

SMALL SCALES POLE AND LINE FISHERY IN WESTERN SAMOA

REPORT ON PRELIMINARY TRIALS *

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Four major constraints hinder the development of pole and line fisheries in small South Pacific territories. These are: (1) Shortage of live bait, (2) The high cost and sophistication of sizable boats and equipment used for this type of fisheries, (3) The rising cost of fuel used in long searches for schools and (4) Reluctance of fishermen to spend many days off shore.

Results of recent developments in Western Samoa, may alleviate these problems: Success in the culture of top-minnows (Poecilia mexicana) is a step toward solving the bait shortage. Utilization of small, locally built catamarans eliminates the costly and sophisticated large vessels. Installment of fish aggregation devices (FAD) make the searches for schools unnecessary.

The techniques used in the culture of top-minnows in Western Samoa were described by Popper (1979). These hardy bait fish were initially used in trials on board the "Tautai Samoa", a twenty four ton Japanese built pole and line vessel and on one trip on the HM5** the SPC tagging vessel early this year. These trials had varying degrees of success. They proved however, that top-minnows, although inferior to many types of wild bait, are suitable for use as live bait and are hardier than most other bait species (see also Baldwin, 1980). These operations, however, did not prove economic feasibility of such an exercise.

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** Cultured top-minnows were tried previously on board HM5 with good results (Brian, 1979).

The situation improved considerably after installment of five FADs in Western Samoan waters *. The later consisted of a buoy made of two drums in a steel cage, anchored by cable and rope to a concrete block. An appendage made of copra sacks stitched to a rope, was attached to the buoy. Since it was worn out within a few weeks the appendage was replaced by old car tyres strung on a chain loop.

One unit, located nine miles north of Apia harbour, proved to be very successful. Schools of skipjack (Katsuwonus pelamis) and yellowfin tuna (Thunnus albacores) were almost invariably sighted around it, two or three months after installment. From February to May 1980, most trips of the "Tautai Samoa" were limited to the distance between Apia and the FAD. The average catches increased substantially (tables 1 & 2). The trips lasted only five to six hours including the return trips, as the limited supply of bait fish was used up.

On May 20th, 1980, the FAD disappeared. ** After this the catches dropped drastically again and amounted to only two catches in eleven trips, totalling two hundred and seventy five skipjack. The boat developed engine trouble in mid August and has been out of commission ever since.

New FADs were designed and built locally ***to replace the original five, all of which were lost within ten months. The new devices consisted of two foam filled, marine grade aluminium cylinders with brightly painted boards attached to a mast, equipped with a radar reflector and a light signal. To this was attached an appendage of twenty five tyres, strung on a galvanized chain loop.

* The first FADs were partly funded by the United States Agency for International Development and installed by the United States National Oceanographic and Atmospheric Administration.

** This FAD was later found in Fiji with a broken and rusted anchoring cable.

*** Designed jointly by Fisheries Division and "Boatcraft" and built at "Boatcraft".

The first new FAD was anchored ten miles north of Apia in September 15, 1980. Schools of skipjack and yellowfin tuna were sighted around it within one month.

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The first trial in pole and line fishing with a/boat, was carried out on October 10th. The boat used was a modified "Alia" a 29' locally built aluminium catamaran. The modifications included two 400 l bait wells, one in each hull and a spraying system. The bait wells were replenished with fresh sea water through a forward directed pipe and over flow holes when the boat was in motion. The spray system consisted of 2 mm holes, drilled in the hollow stern beam. The later was connected through a 2" hose to a 3 HP "Honda" pump. This system provided a fine spray, reaching to a distance of 3 to 4 m.

This first fishing trip was carried out with five fishermen and a chummer. Thirty kg of live top-mirnows were chummed near the FAD between 0930 and 1030 hrs on a cloudy day and calm sea. Despite technical problems with the pump, forty one fish totalling 142 kg were caught. The results improved gradually (table 3) in subsequent fishing trips at different times of day and calm or rough weather. On October 29th, 116 fish totalling 288 kg were landed. On October 30th, however, (following the night of the rising of the Palolo worm) only twenty seven fish were caught.

A rough idea of the costs involved in the method described is given in table 4.

* The "Alias", made of plywood or aluminium, are been built in "Boatcraft", and FAO/UNDP supported project. The boats were designed by FAO Naval architects O. Gulbrandsen and A. Overa.

Table 1 Catches and bait used per trip by Tautai Samoa
for schools searching operations.

