

FAD fisheries of Okinawa, Japan

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THE OKINAWA PREFECTURE

Location and geography

Okinawa Prefecture is located south-west of mainland Japan, forming an arc between Kagoshima Prefecture and Taiwan (Ryuku Archipelago). It extends 1000 km from the east to the west and 400 km from the north to the south. It includes 160 islands—of which 42 are inhabited—spread in three groups: Okinawa, Miyako and Yaeyama. Okinawa Island is the main and largest island of the Prefecture, measuring 104 km by 10 km.

Climate

Okinawa is the only prefecture in Japan which belongs to the subtropical oceanic climate region. The sea-surface temperature ranges from 22 to 29°C. Typhoons occasionally hit the region during the summer and autumn seasons.

Population

Okinawa Prefecture includes ten cities, 15 towns and 28 villages. The total population of the Prefecture is 1.26 million, of whom 82 per cent live in the central and southern areas of Okinawa Island.

THE FAD FISHERY OF OKINAWA ISLAND

Fisheries utilising fish aggregating devices (FADs) were introduced to Okinawa from the Philippines in 1982. Since that time, the fisheries have developed rapidly. Figure 1 shows the comparative catches of bottom fish (such as snapper) and pelagic fish (such as tuna, usually caught around FADs). Bottom-fish catch has decreased since 1981, seemingly because of overfishing. On the other hand, the FAD fisheries catch has greatly increased. The FADs have played an important role not only in improving fishermen's income but also in easing the fishing pressure on bottom fishes.

Deploying FADs requires the permission of the Okinawa Marine Zone Fisheries Regulation Committee, which regulates the number of FADs around Okinawa. In 1995, 177 FADs were permitted; Figure 2 shows their locations around the main island of Okinawa only. Although fishermen prefer to set FADs well apart, in some areas they have to set them very close (less than a mile) to each other.

Generally, a FAD is made up of three sections: the buoy, the mooring line and the anchor. There are

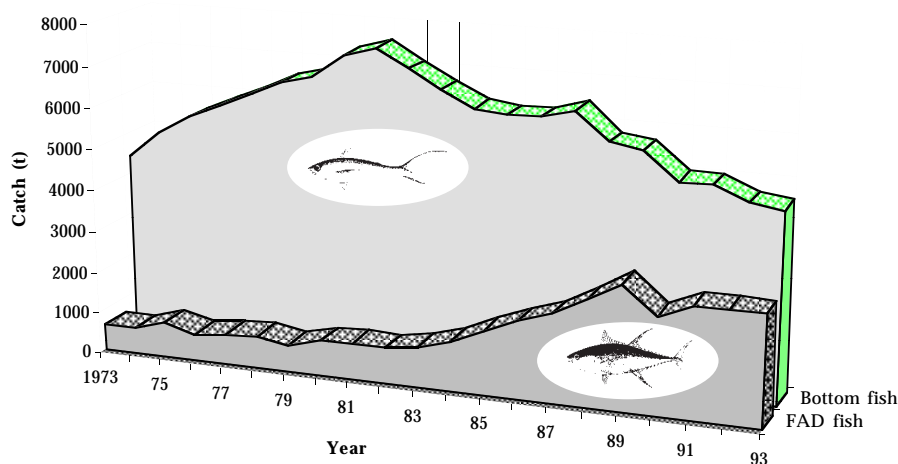
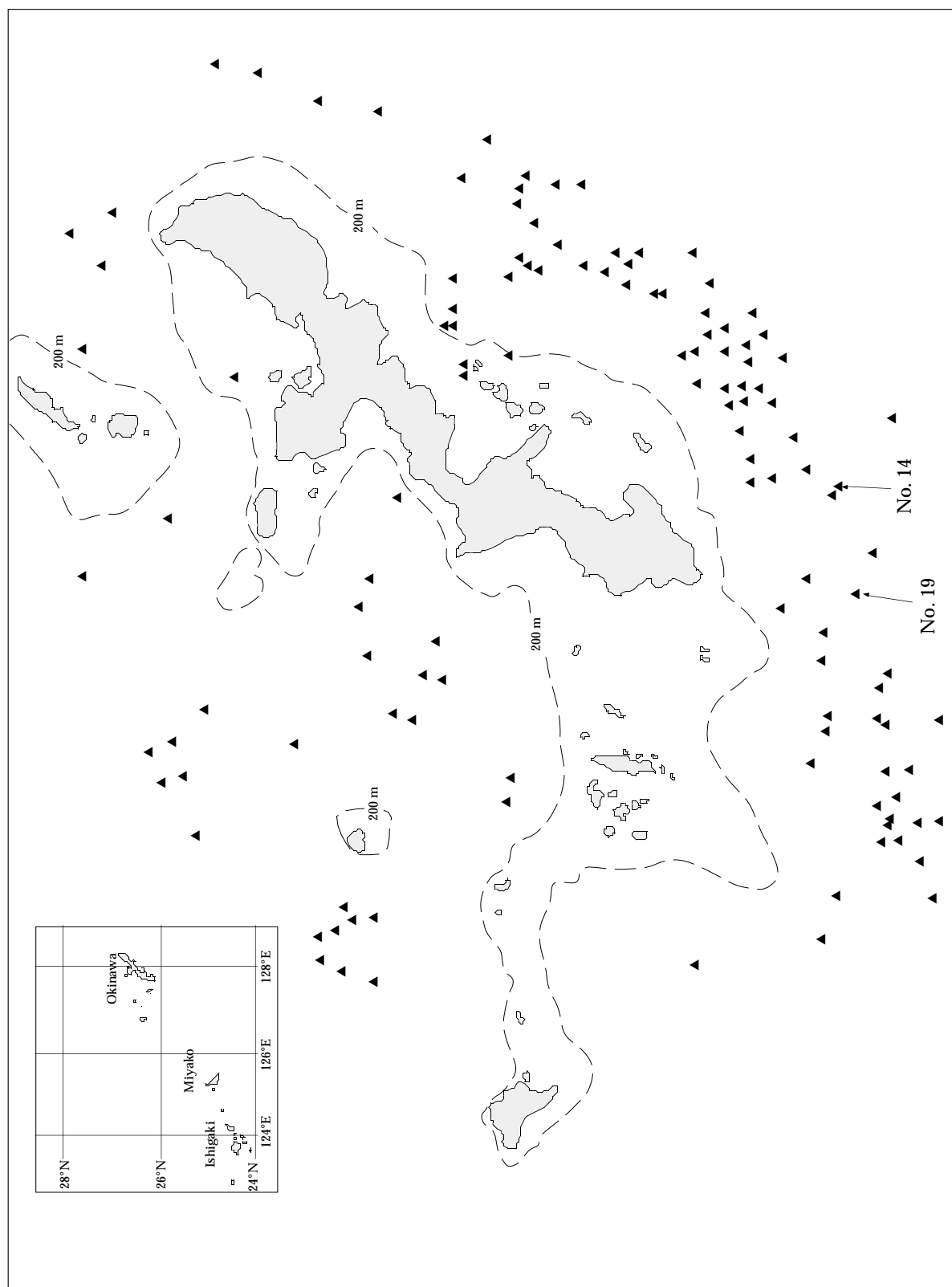


