DEEP SEA BOTTOM HANDLINING IN PAPUA NEW GUINEA

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INTRODUCTION

Interest in deep-sea fishing in the South Pacific is increasing for a number of reasons:

1. There are few shallow reef areas in the region as a whole;
2. In many places the existing shallow reefs are over-fished or nearly over-fished.
3. The flesh of the deep-water fish is not poisonous while that of many shallow water species is;
4. Traditional fishing boundaries are jealously guarded close to shore.

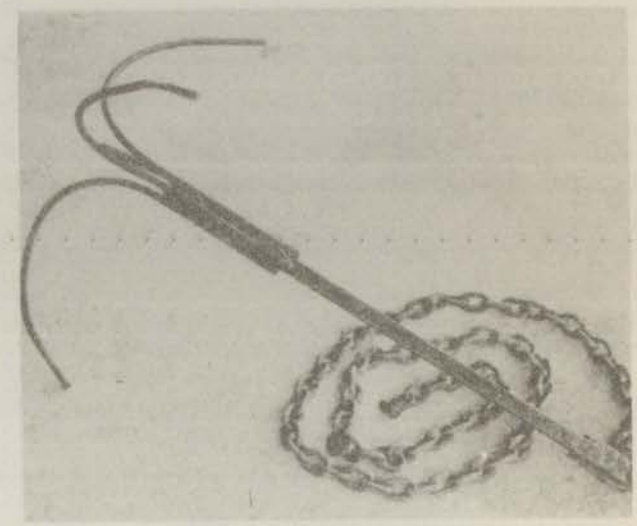
Early in 1982, Mr. Tevita Fusimalohi, a master-fisherman from the South Pacific Commission, came to Papua New Guinea to train local fishermen and D.P.I. officers in the technique of deep-sea bottom handlining. The master-fisherman, accompanied by a fisheries biologist, visited three provinces: Central, Milne Bay and Manus.

This article presents the results of the fishing, and also describes the technique of bottom handlining.

THE FISHING METHOD AND THE AREAS FISHED

Deep-sea bottom handlining is normally carried out from an anchored boat or canoe, but can also be done from a drifting boat if the currents are not too strong. When fishing at a reef drop-off, the boat is anchored in shallow water and the anchor rope is paid out until the boat reaches water of a suitable depth. During this survey, fishing was carried out at depths between 80 and 280 m.

To anchor on reefs or rocky bottoms, a grapnel anchor is used.

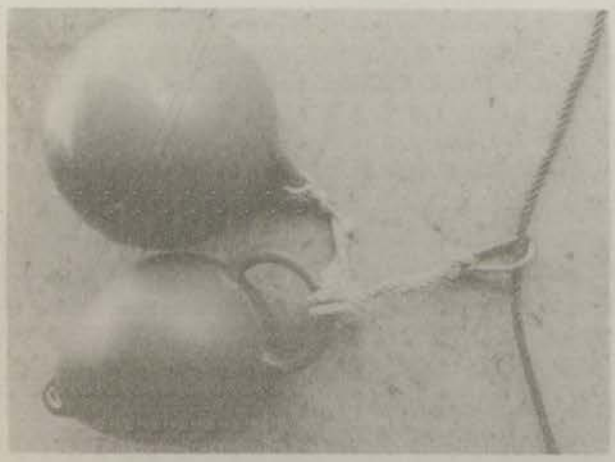


Grapnel anchor with chain

The advantage of this type of anchor is that its prongs are strong enough to hold the boat even in strong winds and currents. However, the prongs will bend to allow the anchor to come free when towed by the boat, so there is less chance of losing both anchor and rope.

Hauling the anchor by hand is very difficult, but instead of using an anchor winch, the boat itself is used to haul the anchor.

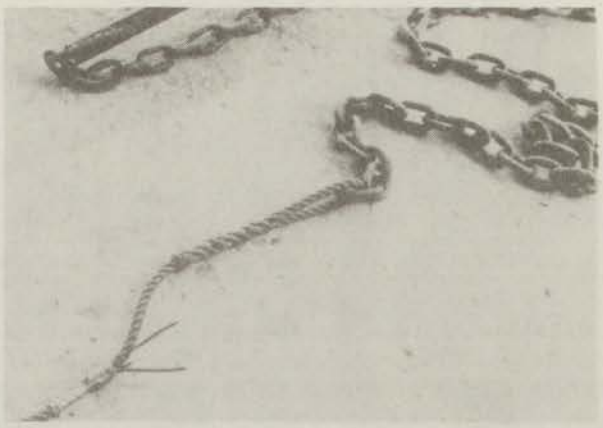
After fishing, the anchor rope is tied to the stern of the boat. While the boat is steaming out from the reef, a float is attached to the anchor rope. This float is pushed backwards by water resistance until it reaches the anchor.



