

A short history of industrial fishing in the Pacific Islands



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**A SHORT HISTORY OF INDUSTRIAL FISHING
IN THE PACIFIC ISLANDS**

by

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Cover photographs:
Tuna boats Koror harbour, Palau (Simon Funge-Smith)
Tuna catch (Bob Gillett)

FOREWORD

This document presents a summary and review of the development of industrial fisheries in the Pacific Islands. The Pacific Islands are, from a fisheries perspective, rather undeveloped and the development of industrial fisheries has generated both revenue and food security for the region. It has also granted access to the vast offshore areas associated with this region. The inshore region still serves as the basis for small-scale subsistence and artisanal fisheries.

Industrial fisheries in the Pacific Islands region have almost exclusively been associated with the tuna resources. Similarly, most industrial-scale opportunities for the foreseeable future are likely to be tuna-related. The industrial tuna fisheries today are by far the greatest fisheries in the region, almost ten times greater than the other fisheries combined. The main tuna fishery is purse-seines with 191 boats from 19 different countries, including four distant water fishing nations.

The history of industrial fishing development has not been without problems. In almost all cases of government-owned tuna fishing companies have not been successful or have failed. A general consensus in the region is that large and complex fishing operations cannot be effectively operated by government and that private sector concerns are more flexible and effective in this regard. Government roles seem best suited to ensuring appropriate policy environments and the increasing effectiveness of Regional Fisheries Management Organizations will see this becoming an increasingly important function in the future.



He Changchui

Assistant Director-General and
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TABLE OF CONTENTS

	<i>Page</i>
EXECUTIVE SUMMARY	vii
INTRODUCTION	1
TUNA FISHING	2
PRE-WORLD WAR II	2
POST-WORLD WAR II	4
CHANGE IN THE 1960s AND 1970s	5
TUNA PURSE-SEINING	6
RECENT POLE-AND-LINE AND LONGLINE DEVELOPMENTS	8
THE TUNA CANNERIES	10
SOME THOUGHTS OF HISTORICAL PATTERNS IN THE DEVELOPMENT OF INDUSTRIAL FISHING IN THE REGION	10
SHRIMP TRAWLING IN PAPUA NEW GUINEA	11
OTHER EXPERIENCE WITH INDUSTRIAL FISHING	12
REFERENCES	13

EXECUTIVE SUMMARY

This paper explores the development of industrial fishing in the 22 countries and territories in the central and western Pacific Ocean. For the purpose of this short paper, industrial fishing is defined using large vessels, generally greater than 15 m in length, for fishing activity that is mainly carried out in offshore areas.

Industrial tuna fisheries produce about ten times the amount of fish being produced by all of the other fisheries of the region combined. Various forms of industrial tuna fishing were attempted in the past century, but only three types have enjoyed any degree of commercial success: purse-seining, longlining, and pole-and-line fishing.

The first substantive industrial fishing activities were those by the Japanese in the 1920s and 1930s in Micronesia. Following the destruction of fisheries infrastructure during World War II, little industrial fishing development occurred until the early 1950s when Japanese fishing activity resumed in Micronesia. Both Japan and the United States of America became active in establishing tuna bases in several parts of the Pacific Islands area in the early 1960s.

Financial shocks to the Japanese and USA fleets in the late 1950s and 1960s resulted in considerable innovation that both enabled the survival of the fleets and affected their presence in the Pacific Islands area. This included the development of sashimi freezer longlining by the Japanese and the tuna purse-seining by the Americans. Important recent developments in the Pacific Islands area include the entry of tuna vessels from China into the fishery and the development of domestic longlining in most countries.

In both longlining and purse-seining, the other Asian players (Taiwan (Province of China), Republic of Korea, and most recently China) have become increasingly successful. This has not occurred through innovation but rather by coupling existing technology with low production costs and aggressive fishing practices.

Besides industrial tuna fishing, which occurs in the waters of all Pacific Island countries, the only other significant form of industrial fishing in the Pacific Islands region is shrimp trawling in Papua New Guinea. The magnitude of shrimp trawling in the Pacific Islands is actually quite small compared with industrial tuna fishing, with the value of fishing for tuna being about 400 times greater.

Some of the important lessons learned in the development of industrial fishing in the region are:

- Government-owned tuna fishing companies are rarely, if ever, successful. It was an extremely expensive learning process, but now the general consensus in the region is that the government is very poor at running large and complex fishing operations.
- Past sustainable industrial operations have been mainly associated with the tuna resources. Similarly, most industrial-scale opportunities for the foreseeable future are likely to be tuna-related.

