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COUNTRY STATEMENT

PAPUA NEW GUINEA

Summary

This document summarises recent activities in the fisheries sector in Papua New Guinea (PNG) and in particular those events which concerned the Department of Fisheries and Marine Resources.

## INTRODUCTION

Papua New Guinea has a population of 3.2 million people of which approximately 700,000 live in coastal rural and urban areas. With a land area of 464,000 square kilometers (km<sup>2</sup>) among more than 600 islands, PNG is the largest country in the Pacific Islands region. After declaring the Declared Fishing Zone (DFZ) in 1978, PNG claimed jurisdiction over 2.3 million km<sup>2</sup> of ocean, the third largest such zone in the region.

The marine resources within this zone are rich and varied with, for example, approximately 2,000 species of fish, 5,000 species of molluscs and a similar number of crustaceans, many of which are harvested by coastal residents for food. A number of these resources are also the targets for some valuable commercial fisheries some of which are shared with neighbouring countries when their range extends beyond PNG's DFZ. In addition, PNG has a variety of native and introduced freshwater resources that are harvested by subsistence and artisanal fishermen.

The Department of Fisheries and Marine Resources was established in December, 1986 to administer PNG legislation concerning the marine and aquatic resources of the country. The Department was established from the existing infrastructure and assets of the Fisheries Division of the Department of Primary Industry. It consists of five sections: Planning, Economics and Marketing; Inspection, Surveillance and Licencing; Management Services; Research and Surveys, and Resource Development.

### Resource Development

In 1980, the Resource Development section of the Department implemented a scheme to upgrade coastal fisheries production which has resulted in the establishment of seven fish purchasing and extension depots. The Baimuru and Milne Bay operations were incorporated into the IFAD project in 1984 (see below) and the remaining four have been incorporated into Provincial government operations as Fishing Authorities. These stations purchase fish, crustaceans and molluscs from surrounding villages. Production figures and expenditure at each station during 1986 are summarised in Table 1.

### IFAD

The International Fund for Agricultural Development (IFAD) involvement in fisheries in PNG commenced in 1983 when support for an Artisanal Fisheries Development Programme was agreed to for the Baimuru Fisheries in the Gulf Province and the Samarai and Misima

Table 1. Production, revenue and expenditure details for all operational coastal fisheries stations during 1986.

Station	Production (Kgs)	Expenditure (Kina)	Revenue (Kina)
Kupiano	25,298	63,119	31,558
Kimbe	60,772	200,669	145,830
Manus	37,703	95,246	58,492
Oro	28,371	186,310	124,644
Baimuru	185,700	358,700	421,000
Milne Bay	265,000	931,400	735,200

Island Fish Plants in Milne Bay Province. The aim of the project is to increase efforts to harvest fish resources by the local population while at the same time promoting development of industrial fisheries largely through foreign investment. IFAD agreed to loan K12.0 million Kina for the project for promoting the exploitation of estuarine resources at Baimuru and reef-associated resources in Milne Bay.

The Resource Development section also operates a refrigeration service which assists with the design, installation and maintenance of all refrigeration plants operated by the Department.

A headquarters-based Fisheries Extension Unit provides technical advice and assistance with the development of fishing skills and gear among coastal communities. One of the aims of this unit is to identify and promote low-cost technical improvements to village dugout canoes or locally built alternative craft which includes planked and plywood canoes. It is hoped to obtain support in 1987 for a vessel development, building and training programme and a fishing skills development programme from FAO/UNDP.

In a country as large and diverse as PNG, it is necessary to assess the suitability of a number of vessel hull and deck designs to local conditions. Vessels currently being tested included;

- i. 'Sandskipper' catamaran, a 24' double hulled plywood vessel powered by a TS 13 longtail diesel of 11hp rating fitted with a sprit sail and jib capable of carrying 2 tonnes.
- ii. 'PNG1', a 36' plywood/planked transport/fishing outrigger canoe powered by an 8hp diesel longtail or outboard motors.
- iii. 'KIR-4' or Red Snapper canoes are 23'6" canoes with 12' beam with pressure treated marine ply hulls powered by 10hp outboards. They can carry 1 tonne of cargo.
- iv. 'PNG-2' or improved dugout, is cut from a single log with plywood or planked upper hull and outrigger. Sail or longtailed 7hp diesel power is used.

