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COMMERCIAL TRIALS WITH A CORAL-REEF LONGLINE

(Technical Report)

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ABSTRACT : To contribute to the identified need for diversification of the local fishery, 25 trials with a coral-reef-longline have been undertaken at reef-slopes (10-25 m) off the West Sumatra coast. The gear has been adjusted using Scuba diving. The hook-rate reached 3% – mainly groupers were caught. Economic calculations have been performed. Discussions about technical findings, by-catch and risks complete this short study. The difficult handling of this gear and the habits of the local fishermen conclude that it is not recommended at present to introduce this gear.

INTRODUCTION

The Indonesian waters, an area of more than 5 million square kilometers, cover two-third of the Indonesian teritory. Indonesia's marine fisheries provide considerable foreign exchange earnings and play an important role in supplying high-quality protein to domestic consumers. Several surveys revealed considerable resources of both pelagic and benthic fishes at the west coast of Sumatra. One of the most important landing places of the West-Sumatra province is Air Bangis, where mainly pelagic species are caught by use of 5 different gear. The increasing fishing effort, together with a complete stop of fishery activities around full-moon because of lack of alternative methods, indicate the strong need for diversification of the present fisheries (Gloerfelt-Tarp, T.: Kunzmann A. 1987, Noerlim S. et.al. 1987).

Beside these mainly economical constraints, the need of nature conservation by means of eliminating the dangerous use of explosives in reefs were the basics to undertake this study.

MATERIAL/TRIALS

Between October 1987 and February 1988 approx. 25 trials with a longline have been carried out above corals. A group of small islands (Pulau Pangkal, Pulau Telur, Pulau Panjang) in front of Air Bangis, West Sumatra (99°, 19' E, 0° 4' N) has been chosen simply because of easy access (20-30 minutes with outboard engine). The reefs on their SW sides (Fig. 1) share both steep slopes (5-25 m depth) and a coral community of head shaped or crusty corals of more or less uniform height.

A small dinghy of 5 m length with outboard engine and Scuba diving equipment to check and adjust the gear has been used. The gear (photos Fig. 3-4 and Fig. 2) has been assembled according to various design proposals (see literature); the final version consisted of :

- Mainline, white Kuralon, 6 mm, Rp. 6.450,–/kg
  (1 rol = 220m = 6 kg).
- Main Floats, container 25 l, flag.
- Floatline, Polyethylene, 8 mm, Rp. 2.750,–/kg
  (1 rol = 220m = 9,3 kg).
- Mainweights, stones à 2-5 kg.
- Floats: Y50, Rp. 550,–/pc; Y 8 Rp. 135,–/pc.
- Branchlines:

