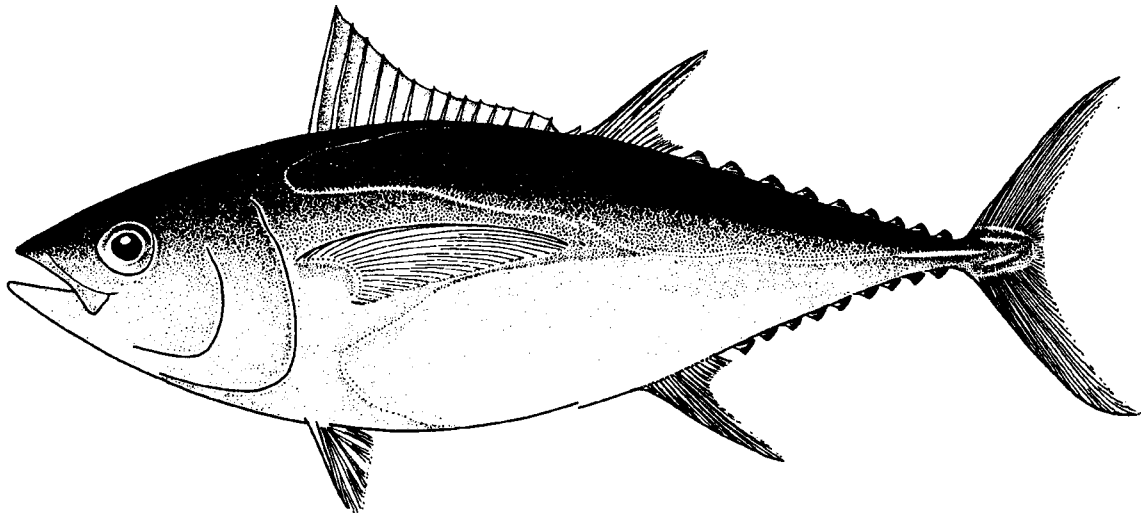




Kiribati National tuna fisheries report

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1. Introduction

The paper presents;

- Tuna landings estimates obtained from the fisheries artisanal surveys conducted by the Fisheries Division between 1998-2000 on 15 islands of Kiribati.
- Some results of the vertical longline trial fishing conducted in Kiribati between December 1995 to July 1998.
- Status of the experimental Small-scale Tuna Longline using monofilament.

2. Artisanal Tuna Catches

In the absence of an effective and continuous data collection of fish catches on the outer-islands, data from the fishery artisanal surveys conducted by the Fisheries Division at least annually on the islands provide useful estimates of the fish landings by species at each island. These are useful for purposes of fishery development planning and monitoring the exploitation of fishery resources. The species are grouped into 18 fish groups of which tuna species (YFT, SJ, etc.) is included.

Fourteen islands were surveyed from 1998-2000 with South Tarawa surveyed twice, in 1998 and in 1999. Weekly tuna landings from the islands ranged from 504 kg (Banaba island) to 20 tons (Washington island) averaging 8 tonnes per island. The percentage of the total catch which comprised tuna ranged from 5.5% to 87% but averaged 25.1% hence about one-quarter of the total catch landed by the artisanal fishers is made up of tuna species at each island. The weekly artisanal landings of tuna species at Tarawa island alone is estimated at 33 tons (1998 survey) to 37 tons (1999 survey).

Annual tuna production on the islands would be in the order of 24 tons (Banaba island) to a few hundred tons (Washington island), the majority being made on South Tarawa where it is densely populated and tuna fishing by the artisanal folks is carried out six days a week on commercial basis by about 200-300 motorized skiffs using outboard engines.

Appendix Table 1 shows the artisanal catch of tuna species (*Scombroidei*) recorded during the week of the artisanal surveys on the 14 islands surveyed.

3. Some Results of the Vertical Longline Fishing Trial

Between December 1995 and July 1998 trial fishing on vertical longlining was carried out in Kiribati, the aim being to assess and determine the effectiveness and viability of vertical longlining fishing (VLF) in Kiribati, so that it can be introduced to the artisanal fishers if proved effective and viable, and to train Fisheries Division personnel. The trial VLF trips were conducted at daytime close to the outer reef slopes and cultured milkfish bait (*Chanos chanos*) of 20-25 cm CFL or 90.5 gm were used. Unfortunately the trial VLF was conducted in the absence of deep water FADs due to the unavailability of such a FAD at the time. Deep water FADs are known to aggregate large tunas.

Thirty trips were made of which 20 trips landed 53 tuna (51 YFT and 2 BET) for a total weight of 562 kg. The tuna sizes caught were small compared to oceanic tuna in the range 58-115 cm CFL (2.3-19.5 kg weight). One BET measured 72 cm CFL weighing 7.0 kg and a smaller one weighed only 3.5 kg. In Samoa tuna catch by VLF around a deep water FAD were in the weight range 15-60 kg (SPC, 1991). The mean catch rates were also low and estimated as 0.86 kg.10-hooks hr⁻¹ (soak time considered) or 2.93 kg.10-hooks⁻¹ (soak time not considered).

The tuna length-weight relationship for the 51 YFT caught was determined by a generalized functional relationship of a fish between its body length and body weight. The values of *a* (intercept), *b* (slope) and *q* (exponential *a*) are;

$$a = -9.288 \text{ with a variance of } 0.028; \quad b = 2.590 \text{ with a } 95\% \text{ CI of } 2.59 \text{ plus or minus } 0.336; \quad q = 0.0001; \text{ So the } L\text{-}W \text{ relationship for YFT is } W = 0.001 * L^{2.59}$$

Seven species made up the catch composition but YFT dominated the catch by number (82%) and by weight (63%).