This unit is also promoting the development of a seasonal deep water snapper fishery in the vicinity of Port Moresby using a variety of existing and experimental vessels.

### Experimental Trap Fishing Papuan Coast

In early 1987, Capt Luis Mendoza, who has extensive experience fishing with traps in the Caribbean, spent 3 months experimental trap fishing on the south coast of PNG. This was a follow up to a visit during 1986 during which exploratory trap fishing was conducted in the same area.

Despite difficulties encountered during the 1987 visit, which included loss of 50% of the 39 traps constructed due to tampering with by local coastal residents and a shortage of suitable mangrove for frame construction, Captain Mendoza remained optimistic about the potential of trap fishing in PNG. He was of the opinion good catches could be taken if traps are deployed close to the reef inside lagoons or barrier reefs. Catches were highly variable around 2kg/trap/3-4 day soak. However, catches between 15 and 30kg/trap/3-4 day soak were occasionally taken.

Experimental trap fishing has been carried out in PNG at Kavieng in the northern islands since early 1984. The objectives of the Kavieng experiments were to:

- i. evaluate the effectiveness of traps as an alternative method of fishing for reef-associated fishes by local artisanal fishermen,
- ii. document the species composition of catches and,
- iii. use traps as a means of capturing fish for tagging and subsequent recapture for growth and migration studies. During the 18-month Kavieng study, 8,599 trap days were expended to catch 1.5t of fish for the first two components. During 1986, the tagging component used arrowhead fish traps on 7-8 day soak cycles, to tag more than 3000 fish representing 90 species. In excess of 750 recaptures have been made to date with some fish having been caught and released up to six times. Surgeonfish contributed up to 40% of the catch. The parrotfish Scarus ghobban, the acanthurid, A. xanthopterus and the coral trout, Plectropoma leopardus have provided the most interesting data to date.

### Barramundi Fishery

The development of barramundi, Lates calcarifer fisheries on the south coast of PNG has been sporadic and those presently operating fluctuate in production due to inconsistent fishing effort. There are two major fishing centres currently receiving and exporting barramundi products. These operations are at Daru in Western Province and Baimuru in the Gulf Province.

The Daru fishery exploits the area of the Fly River - Lake Murray systems and the coast west of Daru Island. Fishermen close to Daru land their catches directly to either of two processors in Daru. Freezer boats act as mother boats to fishermen along the Fly River and Lake Murray systems and on the coast further away from Daru. Production in this area has averaged 28.6 kg/100m net/day (hmd) resulting in an estimated annual catch of 328t in 1981-82, 187t in 1982-83, 139t in 1983-84, and 87t in 1984-85. In 1985-86 there

were no freezer boats operating and thus the fishery was restricted to coastal areas in the vicinity of Daru Island. Up to August, 7t of barramundi had been landed at Western District Sea Food Company (WDSF) operated by the local Provincial Government and total production for the year was estimated to be 14t. This decline in production was a result of a policy which forced all vessels to sell their catches at WDSF in Daru where prices offered for the fish were less than could be obtained elsewhere. This policy has recently been relaxed and now there are nine part-time and one full-time freezer boats operating in the area. The part-time boats are involved in lobster fishing during the barramundi off-season between April and August.

The average annual catch of barramundi from Baimuru during 1981 and 1982 was 21t. As the IFAD project became operational, production increased to 127t in 1985 and 128t in 1986, with an additional 25 to 56t of other species such as jewfish and threadfin salmon. This fishery is a village fishery with no involvement of freezer boats. The catch is landed from canoes or dories which operate throughout the extensive mangrove swampland system of this portion of the Gulf of Papua. Catch per unit effort in this fishery has increased from 5.1kg/hmd to 27.8kg/hmd in 1986. This reflects an increase in the number of nets being introduced to the fishery and general improvement in fishing efficiency as experience with gill net fishing increased.

#### Turtle Research

Turtle research was initiated in 1984 in the Western Province as a result of growing concern over the extensive subsistence and artisanal harvesting of green turtles, Chelonia mydas and to a lesser extent, the hawksbill, Eretmochelys imbricata. The stocks harvested are shared resources with Australia and Indonesia.