Floats used in hauling in the anchor

Floats being attached to the anchor rope by means of a snap shackle

Near the anchor, steel rods are fastened to the rope which pass through the ring of the float and prevent the anchor from sinking.



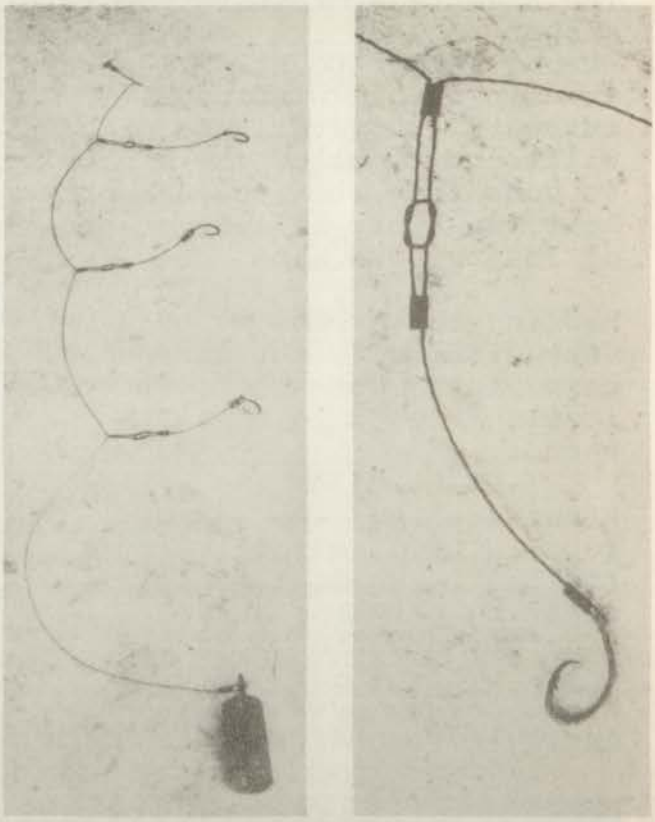
Steel rods on anchor rope near the anchor

When the pull from the boat decreases the anchor will be left hanging from the float. It is then possible to turn the boat around and slowly steam towards the float while the rope is hauled into the boat. This is easily done because there is no tension on the rope since the float is supporting the anchor.

Fish are hauled in using a wooden handreel equipped with over 300 m of monofilament line of 125 kg test strength. Four reels can be used on a 7 m boat, though usually only three reels are used to minimise tangling of the lines. At the end of each line is a terminal rig of wire with three hooks attached. The best hooks to use are curved tuna hooks, because they are easy to unhook and are normally not swallowed by the fish. In addition, this type of hook is self-hooking, so that struggling by the fish causes the hook to become more deeply embedded.

All fishing during these surveys was done from launches of 6 to 11 m length. Different

Wooden handreel. A fisheries research technician unhooking a long-tailed red snapper



Left: Terminal rig showing tuna-circle hooks and sinker.
Right: Tuna-circle hook on terminal rig

Fishing dory equipped with three handreels

TABLE 1. SPECIES CAUGHT IN MANUS, MILNE BAY AND PORT MORESBY

Scientific name	English name	% by weight in catch	No. of fish	Average weight (kg)
Etelis carbunculus	Short-tailed red snapper	47.2	111	4.9
Epinephelus compressus	Black-banded rock cod	12.1	5	27.6
Pristipomoides multidens	Large-scaled jobfish	8.22	44	2.1
Etelis coruscans	Long-tailed red snapper	5.76	15	4.4
Epinephelus magniscuttis	Brown-spotted rock cod	5.52	13	4.9
Lutjanus argentimaculatus	Mangrove jack	2.25	5	5.1
Etelis radiosus	Long-tailed scarlet snapper	2.18	5	5.0
Gnathodentex mossambicus	Large-eyed bream	1.7	10	2.0
Epinephelus morrhua	Brown striped grouper	1.61	9	2.0
Tangia sp.	Tang's snapper	1.34	4	3.8
Lutjanus malabaricus	Scarlet sea-perch	1.30	11	1.4
Pristipomoides filamentosus	Rosy jobfish	1.13	4	3.2
Lutjanus bohar	Red sea-bass	1.06	2	6.1
Tropidinus zonatus	Banded flower-snapper	1.01	9	1.3
Conger sp.	Conger eel	0.92	1	10.6
Epinephelus tauvina	Estuary rock-cod	0.91	1	10.4
Lethrinella miniata	Long-nosed emperor	0.87	2	5.0
Seriola purpurascens	Amberjack	0.49	1	5.6