An attempt was made to determine the variability of tuna catch with respect to changes in the lunar phases using the ANOVA *F*-test with the null hypothesis (*H*₀) derived as being 'no effects of lunar phases on tuna catches' and the alternative hypothesis (*H*₁) derived as being 'there is an effect of lunar phases on the tuna catch'. Table 1 presents the results of the single factor ANOVA test.

Table 1. Single factor ANOVA test results using the F-statistic to test the effects of lunar phases on tuna catch.

<i>Summary of a single Factor ANOVA</i>			
Source of variation:	SS	DF	MS
Total =	100.55	19	
Groups (numerator) =	11.53	3	3.84
Error (denominator) =	89.02	16	5.56
F (GMS/EMS) =	0.69 (computed value from ANOVA test)		

Critical F value $0.05(1)3,16 =$	3.24 (value from the F - distribution table)
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With the critical F -ratio of 3.24 H_0 was accepted and H_1 rejected hence lunar phases did not seem to affect the tuna catch. Only 30 trial trips were made catching 53 tunas and if lunar phases should affect tuna catch then more trips would be needed to show any prominent trend of tuna catch against lunar phases.

Changes in the tuna catch with respect to fishing effort (hook-hrs) showed that there is a positive correlation between the two. The tuna catch increased and peaked at a fishing effort of 400-500 hook-hrs, then declined to zero catch at 700-800 hook-hrs. Similarly a positive correlation exists between the increase in tuna catch with the increase in fishing depth. Twenty-eight YFT (53% of total number) were caught between fishing depths of 66-250 m, the highest number (7 YFT) at around 185 m followed by the second highest number (6 YFT) at around 223 m. However, a low correlation coefficient ($R=0.59$) between tuna catch and increased fishing depth suggests that other factors also affect the tuna catch beside the increase in fishing depth.

4. Small-scale Monofilament Tuna Longline Trial

With the technical expertise of SPC Masterfishermen, a prototype catamaran longline vessel of 5.4 tons powered by a 39 hp diesel inboard was rigged with appropriate electronics, monofilament longline gear and machinery.

Six trials have so far been conducted by the Fisheries Division under the guidance of SPC Masterfisherman using 300-460 hooks. The trial was disrupted due to the failure of hydraulic cooling system and appropriate parts are being ordered from overseas. From the six trips made catches have been encouraging. On one trip a maximum of 16 YFT caught were caught weighing 402 kg in total (about 25 kg weight per YFT) using 450 hooks. By-catch consisted of the sharks, swordfish, wahoo, dolphin fish, stingray, barracuda, oilfish and snake mackerel.

The trial would continue when the necessary parts have arrived from overseas. Much of the problems encountered during the trial and the experiences learned from it would certainly be useful in the years to come when developing the domestic tuna fishery in Kiribati. SPC would be continuously requested to dispatch its Masterfishermen to assist with the trial and to train the Fisheries Division staff.

Appendix Table 1. Tuna landings by the artisanal fishers as recorded during the artisanal fishery surveys.

Catch details (kg) and Year Surveyed	Banaba	Marakei	S.Tarawa	S.Tarawa	Makin	Fanning	Washing.	Arorae
	1999	1998	1998	1999	2000	2000	2000	1998
Catch during the week :OCN	1,267	7,429	61,332	88,356	9,454	1,992	20,723	3,842
of the survey :RFF	703	2,418	2,385	10,376	3,853	414	2,640	2,700
(All Sectors combined) :LGN	0	2,533	25,601	34,893	99	16,892	0	0
:COL	0	0	5,012	9,063	0	0	0	0
Total :	1,970	12,380	94,330	142,688	13,406	19,298	23,363	6,542
Scombroidei species:% of total =	25.6	17.9	35.8	26.1	9.0	5.5	87.0	7.7
estimated catch (kg) =	504.3	2,216.0	33,770.1	37,241.6	1,206.5	1,061.4	20,325.8	503.7

Catch details (kg) and Year Surveyed	Tamana	Niukunau	Onotoa	Tab.S	Tab.N	Abemama	Aranuka	Kuria
	1998	1999	1999	1999	1999	1999	2000	2000
Catch during the week :OCN	7,828	15,871	1,665	8,110	5,124	11,650	3,528	4,687
of the survey :RFF	115	14,682	365	3,635	551	1,085	7,100	13,023
(All Sectors combined) :LGN	0	0	830	8,606	3,107	35,025	1,936	0
:COL	0	0	0	186	990	2,410	0	0
Total :	7,943	30,553	2,860	20,537	9,772	50,170	12,564	17,710
Scombroidei species:% of total =	75.0	30.6	20.0	13.0	26.9	15.7	11.0	22.4
estimated catch (kg) =	5,957.3	9,349.2	572.0	2,669.8	2,628.7	7,876.7	1,382.0	3,967.0

Note. Other species that make up the 100% of the total catch landed are excluded. These are the *Sphyraenoidea*, *Serranidae*, *Mullidae*, *Mugilidae*, *Molluscs*, *Lujanidae*, *Lethrinidae*, *Gerranidae*, *Exocetidae*, *Ealsmorbranchs*, *Crustaceans*, *Clupeidae*, *Cephalopods*, *Carangidae*, *Albulidae* and *Miscellaneous*.

Source: Kiribati Fisheries Division.