Research concentrates on the dynamics of the fishery which involves at least 183 part-time fishermen from the Daru Island area, who appear to hunt selectively for large turtles using outboard or sail powered craft and harpoons. From available data, at least 1200 turtles each year are caught by these fishermen generating an annual gross turnover of K46,000 in the area.

Biological research concentrates on reproduction, feeding, and general condition of individual turtles. In 1986, there were eight female turtles caught for every male which may partly be explained by a local preference for female turtle meat.

As a result of this work, to be completed in 1988, it is hoped a comprehensive management plan can be formulated that will ensure the long term viability of the turtle resources in this area.

#### Gulf of Papua Prawn Fishery

The annual catch of prawns from the Gulf of Papua averages approximately 1000t. During the last 10 years, an average of 15 boats have operated in this fishery. Only the three PNG-owned

vessels are permitted to operate within 3-miles of the shoreline.

Stock assessment of the fishery in 1982, resulted in suggestions for management of the fishery. These included restricting the number of operators, limiting vessel length to 20m and restricting engine power to less than 500 bhp.

During the last 2 years, 32 licences have been approved. Twenty-eight vessels are operating in the Gulf of Papua and 4 in Orangerie Bay to the east of Port Moresby. The majority of the catch consists of Banana prawns (Penaeus merguensis and P. indicus) 54%, with Tigers (P. monodon and P. semisulcatus) 19%, and Endeavours (M. ensis) 19% also contributing significantly. Fishing effort is distributed through 8 areas of the Gulf, although 50% of the catch comes from 13% of the total area in depths of 20 to 40m in Freshwater and Orokelo Bay.

The early years of the fishery was dominated by Japanese-operated trawlers who fished with twin-otter trawl nets. In 1986-87, 5 vessels chartered from Australia using quad-rig otter trawl nets entered the fishery on charter agreement with nationally owned companies. There are currently four such companies operating a total of twelve boats.

### Tuna

During 1986, the domestic pole and line fishery did not recommence following its closure in 1985. The foreign-based fishery was again dominated by Japanese vessels. One hundred and forty one single seiners, 14 group-seiners, 53 longliners and 7 pole-and-liners were licenced to enter PNG's 200 mile DFZ on 406 trip licences. Of these, 98 Japanese vessels applied for 254 licences, 27 US single seiners applied for 38 licences and 14 Taiwanese single and group seiners applied for 58 licences. Boats registered in Korea, Panama, Cayman Islands, Indonesia and Vanuatu also fished within PNG's DFZ and the revenue generated from access fees for all vessels amounted to K3.34 million.

A preliminary estimate for the catch of licenced longliners during 1986 is 8,000t, with purse seiners catching 58,000t and pole-and-liners 163.5t. Final estimates of the catch will be available when all catch data sheets have been processed.

The species composition of the catch is estimated in Table 2.

An area of concern for PNG fisheries administrators remains the lack of attention given by fishermen to the 'Discard' and 'other species' components of the catch data sheets returned by these fishermen as a condition of their licence.

Table 2. The estimated percentage composition of the catch of foreign-registered tuna fishing vessels which operated in PNG's DFZ during 1986.

	Bigeye	YFin	SJ	Blue Marlin	Others
Purse Seine	-	27.9	71.7	-	0.4
Longline	18.0	74.1	-	1.9	6.0
Pole and Line	-	8.5	79.2	-	12.3

Two major developments in early 1987 affecting the tuna industry in PNG were the finalisation of a regional treaty with the American tuna industry and the termination of the agreement under which Japanese-based vessels entered the DFZ.

### Torres Strait Fisheries

The Torres Strait Protected Zone (TSPZ) came into being in February 1985 following ratification of the Torres Strait Treaty by PNG and Australia. The aim of establishing the TSPZ was to protect the traditional way of life and livelihood of Torres Strait inhabitants. However, importantly for fisheries, it allows the two countries to share responsibility for the exploitation, management and conservation of the marine resources. Australia recognises three categories of fishing in the Protected Zone. These are "traditional", "community" and commercial fishing. Community fishing is limited commercial fishing by traditional Australian inhabitants of the Protected Zone. PNG on the other hand recognises only traditional fishing and commercial fishing. Traditional fishermen are guaranteed the right to move freely throughout the Zone to carry out their traditional activities. In contrast to this the commercial fisheries are carefully regulated and share the harvest of the designated resources under a complex catch sharing arrangement.