..... Continued

TABLE 1. - Continued

Scientific name	English name	% by weight in catch	No. of fish	Average weight (kg)
S. dumerilii	Deep-water amberjack	0.48	2	2.8
Epinephelus chlorostigma	Brown-spotted grouper	0.45	3	1.7
Pristipomoides flavipinnis	Yellow jobfish	0.45	8	0.6
Caranx lugubris	Black trevally	0.44	1	5.0
Gymnosarda nuda	Dogtooth tuna	0.40	1	4.6
Caranx sp.	Trevally	0.39	1	4.4
Lutjanus erythropterus	Red snapper	0.37	1	4.2
Epinephelus sp.	Rock cod	0.31	5	0.7
Lethrinus kallopterus	Yellow-spotted emperor	0.27	1	3.1
Paracaesio sp.	Snapper	0.26	1	3.0
Tropidinus argyrogrammicus	Large-eyed flower-snapper	0.16	4	0.5
Branchiostegus wardi	Tile fish	0.13	1	1.5
Variola louti	Lunar-tailed rock cod	0.07	2	0.4
Pristipomoides auricilla	Gold-tailed jobfish	0.07	2	0.4
Cephalopholis sp.	Coral cod	0.02	1	0.2
		TOTAL	286	1140

baits were used according to availability, but the main baits were skipjack and mackerel tuna.

In the Central Province, fishing was carried out close to Port Moresby, outside the barrier reef, near the Basilisk Passage.

In Milne Bay, most of the fishing was done north of Sideia Island, but areas north of Wari Island were also surveyed. In the Manus Province, both the north and south coasts of Manus Island were fished.

RESULTS

Seven trips were made around Port Moresby, four in Milne Bay and four from Manus Island. The trips lasted between a couple of hours and three days. The species encountered are listed in Table 1. Almost half of the catch, by weight, was red snapper.

The hourly catch-rates expressed in kg of ungutted fish per line were as follows:

Port Moresby	4.0	(in 41 hours)
Milne Bay	2.5	(in 65 hours)
Manus	4.6	(in 61 hours)

The overall average was 3.7 kg. These catch rates do not include sharks, because sharks were considered to be of little commercial value. The average weight of the fish was different at different depths, and these results are presented in Table 2. In general, average weights increased with depth up to 200 m. Below 200 m, the average weight stayed about the same.

DEEP-SEA BOTTOM HANDLINING IN PAPUA NEW GUINEA

The catch rates obtained during this survey are probably less than those which could be achieved. Most fishing was done by inexperienced trainees and in previously unfished areas. The distribution of fish is not uniform and it is usually necessary to discover the 'good' spots by trial and error.

Even so, the catch rates obtained in this survey are not very different from catch rates in areas in the Pacific where deep-water bottom handlining is carried out commercially. So this technique could become economically viable and popular in Papua New Guinea. However, this type of fishing will not become widely used until inexpensive and strongly-built boats

TABLE 2. AVERAGE WEIGHTS OF FISH IN KG FOR DIFFERENT DEPTHS

Depth interval (m)	Average weight (kg)
80 - 100	1.6
100 - 120	2.2
120 - 140	2.7
140 - 160	1.3
160 - 180	2.3
180 - 200	6.5
200 - 220	4.3
220 - 240	4.9
240 - 260	5.8
260 - 280	4.8

become available. Much of the reef fishing in Papua New Guinea is carried out from small dugout canoes which cannot be used for handlining in deep water.

The introduction of craft such as the 'F.A.O.' design plywood catamaran may stimulate village fishermen to go further out than their traditionally fished shallow reefs to the deep reef drop-offs. Here, deep bottom handlining can be used to harvest the virtually unfished stocks of deep-water snappers.