Figure 1: Comparative catches of bottom and FAD fish

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several types of buoys in Okinawa and two of them, the vertical type and the multiple-float type, are the most commonly used. The structure of FADs has been devised by each region's fishermen. Though it is difficult to choose the best type, so called 'vertical types' (raft made of one big spherical float) have been preferred by fishermen recently.

The size of the catch that can be expected from one FAD annually depends greatly on the location of the FAD. An effective FAD can be a hundred times more productive than an ineffective one. Table 1 and figure 3 show the catch from

eleven FADs belonging to the Itoman Fisheries Cooperative (IFC) at the southern tip of Okinawa Island in 1995. It is generally accepted that the further from the coast a FAD is moored, the better its chances of being productive. The catches from FADs no.14 and no.19, which are located well offshore in depths of over 1500 m (see Fig. 2), were very good indeed (Table 1, Fig. 3).

For pelagic fish, there is a strong relation between current and catch, the depth and the current should be carefully evaluated when deploying a new FAD.

Table 1: Total catch and value of catch from 11 IFC FADs in 1995

FAD no.	Catch (kg)	Value (Yen)	Average value (Yen/kg)
3	32,441	14,904,875	459
4	5,830	2,987,452	512
11	29,959	12,956,854	432
13	4,084	1,523,652	373
14	93,253	41,369,213	444
16	17,668	8,193,524	464
17	3,054	1,182,650	387
18	8,698	4,291,018	493
19	133,778	64,864,517	485
20	35,947	12,680,221	353
21	22,268	10,202,882	458
Total	386,980	175,156,858	453

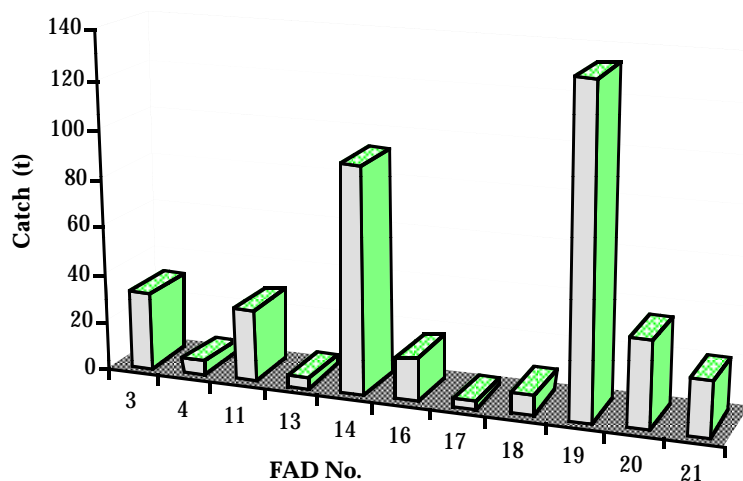


Figure 3: Comparative catches of 11 IFC FADs in 1995

One of the most important species in the Okinawan FAD catch is yellowfin tuna. Table 2 shows the catch composition of fish from FADs landed in the IFC market in 1995. Having a higher price, bigger yellowfin tuna (>10 kg) are the fishermen's main target.