Date	Kg Baitfish Cultured (wild)	Number of Fish Caught	Total Weight (Kg)	Catch Per Unit Bait
1 Jul. 17/1979	50 (45*)	340	1024 *	11:1
2 Aug. 8/ "	60	160	291	5:1
3 " 23/ "	40 (50*)	180	578	6:1
4 Oct. 30/ "	50 (2.5*)	167	364	7:1
5 Nov. 6/ "	37	233	544	15:1
6 " 8/ "	51	5	28	0.5:1
7 " 21/ "	26	161	372	14:1
8 " 27/ "	45	4	33	0.7:1
9 Dec. 4/ "	26	16	53	2:1
10 " 14/ "	50	64	291	6:1
11 " 18/ "	72	390	920	13:1
12 Jan. 7/1980	60	-	-	-
13 " 8/ "	68	-	-	-
14 " 11/ "	50	53	122	2:1
15 " 14/ "	61	140	349	6:1
16 " 15/ "	35	-	-	-
17 " 22/ "	50 (7.5*)	338	874	15:1
18 " 24/ "	50 (7.5*)	312	644	13:1
19 Feb. 5/ "	70	-	-	-
20 " 7/ "	38	-	-	-
30 Apr. 9/ "	44 (100*)	35	84	0.6:1
31 " 16/ "	40 (20*)	-	-	-
32 " 21/ "	38	73	159	4:1
43 May 20/ "	48.5 (30*)	-	-	-
44 " 27/ "	104.5	-	-	-
45 Jan. 13/ "	54.5	-	-	-
46 " 16/ "	71.5 (7.5*)	229	931	12:1
47 " 19/ "	71.5	-	-	-
48 " 23/ "	48.5 (2.5*)	-	-	-
49 Jul. 7/ "	41	-	-	-
50 " 8/ "	46 (25*)	-	-	-
51 " 15/ "	64.5 (12.5*)	46	167	2:1
52 " 18/ "	68	-	-	-
53 " 29/ "	60.5	-	-	-
34 Totals	1798 (310)	2946	7828	-
Averages	52.6 (9)	86.6	230	4:1

* Estimated weights

Table 2 Catches and bait used per trip when fishing near fish aggregation device

Fishing Trip	Date	Kg Baitfish Cultured (wild)	Number of Fish Caught	Total Weight (kg)	Catch per Unit bait
21	Feb. 20/1980	50	164 *	352	7:1
22	Mar. 10/ "	59	427	852	14:1
23	" 12/ "	37	323	656	18:1
24	" 14/ "	84 (12.5*)	373	780	8:1
25	" 17/ "	64 (62.5*)	321	656	5:1
26	" 19/ "	46	172	371	8:1
27	" 21/ "	49 (45.8)	95	208 *	2:1
28	" 24/ "	21	84	194	9:1
29	" 28/ "	30	29 **	57	2:1
33	Apr. 22/ "	47	121 **	204	4:1
34	" 23/ "	47.5 (7.5*)	120 **	276	5:1
35	" 29/ "	67.5 (10*)	488	979	13:1
36	May 1/ "	54 (7.5*)	151	316	5:1
37	" 5/ "	64.5	122 **	249	4:1
38	" 7/ "	49.5	65	125	3:1
39	" 8/ "	69.5 (27.5*)	42	102	1:1
40	" 13/ "	46.5 (17.5*)	116	254	4:1
41	" 15/ "	74.5 (45*)	67	311	3:1
18	Total	738.9 960.5 (235)	3280	6942	-
	Average	17.1 53.4 (13.1)	182.2	385.7	6:1

Table 3 Catches and bait used per trip of small boat near fish aggregation device

Fishing	Date	Kg Baitfish Cultured	Number of Fish Caught	Total Weight (kg)	Catch per Unit Price
1	Oct. 10/1980	30 *	41	142	5:1
2	" 21/ "	50 *	42	143	3:1
3	" 23/ "	45 *	41	134	3:1
4	" 24/ "	70	51	167	2:1
5	" 28/ "	43	105	285	7:1
6	" 28/ "	30	36	114 *	4:1
7	" 29/ "	28	116	288 *	10:1
8	" 30/ "	30	27	86	3:1
9	" 31/ "	20	-	-	-
10	Nov. 5/ "	35	45	138 *	4:1
	Total	381	504	1497	4:1
	Average	38	50	150	4:1

* = estimated weight

** = not all fish caught at busy

Table 4 : Estimated costs per fishing trip of small boat near aggregation device in Western Samoan Tala (TWS \$ = 1.20 US\$)

	Item	Cost
1	Cost of "Alia" and equipment at 5.000.- based on 200 trips per year and 5 year and 5 years life span	5.-
2	Cost of pump used for spray system 400.- at one year's life span	2.-
3	Cost 40 kg of bait at 2.50 per kg	100.-
4	Cost of crew of 5 at 5.- per trip	25.-
5	Share in cost of aggregation device * 1850.- to be used minimum of 200 times by 5 boats	2.-
Total		152

* Cost of aggregation device and installation in \$ US

	Item	Cost
1	Buoy with attachments for mooring and appendages (at Boatcraft)	850.-
2	Anchoring, rope and chain	900.-
3	Echosounder and mounting at 6000.- to be used for numerous installations	100.-
Total		1850.-

It is felt that if substantiated, the results of the trials described will have considerable significance to fisheries development in Samoa and other island territories. The development of pole and line fisheries in other Pacific Islands, faces problems and conditions similar to those encountered in Western Samoa (personal observations). Therefore methods described herein might also be applied to fisheries in these islands.

The simplicity, low cost and small scale of the suggested fishery will make it suitable for small enterprisers and fishermen at the village level. This will be the case if FAD's are properly located in the fishing grounds concerned.

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