 tons (10%)
(4) Others 584 tons (12%)	



The whole view of Katsumoto Fisheries Cooperative Association, with Mr. Ni-ichiro Kashii, Chairman

(1) There are abundant natural resources available to the remote island, and high productivity is brought about by utilizing the productive capacity of nature.

(2) In order to hold production costs to a minimum, an enterprise must be carefully managed. In other words, it is necessary to make the largest possible use of the natural resources available, and to do it with the use of cheap labor and self-sufficient production methods whenever possible.

(3) The nearest market outside the island where products of the island can be shipped should be secured, and effective means of transportation should be established.

the labor of family members, (iii) fishing methods which do not require much expense in terms of fishing gear and bait, and (iv) high level angling techniques which have been cultivated over a period of many years.

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For the remote island, even if the problem of production is solved, there still remains the problem of distribution. There is a bad phenomenon which is unfortunately common in remote areas, that is for a few middlemen to practice monopolistic buying and thus control the economy in their own interest. Also in Katsumoto-ura, until about 1930 rights and interests were held by wholesale dealers or by a part of the wealthy class. Only after the fishermen were united and had cultivated a sense for economics, did self-supporting management become possible.

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Katsumoto Fisheries Cooperative Association, established in 1932, entered the stage of rapid progress after the Second World War with the increase of funds as mentioned above. Among activities by the association until now, they have obtained

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It is clear that the development of yellowtail angling and squid hand line fisheries in Katsumoto-ura has been made possible by repeated trial and error on the part of fishermen who followed the above-mentioned basic principles. They have succeeded in achieving a production which is constant, even if its scale is not large, with the support of various factors such as : (i) abundant resources for coastal fisheries, (ii) small-scale management based mainly on

Fig. 1 Catch by fish species and by fishing method in Iki Island (Jan.-Dec., 1977)

	Medium-and small-scale round haul net	Lift net	Gill net	Squid hand line	Angling other than squid	Long line	Large fixed net	Small fixed net	Boat seine	Shellfish gathering	Seaweed gathering	Other fishing
Sardine	●	●										
Yellowfin horse mackerel	●	●			●			●				
Mackerel	●	●			●			●				
Pacific saury			●					●				
Yellowtail	●		●		●	●	●	●	●			
Skipjack	●	●	●		●		●	●				
Tuna and marlin							●	●				
Flatfish			●		●		●	●				
Seabream			●		●		●	●	●			
Three line grunt	●		●		●		●	●				
Other fishes	●		●		●	●	●	●				●
Shellfish										●		●
Squid	●	●	●	●			●	●				
Other marine animal												●
Seaweed											●	●

(Remarks) ● indicates the size of total catch in Iki Island

▨ indicates the share by Katsumoto Fisheries Cooperative Association



Auction begins at 5 : 30 a.m. every morning except Sunday in a market within fisheries cooperative association.

excellent results in improving the distribution, i.e., (1) exclusion of trading capital, (2) establishment of a cooperative selling system, and (3) expansion of the business area by direct delivery to the consuming area. Especially, the sudden rise in prices of high-grade fresh fishes since the 1960's and the commission of a large ferryboat connecting Iki Island with Fukuoka City (having a population of one million) have greatly promoted the economic growth of the fisheries of Katsumoto-ura.

Since August 1977, the Katsumoto Fisheries Cooperative Association has adopted an auction system, opening a market within the fisheries cooperative, along with the existing cooperative selling system (consignment sales to the markets in the consuming area). The three purposes for beginning an auction by the fisheries cooperative are as follows:

(1) To increase the demand within the island for aquatic products. (2) To elevate the commodity value of coarse fishes other than yellowtail and squid, and to stimulate the fishermen's incentive to catch more fish. (3) To cultivate the price-making ability in the producing area, and to develop Katsumoto-ura into a transit port for the other remote islands.

\* \* \* \* \*

For the past three or four years, a poor catch has continued in offshore squid fishing grounds, and some of the fishermen using medium-sized fishing boats have changed their occupation or have given up fishing because of poor profits. Also, in the near-by fishing grounds, small-sized fishing boats of under 5 tons have become over crowded, and excessive competition in fishing is feared. Although the future direction of the development of coastal fisheries in Katsumoto-ura is not yet clear, (1) reconsideration of unused resources other than squid and yellowtail which have been until now neglected during the developmental process. (2) determination of the size of fishing boat

most appropriate to the management of coastal fishery in the remote islands and establishment of a year-round operation system, and (3) improvement of the facilities for distribution and storage, and promotion of the processing industry of aquatic products are the important problems to be solved.