Deploying one FAD usually costs 3 million yen (equivalent to US\$ 30,000), which includes the cost of the FAD itself (with the buoy, the mooring line and 2 anchors) and the deployment costs. A hand-made buoy usually costs half the price of a manufactured buoy. Some of the fisheries cooperatives are using fully 'home-made' FADs.

The lifespan of FADs on station depends on the location and the number of typhoons passing in the vicinity of Okinawa; one and a half years is said to be average. Some fisheries cooperatives check their FADs every few months and replace damaged parts to extend the FAD life.

Recently, a very strong rope material called 'Bectran' has been used. This rope is very expensive—more than 1000Yen/m—but strong enough to resist a knife-cut. Bectran has been used from the buoy down to 600 m depth, the rest of the mooring line being made with cheaper materials (e.g. polypropylene).

The total length of the ropes from the buoy to the anchor is usually 1.4 times longer than the depth, thus allowing a 40 per cent slack to the mooring line.

It would seem costly if a 3 million FAD was lost in one or two years. However, a FAD is consid-

ered to pay for itself in Okinawa. One of the characteristics of Okinawan FAD fisheries is that the subsidy from governments has tended to decrease recently. The municipal governments are still subsidising FADs, but the prefectural government no longer does so. In Itoman, the municipal government and IFC share the expenses related to each new FAD; but if the FAD is lost, the fishermen will have to deploy a substitute FAD at their own expense.

IFC fishermen have to pay two per cent of their catch from FADs and 20,000 yen annually as FAD management fees. New FAD deployment plans or management plans of FADs are authorized by the FAD Management Committee set up by FAD fishermen in the region. The Committee has now 120 members and manages 11 FADs.

There are some rules on fishing around FADs. For example, you have to round a FAD clockwise when trolling to reduce boat-clash accidents. Mooring to FADs and using wire fishing gears are prohibited.

Recently, a project to deploy huge, durable FADs (called 'Nirai' in Okinawa) is implemented by the national and the prefectural governments. The surface buoy is made of steel. It is 7 m deep and 16m wide at the base (see Figure 4 and picture on next page). The mooring line is made of chains and reinforced wire rope.

The total cost of one of these FADs is more than 100million yen (≈ US\$1 million). However, it is designed to last at least 10 years. In 1995, two of these FADs were deployed offshore of Okinawa.

Table 2: Catch and value by species from 11 IFC FADs in 1995

Name of fish	Catch (kg)	Value (Yen)	Average value (Yen/kg)
Yellowfin tuna (>10 kg)	166,549	108,927,242	654
Yellowfin tuna (<10 kg)	136,788	37,280,846	273
Dolphin fish (mahi-mahi)	28,384	6,486,844	229
Black marlin	17,580	10,229,210	582
Albacore	13,983	4,153,521	297
Skipjack	11,424	3,111,913	272
Wahoo	4,881	1,618,505	332
Bigeye tuna	3,479	1,857,745	534
Rainbow runner	2,018	718,233	356
Others	1,894	772,799	408
Total	386,980	175,156,858	453

They withstood three typhoons with no damage. Their aggregating effect has been great so far; twelve tonnes of tuna were caught from around one of them in September 1995. Recently, two

more were set around Okinawa. We will try to keep the SPC FAD Information Bulletin readers informed about this project in future issues.



A 'Nirai' being serviced

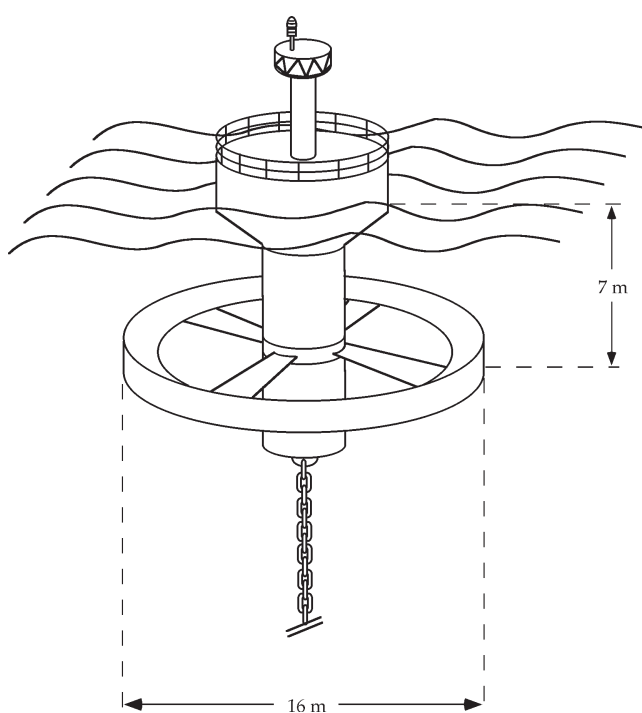


Figure 4: Details of the 'Nirai' raft