

SOUTH PACIFIC COMMISSIONELEVENTH REGIONAL TECHNICAL MEETING ON FISHERIES  
(Noumea, New Caledonia, 5-10 December 1979)COUNTRY STATEMENT - REPUBLIC OF KIRIBATISUMMARY

The Republic of Kiribati covers three groups of islands stretching over 2000 miles of the Central Pacific with a total sea area of 1,015,174 square nautical miles. The Fisheries Division of the Ministry of Natural Resource Development has a total staff of 74 (63 Gilbertese, 11 expatriates) with a development programme covering:

- (1) Development of a commercial tuna industry
- (2) Development of the artisanal fishery
- (3) Aquaculture
- (4) Training

The Commercial Tuna Fishery

A year-long survey was conducted under the auspices of Japan International Cooperation Agency (JICA) covering two 6 month periods. The aim was to assess the quantities of wild baitfish available in the lagoons of the Gilbert Island group. A total of 269,841 kg of skipjack and yellowfin was caught using 7,575 buckets of bait, both wild and cultured. The Government of the Republic of Kiribati took delivery of a 35m pole-and-line vessel funded by the U.K. and built in Japan. This vessel is presently carrying out an evaluation of Chanos chanos (milkfish) as a baitfish with pleasing results.

The Artisanal Fishery

A 15.5m extension vessel funded by Australia is due to arrive in the Republic of Kiribati in December and will be used to transport fisheries staff to outer islands for extension work, carry out experimental work on outer reef fishery, and collect fish for marketing on South Tarawa.

It is proposed to construct a fish reception centre on South Tarawa to supply the market demand of the urban centres, following a pilot scheme carried out in 1978 to assess supply and demand.

#### Aquaculture

The UNDP project to cultivate and evaluate C. chanos as a baitfish for live bait fishing has now 40 ha of ponds in production. This area will be doubled next year. Feeding trials and fry surveys have been completed, and production is in progress.

#### Christmas Island

Exports of C. chanos and Panulirus penicillatus (rock lobster) are steady at present with a total of 1,350 kg each charter flight to Honolulu and Nauru. The brine shrimp project is temporarily in abeyance awaiting a consultant's report.

#### Training

Five members of the Division have received training overseas in aquaculture, masterfisherman techniques, and bêche-de-mer. Two trainees from overseas have attended courses in Tarawa.

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COUNTRY STATEMENT - REPUBLIC OF KIRIBATI

BACKGROUND

1. A former British Colony, the Gilbert Islands achieved its independence on July 12th 1979 to become the Republic of Kiribati. The country is composed of three groups of islands, the Gilbert Group, the Phoenix Group and the Line Group. The declaration of a 200 nautical mile fisheries zone round the three groups was made this year and gives the country a total sea area of 1,015,174 square nautical miles. As its marine resources represent the major potential source of income for the future, the Government of the Republic of Kiribati places the highest priority on the development of the fisheries.

STRUCTURE OF THE FISHERIES DIVISION

2. The Fisheries Division forms part of the Ministry of Natural Resource Development and has a total staff of 74. The headquarters is at Betio on Tarawa atoll where most of the staff are based, but there is a section based on Christmas Island to cover the Line Islands Group. Next year it is expected that a section will be established in the Phoenix Group. The breakdown of the staff structure is as follows:

- 1 Chief fisheries officer
- 4 Fisheries officers
- 1 Assistant fisheries officer
- 1 Senior fisheries assistant
- 11 Fisheries assistants
- 5 Trainee fisheries assistants
- 1 Vessel master
- 2 Marine engineers
- 3 Trainee deck officers
- 2 Trainee marine engineers
- 2 V.S.Os
- 2 Peace Corps
- 34 Fishermen

F.A.O. Personnel

1	Project manager, Baitfish culture and evaluation			
1	Master fisherman	"	"	"
1	Marine biologist	"	"	"
1	Associate expert	"	"	"

JICA Personnel

1 Marine engineer

3. The work programme of the Fisheries Division covers the followings:

- (1) Development of a commercial tuna fishery
- (2) Development of the artisanal fishery
- (3) Aquaculture
- (4) Training

and following is a review of progress in these fields since the last technical meeting in March 1978.

REVIEW OF DEVELOPMENTS

The Tuna Fishery

4. A survey conducted under the auspices of the Japan International Cooperation Agency (JICA) ended on October 31st 1978. The purpose of the survey was to assess the baitfish potential for pole-and-line fishing on the waters of Kiribati. The first stage of the survey, from November 1977 to March 1978, was conducted by an Okinawan vessel, the Kyoryo Maru 21.5m long of wooden construction and a complement of 25 of whom 10 were Gilbertese trainees. A prolonged period of westerly winds hampered operations somewhat in the latter part of the period, for during the westerlies the lagoons become turbid and dispersal of bait fish schools occurs. During this part of the survey 16,010 kg of skipjack and yellowfin were caught using 1,371 buckets of bait (3 kg bucket).