*) 3/88, ADP – Fishery Section

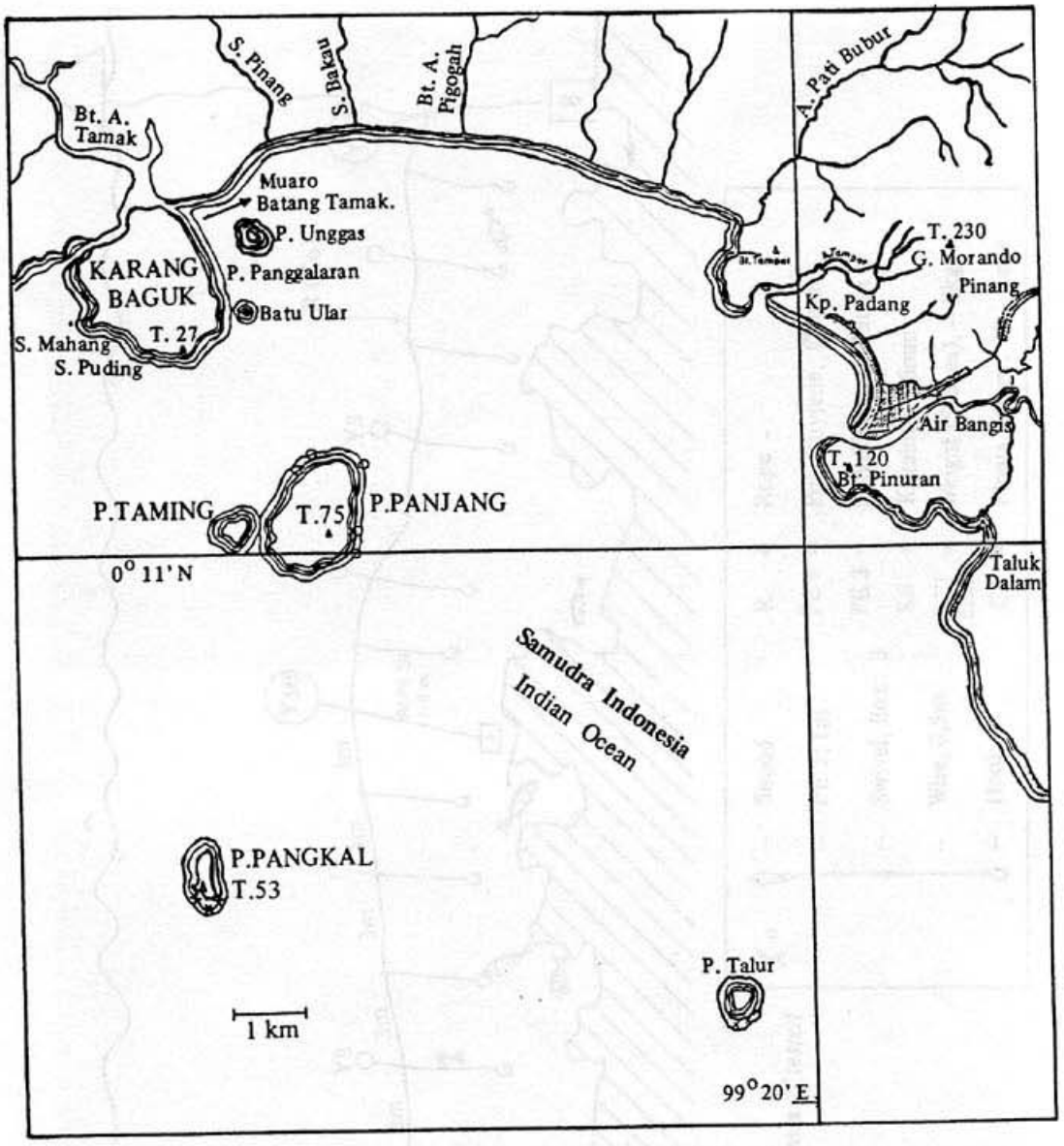

Figure 1. Position of Island in front of Air Bangis
× Indicates the reeps where the longline was used