Six fisheries have been declared commercial fisheries, but are more commonly referred to as Article 22 fisheries, as it is this article of the Treaty under which they are declared. They are the prawn, mackerel, pearl shell, lobster, and dugong and turtle fisheries. In fact the dugong and turtle fisheries were declared Article 22 fisheries for the purpose of conservation. Each fishery will be dealt with in turn below.

**Prawn:** This fishery has seen no PNG involvement, despite the fact that for the past three years PNG was allocated a 300t (whole weight) catch quota within a 1200-1500t Total Allowable Catch (TAC). There have been several factors that have held up PNG participation which have now hopefully been removed, and it is anticipated that PNG will have seven trawlers working in the Protected Zone in the near future.

The fishery is based on the Tiger Prawn, Penaeus esculentus, and P. semisulcatus, with an important component of the catch being made up of Endeavour Prawn, Metapenaeus endeavouri. At the present time it is generally believed that the Torres Strait prawn stocks are not biologically over fished and the TAC has not been invoked for management purposes.

Mackerel: Again, PNG has not participated to any extent in the mackerel fishery despite the fact the base for fishing operations in the Protected Zone, Daru, is only 35 nautical miles from a very productive fishery at Bramble Cay. The TAC for the mackerel fishery is 500t live weight which allows ample room for PNG to participate in the fishery.

Pearl Shell: The pearl shell fishery is primarily to supply live shell to the cultured pearl industry based in Thursday Island at the tip of the Cape York. PNG has not been actively fishing for shells from PNG but PNG divers working on Australian boats have been involved in the fishery for many years. The fishery is presently depressed due to the scarcity of shell and although good stocks may exist in waters under PNG jurisdiction, industry cannot afford to fish waters where the return is uncertain.

Lobster: The lobster fishery for Panulirus ornatus is the most important of the Torres Strait fisheries to PNG at the present time and is likely to continue to be so. The lobster migrate from Torres Strait to the Gulf of Papua to breed after spending their first few years in Torres Strait. Consequently, when talking about the lobster fishery the area being discussed extends some 250 to 300 nautical miles in an east - west direction. The fishery is a dive fishery in Torres Strait where the lobster are speared with a short "cray spear". In the eastern Gulf of Papua fishermen dive for lobster during the day when they capture them by hand or chase them into surround nets, and capture them by night with hoop nets and pressure lamps. Since 1973 there has been a trawl fishery for the lobster during the breeding migration. Initially the trawling was confined to the Gulf of Papua and was carried out by PNG based prawn trawlers. However, later the Australian trawlers discovered the migration in Torres Strait as well. At various times since 1973 one or both countries have introduced measures to control the trawl catch. In PNG this was a quota system or a complete ban. Australia introduced bans on daylight trawling and finally banned trawling altogether in 1984. A three year trawling closure for lobster was introduced for the Gulf of Papua and TSPZ in 1985 as part of the joint management program. The purpose of the ban was to allow the lobster stock to recover from what appeared to be a low level, and It was consistent with the general management objective of promoting the fishery as a dive fishery, to maximise the benefits accruing to the traditional inhabitants.



The nature of the dive fishery has changed dramatically over the past two years in PNG. A number of factors account for the change. One of the most important factors may have been the recruitment of an extremely strong year class to the fishery in 1985. Landings in Daru increased from 32t tail weight in 1984 to 69 and 74t in 1985 and 1986 respectively. In addition to the catches landed in Daru it was estimated that an even larger catch was landed in Australia by PNG divers that fished there under the guise of traditional fishing. The result of these large catches is that the divers were able to afford a significant increase in expenditure for fishing equipment, including dinghies, outboard motors etc. The reefs in the northern part of Torres Strait are fished far more heavily now and competition between the divers is high. While lobster catches have been increasing in Torres Strait the situation has also improved in the eastern Gulf of Papua around Yule Island. Catches have increased from a few individual lobster being caught in 1983/84 to approximately 20t in 1986/87. The improved catches are certainly partially due to the ban on trawling, as well as good recruitment.