5. The second half of the survey from May to October 1978 was carried out by a Japanese pole-and-line vessel, the Hatsutori Maru No.3, 35m long of steel construction, freezing capacity of 7t per day, and a crew of 27 comprised of 1 JICA official, 14 Japanese fishermen, 10 Gilbertese fishermen and 2 observers from Fisheries Division. At the end of the period 253,831 kg of skipjack and yellowfin had been caught using 6,205 buckets of bait.

6. In both parts of the survey wild bait was caught by two methods bouki-ami and beach-seine with Herklosichthys punctatus forming 96% of the catch for the beach-seine operation and 57% for the bouki-ami operation. Spratelloides delicatulus formed 36% of the bouki-ami catch, while other species in evidence were Allanetta ovalaua and Apogonidae. The operation for bouki-ami was usually carried out in depths of 9-10 fathoms (16-19m) with only occasional damage to the net. The conclusions of the survey team were promising insofar as wild bait-fish existed in sufficient quantities to support a commercial operation.

7. Chanos chanos is under cultivation to supplement wild bait supplies and results so far have been encouraging. Skipjack response to C. chanos is good, superior to its response to H. punctatus and C. chanos has a lower mortality, surviving fairly rough treatment. The average mortality rate has been found to be 10%.

8. The government took delivery of a 35m skipjack vessel, Nei Manganibuka, of all welded steel construction powered by a 750 h.p. Yanmar main engine, auxiliary power is provided by two Yanmar auxiliaries, and brine refrigeration by Nissin, dual compressors. There are three bait wells of 24 cubic metres volume plus six brine wells and one dry hold. All holds are refrigerated with holding temp  $-25^{\circ}\text{C}$ . Electronics include autopilot, radar, echo sounders (high and low frequency), Doppler log, Omega receiver, SSB, D.S.B., V.H.F. (ship/air), D.F. and interphone.

9. The vessel is continuing the evaluation of milkfish as a bait-fish and gathering further information on the wild bait stocks. The programme will be completed by the end of 1980 and full information will be available then. The fishing master is an FAO master fisherman, the chief engineer is supplied by JICA, and the marine biologist is FAO, the rest of the crew of 20 are Gilbertese. It has not been possible to evaluate the automatic poles as yet due to mechanical faults and delay in receiving spare parts. However during commercial trials the best day recorded was 8t of skipjack using only 14 polemen. This proved too much for the brine refrigeration, so fish in excess of the freezing capacity are held in RSW until freezing capacity is available. The fish are shipped in containers to Japan by Daiwa Line, each container holding 15 t which is less economic on freight rates per van but gains on quality. It was found that stuffing 16t overloaded the reefer container with some deterioration of quality.

10. So far the operation has concentrated on the coastal areas but later in the year investigations will be carried out further off the coast. The average weight of skipjack caught by Nei Nanganibuka is 3 kg.

#### Development of the Artisanal Fishery

11. The development of the artisanal fishery has been hampered by the lack of a suitable vessel to carry out extension work. This vessel is now under construction in Australia through the Australia aid programme. It is a 15.5m all welded steel vessel of prawn trawler design powered by a 200 h.p. Cummins main engine, with a 2t capacity freezer hold,

It ice box on deck, all hydraulic deck equipment (line hauler and anchor windlass) and accommodation for 7. Electronic equipment consists of echo sounder, S.S.B. radio telephone, V.H.F. ship/shore, ship/air, radar, D.F. and autopilot. The vessel is due to arrive in Tarawa in the latter part of this year and will commence work in the new year. Its programme will consist of visiting outer islands to supply local fishermen with fishing gear, increase fish production (both fresh and salted) and collect fish for transport to Tarawa for sale on the urban market. The fishermen will be encouraged to form themselves into groups for improved efficiency. Some Gilbertese are proficient in the skills of outer reef fishing, but it is hoped to carry out an experimental programme in order to increase production from the outer reef fishery. The emphasis at present will be on production of salt dried fish as many technical problems need to be overcome before ice plants can be erected on outer islands.

12. The marketing of fish surplus to an island's needs will be carried out on South Tarawa, the centre of urban population in the Republic of Kiribati. To this end a reception centre will be constructed on Betio, the main port. This will consist of:

- (1) An ice machine
- (2) A cold store (10t capacity, holding temp.  $-15^{\circ}\text{C}$  to  $-20^{\circ}\text{C}$ )
- (3) A chill store (5t capacity, holding temp.  $0^{\circ}\text{C}$  to  $-5^{\circ}\text{C}$ )
- (4) A blast freezer (1t per 12 hours)
- (5) 3 retail outlets
- (6) Refrigerated transport.