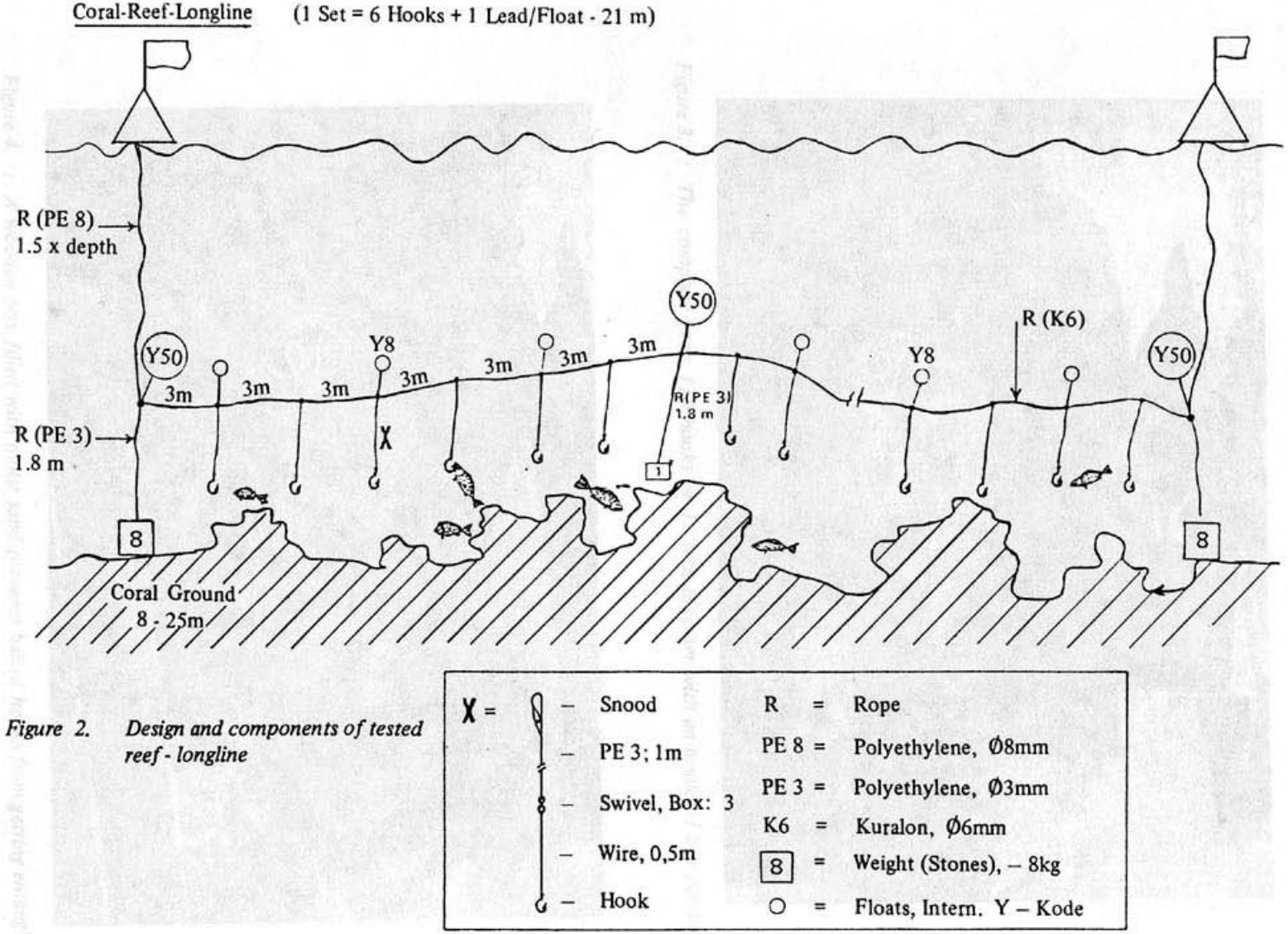

Figure 2. Design and components of tested reef - longline

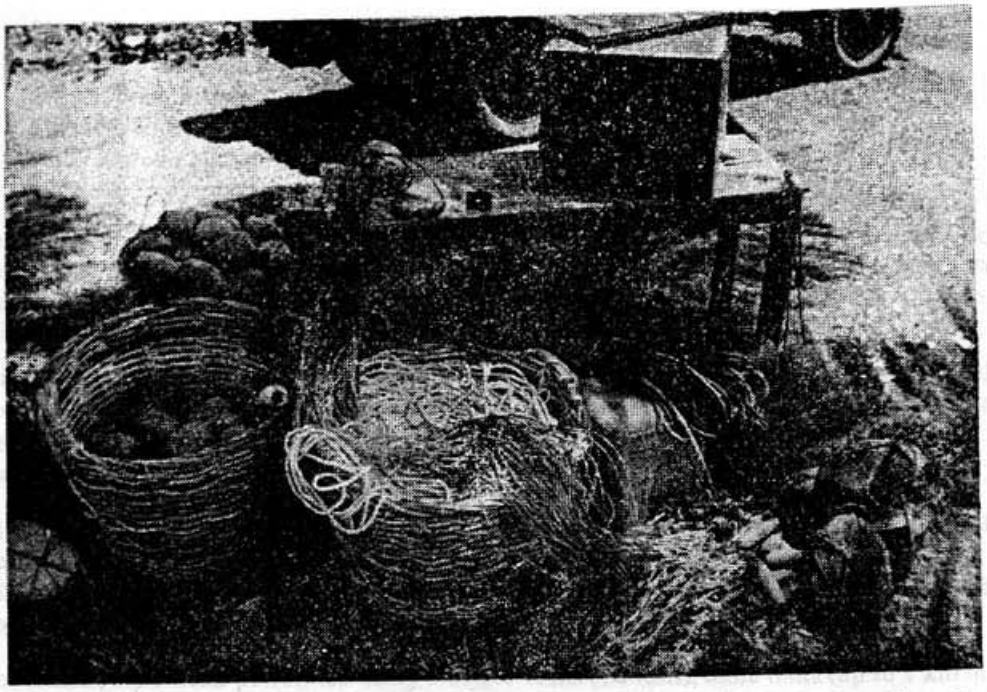

Figure 3. : The complete gear, 110 hooks or 18 sets, together with an insulated box for bait.