#### La economía en las islas distantes

Los pescadores de Katsumoto-ura de la isla de Iki han desarrollado su propio sistema de pesca al mismo tiempo que ponían solución a las desfavorables condiciones que restringen el desarrollo económico de las islas distantes. Han tenido éxito al poder conseguir una producción que se captura, aunque a pequeños niveles, cíclicamente, con la ayuda de diversos factores, tales como (i) recursos abundantes para la pesca costera; (ii) producción a pequeña escala basada principalmente en una labor familiar; (iii) métodos de pesca que no requieren demasiados gastos de equipos de pesca ni de cebos; y (iv) técnicas de alto nivel de pesca con caña que se han desarrollado a través de muchos años.

#### L'économie dans les îles distantes:

Les pêcheurs à Katsumoto-ura dans l'île Iki ont poursuivi leurs efforts pour développer leur propre système de pêche tandis qu'ils devaient surmonter des conditions très défavorables offrant un obstacle pour le développement économique des îles distantes. Ils ont réussi à fournir une production, qui quoique de faible ampleur, est d'un niveau substantiel et de façon cyclique en mettant à profit des facteurs tels que: (i) ressources abondantes en pêches côtières (ii) exploitation de faible envergure basée principalement sur la collaboration familiale (iii) application de méthodes de pêches ne nécessitant pas d'investissement excessif en appareils et en appâts; et, (iv) mise à profit des techniques très élaborées de pêche à la ligne qui ont été perfectionnées au cours de nombreuses années.

The administration for agriculture, forestry and fisheries has undertaken various policies, such as elevation of productivity, balancing of price and market, elevation of the producer's income, development of effective management, and improvement of systems and industrial structure. One of the effective ways to carry out these policies is by financial aid from the government. Japanese agriculture, forestry and fisheries are conducted on the basic premise of a market system under a capitalist economy in the same way as other industries. However, because of the following special characteristics, protection and supervision by the government play an important role for these industries:

- (1) These industries are closely related to the security of the national food supply.
- (2) Since these industries are based on public resources such as land or fishing grounds, it is necessary to utilize social overhead capital in order to increase the basic productivity of these resources.
- (3) Small-scale management systems mainly depending on the family labor tend to be dominant, and official aid and regional measures by farmers and fishermen are necessary for the stable development of agriculture, forestry and fisheries.
- (4) Because these industries are vulnerable to the changes in natural conditions such as weather, the government must work at stabilizing prices and distribution by intervening in the market system as occasion requires.

The government's aid to agriculture, forestry and fishery industries has been carried out by the two systems of "subsidy" and "financing". Various kinds of subsidy and financing systems have been established depending on the needs of the times. An outline of these systems for fishermen is as follows:

#### [Subsidy system]

A part of the funds used for construction of jointly used facilities and the like are granted to the operational body of municipalities or fisheries cooperative associations by the government. This system is operated by forming an annual budget based on a legitimate program of projects. The rate of government subsidy is set at percents such as 50%, 60% or 70% of the total operating expense depending on the kind of project:

Subsidized projects are divided into those which are related to land facilities and those related to sea facilities, and the following are the two main projects which are being subsidized at present:

- (1) Coastal fisheries structural improvement projects (on land)
  - 1.1. Jointly used facilities for fisheries .... fish preserves and culturing facilities, seedsupplying facilities, storage and working facilities and others.
  - 1.2. Facilities for improvement of distribution .... facilities for landing and sorting, freezing facilities, cold storage facilities, ice making facilities, and others.
- (2) Coastal fishing ground improvement and

## Investment for Modernization of Fisheries by the Government

exploitation projects (in the sea)

- 2.1. Setting of fishing banks.
- 2.2. Creation of propagation and culturing grounds ..... nursery grounds for larvae and juveniles, large-scale propagation grounds, medium-scale fish farms, and exploitation of unused shallow fishing grounds.
- 2.3. Preservation of coastal fishing grounds.

#### [Financing system]

There are two kinds of financing systems.