Providing an effective ban on trawling is continued there is little immediate fear of over fishing. As a result the TAC is a floating limit set at the level of the dive fishery.

While a good deal is known about the lobster fishery and the biology of the species, several major aspects of its life history remain unknown. The single most important unknown aspect is the fate of the migratory lobster. Physiological studies that commenced in 1985 are beginning to shed light on the possibility of mass post migratory/spawning mortality. While a good deal remains to be done on these studies, indications are that at least a portion of the population dies after breeding. If the bulk of the breeding population can be found and fished successfully then a new fishery can be developed with little threat to the long term viability of the fishery. Work is continuing in this direction.

**Turtle:** The turtle fishery is managed in the Australian area of jurisdiction as a purely traditional fishery, however in the PNG area of jurisdiction it is managed as an artisanal fishery. The fishery operating out of Daru has been closely monitored since 1984.

**Dugong:** Dugong are managed as traditional fisheries in the entire TSPZ. Emphasis is being placed on conserving the remaining stock.

## Freshwater Fisheries

Phase one of a UNDP/FAO funded project to determine options to improve the fisheries potential of the Sepik River commenced in early 1987. The project stems from research undertaken by the Department between 1981 and 1986. Previous research has shown the Sepik River fishery to have a yield of 10% of that which might be expected by comparison with similar rivers in other geographic areas. At present the flood plain yields an estimated 4,000t/yr, approximately half of which is from an introduced tilapia (Oreochromis mossambicus). One of the reasons for this low yield is that the freshwater fauna of New Guinea is different from that of other geographic zones. True freshwater fishes do not occur in PNG; they are almost all diadromous or are permanent inhabitants of freshwater but are derived from marine families, eg gudgeons and fork-tailed catfishes.

One potential way of improving the fishery is to improve the stocks upon which the fishery is based by introducing further species of fish. The project aims to investigate the potential risks and benefits of this approach and advise the government accordingly.

Research activities will include;

- i. Investigations of trout stocking in Highland streams.
- ii. Investigations of carp in the Sepik River.
- iii. Analysis of fish landings at Sepik River markets.
- iv. Investigation of tilapia in the Sepik River.
- v. Investigation of the existing Sepik River floodplain fishery and fish fauna.
- vi. Investigation of the Ramu River fish fauna.
- vii. Investigation of the limnology of the Sepik River.
- viii. Socio-economic analysis of the present subsistence fishery and analysis of the impact of proposed fish introductions.
- ix. Investigation of the potential food availability for Sepik River fishes.

The Department is also in the process of attempting to re-establish an interest in carp farming in the Highlands. Funding is being sort from UNDP/FAO to support the development of a carp hatchery and grow out ponds at Aiyura. During 1986 fingerling carp were successfully raised at the farm and stocking density trials were commenced. Integrated farming experiments involving carp production with pigs and poultry are also in progress and supplementary feed experiments using sweet potato, dried coffee pulp, poultry feed and egg yolk have also commenced.

### Inspection and Surveillance

The Inspection and Surveillance Section of the Department of has three principal functions.

1. Enforcement of legislation relating to the exploitation of fisheries resources
2. Ensure fisheries products satisfy set quality requirements, and
3. Monitor fishing vessel operations.

### Surveillance

Papua New Guinea's purpose in establishing a fishing vessel detection surveillance and monitoring system is three fold;

- i) detect violators of the 200 mile declared fishing zone, specifically unlicensed foreign fishing vessels.
- ii) monitor the movement of licensed vessels
- iii) assist with the collection of environmental and biological data relating to the fisheries.

The ability of the Department to carry out these activities will improve in future as the Defence Force, with whom the Department co-operates to carry out surveillance, is in the process of acquiring four new patrol vessels, courtesy of Australian aid.

### Licencing

All fishing vessels are licenced to fish in PNG's DFZ under licence conditions administered by the Minister for Fisheries and Marine Resources. Foreign vessels registered in Thailand, Australia, Cayman Islands, Vanuatu, Japan, Taiwan, Korea, Mexico, Indonesia, America and Honduras have operated under licence in PNG's DFZ during the last two years. The Licencing Section, issues licences once details concerning the operation of the vessel have been examined by the Department, and monitors the operation of the vessel during its period in PNG through the receipt of telex and trip reports.

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