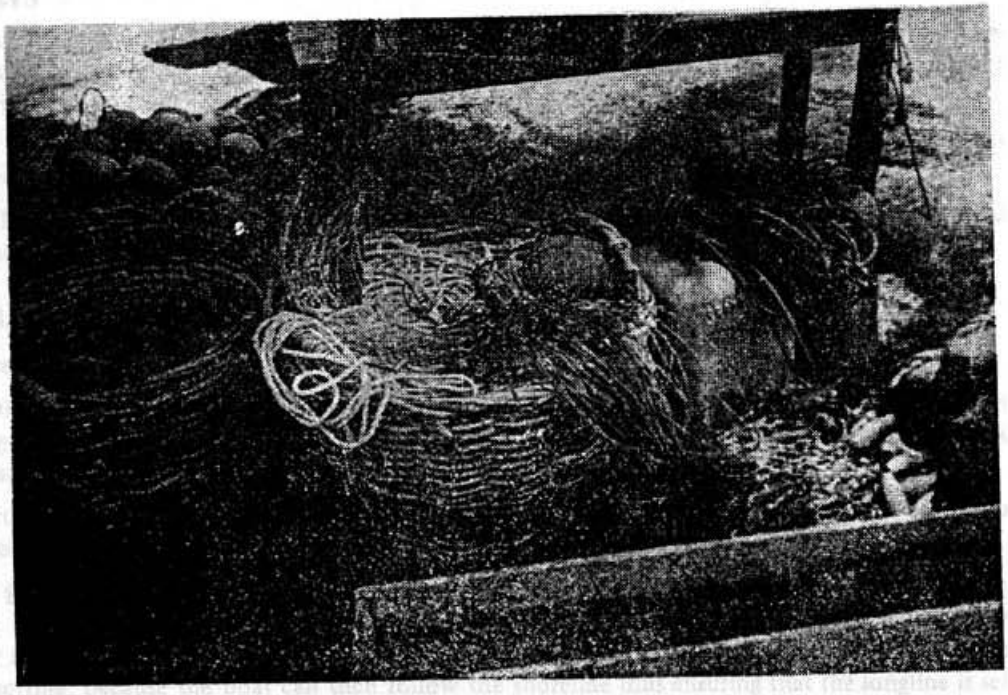

Figure 4. : A wooden box filled with moist sand prevents baited hooks from getting entangled.

Snood 6mm, Rp. 1.800,–/pc.
PE-Rope 3 mm, Rp. 2.750,–/kg (1 rol = 220m = 0,9 kg).
Swivel, Brass Box No. 3, Rp. 6.800,– / 12 pc.
Stainless Wire 0,8 mm, 2g/m, Rp. 13.000,–/kg.
Hook Marudo Mutso 355, No. 28, No. 80,–/pc.

A total number of 110 hooks and thus a length of 400 m mainline (18 sets) turned out to be easy operational with two people in the dinghy. Several baits have been used like Indian Ocean mackerel (*Rastrelliger spec.*) cut into 1/3 – 1/4 pieces, squid (*Loligo spec.*), mussless (*Perna spec).* The hooks were stored on specially-made forked hangers; the floats etc., as well as the 400 m long mainline, in rattan baskets.

Various small technical adjustments were made in the beginning of the trials. Later procedures have been continued simply because of economic reasons, why I will only mention the final version in the section results together with some small tips and tricks. Major decisions had to be made about :

- different baiting procedures, like: preparation onshore before departure or baiting minutes before setting,
- different setting procedures adjusted to currents, high and low tides (with/without engine etc.).

Some trials have been performed using a bigger vessel (50 tons), more units (up to 1 km line) in a mixed-coral area without island close-by (Karang Anso, 98^0, 55' E, 0^0 1' N), predominated by branched corals (*Acropora* spec.) and huge blocks.

RESULTS

The anticipated fish have been caught, in nearly every trial one or more groupers (*Ephinephelus* spec.). Besides groupers there were regularly representatives of the family *(Muraenidae)* on the hooks.

In rare cases the longline caught sweetlips (*Haemulidae*), snappers (*Lutianidae*), big cobias (*Rachycentron canadus*) and once a sea-turtle.

A hook rate of 3% has been achieved. Best results occured setting the longline at around 1730 hrs., and hauling at around 1930 hrs.