(1) Financing for a public body such as municipalities or fisheries cooperative associations ..... These loans are used for construction of jointly used facilities etc. This financing is managed by a governmental financial organization such as the Agriculture Forestry and Fisheries Finance Corporation, with a government grant which is paid at a fixed rate of interest.

(2) Financing to individual fishermen ..... Funds necessary for modernization of fishing boats, engines and fishing gear are furnished to individual fishermen.

2.1. Financing system with funds for modernization of fisheries ..... This type of loan is supplied from the funds of a fisheries cooperative association, prefectural federation of fisheries cooperative associations, with a government grant to be paid at a fixed rate of interest. This is applicable in all parts of the country.

((The terms of a loan)) In the case of a fishing boat of under 20 tons — Interest : 5% a year, the term of repayment: within 12 years (however, 6 years for a wooden vessel and 6 years for an engine only), financing rate: 80% of the total construction expense, limit of loan: 30 million yen.

2.2. Financing based on the Coastal fisheries structural improvement project ..... This type of loan is supplied from funds for the promotion improvement projects, and it is applicable only in the limited areas specified by the project.

((The terms of a loan)) In the case of a fishing boat of under 10 tons — Interest: 3.5% a year, the term of payment:

within 9 years for steel vessels and FRP boats, and within 6 years for wooden vessels, financing rate: 80% of the total construction expense, limit of loan: 18 million yen for an individual.

#### Inversiones para la modernización de la pesca realizadas por el gobierno

La administración de la agricultura, silvicultura y de la pesca están sistematizadas mediante diversas políticas como por ejemplo el incremento de la productividad, racionalización de los precios y del mercado, aumento de los ingresos del productor, desarrollo de la administración, y mejora del sistema y de la estructura industrial. Una de las medidas más efectivas para la realización de estas políticas es la ayuda de fondos financieros del gobierno.

#### Investissements gouvernementaux pour la modernisation des pêches:

L'administration pour l'agriculture, les forêts et les pêches se préoccupe systématiquement d'affaires variées telles que l'élévation de la productivité, la rationalisation des prix et du marché, l'élévation du revenu des producteurs, le développement administratif et l'amélioration du système des pêches et des structures industrielles en rapport. L'une des mesures effectives qui s'avère impérative pour mener à bien cette politique est l'aide gouvernementale sous la forme de fonds financiers.

# "A Progressing Fish" Growing with The Warm Current

## Yellowtail (*Seriola quinqueradiata*)

The yellowtail belongs to the Carangidae family, and all of the ten-odd allied species known in the world inhabit the Temperate Zones. Yellowtails living in the neighbouring waters of Japan spawn in the region south of central Japan, especially in the southwest waters. Eggs, carried by the Kuroshio Current and Tsushima Warm Current, are dispersed while drifting, resulting in wide distribution throughout the entire coastal waters around the Japanese Islands except a part of Hokkaido.

Juveniles will attach themselves to the "drifting seaweeds" (brown algae) drifting with the oceanic current when they have grown to a size of about 1cm. They continue to grow under the protection of these seaweeds until they reach a length of about 15cm. This is an important habit in the life cycle of the yellowtail.

In Japan, the yellowtail is referred to as "a

progressing fish". This means that its market name changes with the size of the fish. Various names are used at several growth stages according to the body length, and even among traders involved in fisheries, it sometimes leads to confusion.

An example is shown in the following table 1:

This phenomenon indicates that the yellowtail has been treated as a high-grade commodity at each stage of growth since early times, and it has been an important part of traditional cooking. Moreover, this suggests that various fishing methods have been developed, according to the migrating season, in various districts.

In the past, the fixed net was the main fishing method. At present, fishing is mainly carried out by angling, in addition to the fixed net and round haul net, resulting in an increase in the total catch.

Representative fishing grounds and fishing methods are: (1) Hand lining, trolling, and long-line in western Japan (Nagasaki, Fukuoka, Yamaguchi and Shimane Prefectures), (2) fixed net in the Japan Sea (Toyama, Ishikawa and Fukui Prefectures), and (3) fixed net on the Pacific coast (Mie and Kochi Prefectures).

There are two fishing seasons in a year: i.e., the season of the northward migration and that of the southward migration of the yellowtail schools, which occur along both the Pacific Ocean and the Japan Sea coasts of the Japanese Islands. The major fishing season is from autumn (about October) till winter in all districts.