A pilot scheme was initiated in 1978 to study the supply and demand on South Tarawa where there is a shortfall in the supply of fish. A collection point was set up and disused refrigerators were employed as ice boxes. The fishermen brought their catch to the collection point, from where it was transported to the market and sold directly from the ice boxes. The marketing was carried out by the Local Produce Section of the Co-operative Federation with the Fisheries Division providing technical advice, ice and extra labour. A lease was taken on a retail store which contained a chill room. After three months the scheme was not continued owing to various problems encountered; inadequate transport and storage facilities, supply outstripping demand on occasions, and inferior quality of the landed product.

13. The largest percentage of fish handled was skipjack which was caught using pearl shell lures on poles fished from outboard-powered boats, as much as 500 kg per boat on some days. The fish, although gutted and gilled, had often been exposed to the sun for up to 4 hours, thus reducing its potential shelf life. Constant transport breakdowns meant that the fish could not be sent from Betio to Bairiki and Bikenibeu, the other major centres on South Tarawa. These factors allied to a lack of suitable storage space brought the scheme to an end. However the main object of the pilot scheme was to assess the potential supply and demand along with the pitfalls possible in any marketing scheme. Thus the South Tarawa

fish reception centre could be planned along rational lines avoiding previous snags. It is proposed to collect the fish at sea and place it in ice as the present boats used by fishermen are not suitable for carrying large enough ice boxes. Then the product can reach the market in perfect condition. It was found during the scheme that very little lagoon or reef fish were channeled through except at full and new moon when Albula vulpes (bonefish) Gerres argyreus (Pacific silverbiddy) Mugilidae (mulletts) and Chanos chanos (milkfish) were making their spawning runs. This shortfall it is proposed to overcome by collecting from outer islands.

#### Aquaculture

14. The present UNDP project to evaluate C. chanos (milkfish) as a baitfish for use on skipjack pole-and-line vessels is due to be completed at the end of 1980. The production ponds, present area 40 ha, have now come into production. Trials at the experimental ponds revealed that a production rate of 2 tonnes annually per hectare is possible. The production area will be doubled by the end of 1980 under EEC aid. The stocking of the ponds is partly by entry of the fry through the main sluice gate and partly by collecting fry from various stations around the lagoon. A fry survey conducted over 12 months revealed that regular harvesting was feasible throughout the year, but that the peak seasons were June to July and December to February. It is possible that this latter is subject to fluctuation as it is often the season of the westerly winds which would disrupt the entry of fry into the lagoon, the prevailing winds being easterly.

15. Feeding trials using fish meal and powdered copra have been conducted and proved successful. The copra is dried in a solar drier, which is a modified glasshouse with the floor painted black, extra side windows, apex vents and rails for trolleys. The dried copra is then crushed and the oil removed. A coffee grinder powders the crushed copra which is mixed 2:1 with fish meal for baitfish feed; for fattening table fish pure copra cake is used. Oil separation is approximately 90% achieved by passing the crushed copra twice through an expeller.

#### Christmas Island

16. On Christmas Island milkfish are harvested from the series of ponds constructed for the production of brine shrimp eggs. 500 kg are dispatched to Honolulu on each charter flight and 500 kg to Nauru. The flights are two per month. The milkfish are caught in a fish trap, then placed in CSW and transported to a chill store close to the airport to await shipment. On the arrival of the plane they are placed in insulated boxes on board the aircraft.

17. Rock lobster (Panulirus penicillatus) are also shipped out on the same aircraft at the rate of 350 kg per flight. These are harvested by fishermen on the reef flat using a pressure lamp and merely picking them up. Production cannot be increased yet due to inadequate handling facilities. This it is hoped to rectify next year by constructing an ice making machine, cold store, blast freezer and holding tanks.

18. Some work has been carried out by the University of Hawaii on milkfish maturation but no conclusive results have as yet been obtained. Further work will be carried out next year. Meanwhile the brine shrimp project is in abeyance awaiting a consultant's report.

#### Outside surveys

19. 1978 saw the arrival of the SPC chartered vessel the Hatsutori Maru to carry out its tagging programme in the area of the Gilberts Group, which results are published in preliminary country report No.11. The Fisheries Division was very grateful to the SPC team for having the opportunity to place two fisheries assistants on board the vessel, both of whom benefitted greatly from the experience.

#### Training

20. Fourteen Gilbertese fishermen received training in the skills of pole-and-line fishing and now form part of the crew of the F.V. Nei Manganibuka. At present a Gilbertese master fisherman on board the vessel while the JICA chief engineer is training two Gilbertese engineers.

21. Three trainees were dispatched to Japan for 6-month courses in aquaculture, master fisherman, marine engineering funded by JICA. Another trainee spent 6 months in Israel studying aquaculture funded by UNDP.

22. In September 1979 the SPC ran a training course on statistics attended by trainees from the Fisheries Division including one from Solomon Islands. Another trainee from Tonga spent three months studying aquaculture methods for farming C. chanos at the fish ponds on Tarawa funded by SPC.

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