CONCLUSIONS/DISCUSSION/RECOMMENDATIONS

1. Technical Findings

The trials revealed that the proper adjustment of the used gear is the most important part. In the beginning the longline got regularly entangled in rocks or corals, why snorkeling with a mask to see at least once the shape of the reef is a must.

Groupers are likely to occur in the depth between, 10-25 m. One should be careful to go too close to the ground (sandy, muddy bottom at the slope) as crabs will eat all the bait.

In general the use of the dinghy is preferable to the use of a big boat, because during setting of the longline, the hooks could be dragged above the ground. This does not occur with the dinghy if the main-weights have at least 8 kg. It is of advantage as well to use the outboard engine while setting, because the boat can then follow the shoreline thus ensuring that the longline is set above the same depth contour.

It is recommended to bait before departure and store the hooks with bait in a box (L = 120cm x W = 25 cm x D = 25 cm, photos : Fig. 3 and 4 filled with moist sand. Advantage: hooks do not get entangled, fast setting once the position is reached. Disadvantage: bait can get spoiled if operational grounds far away.

2. Economy

From the economical point of view the first ten trials have been a loss, since a lot of adjustments had to be made. For the remaining trials a simple calculation for pure running costs is :

Bait for 110 hooks	1,000 – 2,000	Rp.	(incl. ice)
Petrol, oil etc.,	4,000 –	Rp.	
Food, 2 people	1,000	Rp.	
Total	6,000 – 7,000	Rp.	

Supposing a price of Rp. 2,500/kg grouper and an average weight of 2-4 kg per fish, one has to catch at least one grouper a night to compensate for the pure running costs. In fact an average hook-rate of 3% (i.e. 3 fish per 100 hooks) was reached for the last trials.

Considering back payment of investment costs (see appendix) and a reasonable profit, three fish a night (Rp. 22,500) is certainly not enough, why I want to mention, that :

a. the longline should be operated with more than 110 hooks.

b. the three islands in front of Air Bangis with very limited reef-area may not reflect the true situation of grouper-stocks on a big reef, due to influence of river water.

c. the operation of a coral-reef longline should be undertaken for as an additional income during full-moon, when Air Bangis fishermen are anyway not operating.

3. Biological Subjects up for Discussion

The regularly caught muraenas cause problems, since they fight endlessly and can entangle the wire until useless, beside the fact that they are hard to sell. The fact having caught a turtle (which luckily survifed after being freed again) shows the danger operating such a gear in reefs, where turtles frequently occur. On one hand coral-longlining could help stopping the use of explosives already occuring in our area, on the other hand stocks of sea-turtles could be influenced.

Considering above mentioned argumentation, especially biological conflicts, economical profitability and the fact that this coral-longline turned out to be a sophisticated tool, which needs permanent observation, adjustments and improvisation, my experiences with the local fishermen so far show that the "average Air Bangis fishermen" will not like to operate this gear, why I recommend against its use at present.

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APPENDIX

Investment cost, 18 sets/400 m:

x	400 m Kuralon rope (12 kg)	à	Rp. 6,450/kg	Rp. 77,400,–
	2 Mainfloats (second hand)	à	Rp. 1,000,–	Rp. 2,000,–
	50 m Floatline (2,5 kg)	à	Rp. 2,750/kg	Rp. 6,845,–
	18 Floats Y 50	à	Rp. 550,–	Rp. 9,900,–
	55 Floats Y 80	à	Rp. 135,–	Rp. 7,425,–
x	110 m Branchline (0,45 kg)	à	Rp. 2,750/kg	Rp. 1,240,–
x	110 Snoods, 6 mm	à	Rp. 1,800/pc	Rp. 198,000,–
	110 Swivels, brass, Box 3	à	Rp. 6,800/12 pc	Rp. 62,300,–
	55 m Stainless wire (150 g)	à	Rp. 13,000/kg	Rp. 1,950,–
	110 Hooks, M.M. 355, No. 28	à	Rp. 80/pc	Rp. 8,800,–
				Rp. 375,860,–

x It has to be considered that e.g. the snoods are used only for research reasons, because the design of the gear can be changed very fast. A local fisherman would link the branchlines directly with the mainline (no costs at all). As well the use of Kuralon rope and brass swivels, which is of best quality will most likely not be copied by local fisherman. An estimation of investment costs for the local version is in the range of Rp. 100,000,–