The main prefectures where natural yellowtails are caught are shown in the figures. The main districts producing cultured yellowtails are distributed along the waters where juveniles for culture ("Mojako") are caught (mainly along the Pacific coast south of Chiba Prefecture), and they are consumed mainly in western Japan where the commodity value of yellowtail is considered high. Cultured yellowtail are consumed in abundance in Osaka, Tokyo and many provincial cities of western Japan.

Un "creciente desarrollo de los peces" con las corrientes cálidas — Cubera (*Seriola quinqueradiata*) —

La cubera pertenece a la familia de los carangidae, y unas diez especies afines que se conocen en todo el mundo viven todas en las zonas templadas.

Las cuberas que viven en las aguas japonesas se producen en las aguas de la zona sur del centro del Japón, especialmente en la zona del mar del sudoeste. La Corriente Kuroshio transporta los huevos y la Corriente Caliente de Tsushima los dispersa llevándolos con la corriente, dando como resultado una amplia distribución por todas las aguas costeras en torno a las islas japonesas a excepción de una parte de Hokkaido.

Une croissante féconde du poisson grâce au courant chaud:

— Sérioles (*Seriola quinqueradiata*) —

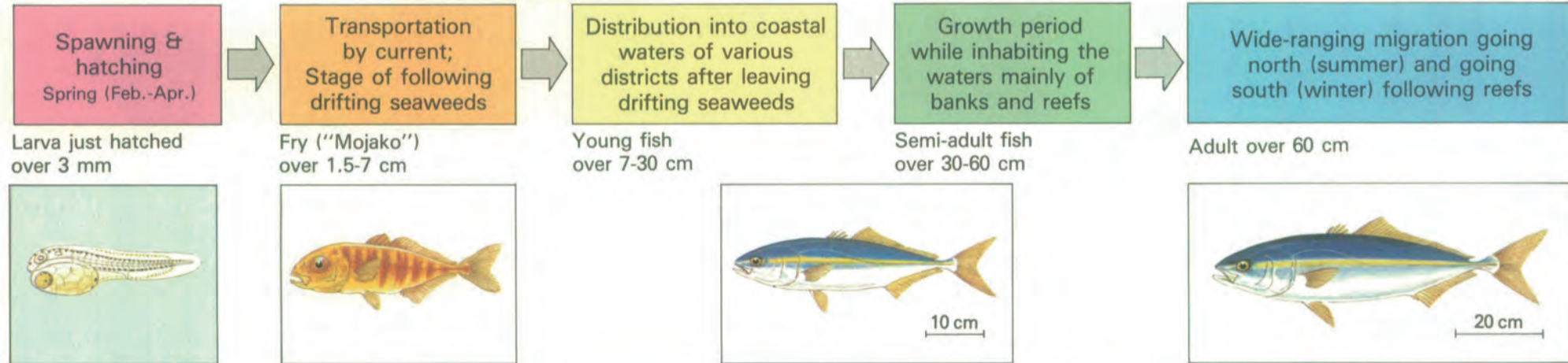
Les sérioles appartiennent à la famille Carangidae, et plus de dix espèces parentes sont connues et qui vivent dans les zones tempérées du monde entier.

Les sérioles vivent dans les eaux japonaises se multiplient dans les eaux méridionales au centre du Japon, en particulier dans la région maritime du sud ouest. Les frais sont portés par le courant Kuroshio et le courant chaud Tsushima puis disséminés à la dérive et il en résulte alors une répartition très élargie dans toutes les eaux cotières baignant les îles japonaises sauf la partie septentrionale de Hokkaido.

Table. 1 Names of yellowtail by growth stage in a district of the Pacific coast

Growth stage	Stage at which juvenile attaches to drifting sea weed within several months after spawning, up to about 15 cm	From "Mojako" stage up to about 30 cm	About 1 year old 30 ~ 50 cm	About 2 years old 50 ~ 65 cm	Over 2 years old
Name	"Mojako"	"Shokko" "Wakashi" "Wakanago" "Tsubasu"	"Inada" "Hamachi"	"Warasa" "Mejiro"	"Buri" (Yellowtail)

### Life history of yellowtail and its relation to fishery



Fishing conditions by fishing method (1978)