A wide range of fishing activities is carried out in Pacific Islands. In a recent study on categorizing fishing in the region (Gillett, 2005), some conclusions relevant to a study on industrial fishing were made:

- On the basis of legislation, literature and common usage in the region, the most common scheme for classifying scales appears to be: subsistence (or non-commercial), artisanal (or small-scale commercial), and industrial (or large-scale commercial).
- The word “industrial” is not defined (or even used) in the fisheries legislation of any Pacific Island country.
- The Pacific Islands represents a fairly straight-forward situation: the offshore fisheries are (with one or two exceptions) all industrial-scale operations; all fisheries that operate close to, on, or within the reef (or shore) are much smaller in scale.

The term “industrial fishery” is often used in the region and is loosely understood to mean offshore fishing in large vessels. A more encompassing and robust definition could be formulated in detail, but for the purpose of this short history paper, industrial fishing is defined as using large vessels, generally greater than 15 m in length, for fishing activity that is usually carried out in offshore areas.

The present industrial fishing activity in the Pacific Islands consists mainly of three types of tuna fishing and shrimp trawling. Tuna fishing is carried out in all Pacific Island countries and territories, while shrimp trawling is presently confined to a few areas in Papua New Guinea.

A study by the Asian Development Bank (ADB, 2001) showed that the industrial tuna fisheries produce about ten times the amount of fish being produced by all of the other fisheries of the region combined (shrimp trawling, inshore commercial, inshore subsistence). In terms of value, the tuna fisheries in the Pacific Islands area are worth over seven times that of all other Pacific Island fisheries together.

TUNA FISHING

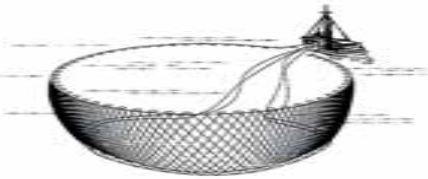

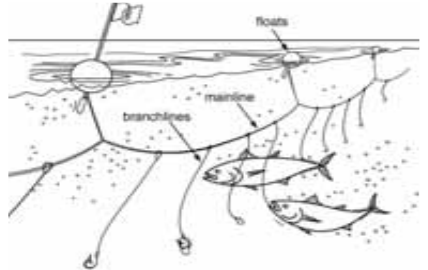


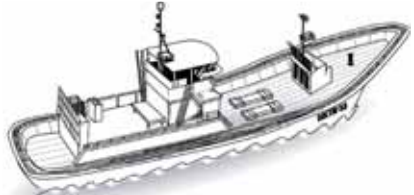
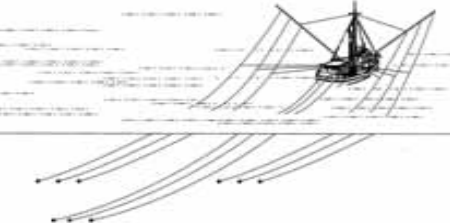

Tuna fishing has been important in Pacific Island countries for centuries, but prior to 1900 this activity was restricted to small-scale fishing, mainly using canoes just outside the reef. Various forms of industrial tuna fishing were attempted in the past century, but only three types have enjoyed any degree of commercial success: purse-seining, longlining, and pole-and-line fishing. A fourth type of tuna fishing, trolling, is not undertaken on an industrial scale in the Pacific Islands, but some industrial tuna trollers are based in the region and troll in temperate waters to the south. The four main industrial gear types and associated vessels are shown in Figure 2.

PRE-WORLD WAR II

Attempts at developing industrial fishing in the region began over a hundred years ago. In August 1899 the USA. Fish commission vessel *Albatross* departed San Francisco on an 18-month fishery investigation cruise that included areas in what is now French Polynesia, Cook Islands, Niue, Tonga, Fiji, Tuvalu, Kiribati, Marshall Islands, Federated States of Micronesia, and Guam (Alexander, 1902). The results were disappointing and apparently no follow-up activities occurred.

Much more substantial and methodical fisheries development activities were undertaken some twenty years later by the Japanese. After the outbreak of World War I, Japan declared war on Germany in August of 1914 and subsequently wrested control of the German Pacific Island possessions to the north of the equator – what is now known as the Palau, the Federated States of Micronesia (FSM), Marshall Islands, and the Northern Mariana Islands (referred to in this report as

Figure 2: Main industrial tuna fishing gear presently used in the Pacific Islands region

Gear Type	Catch	Typical Vessel that Uses Gear	Notes
<p data-bbox="394 264 528 288">Purse seine</p> 	<p data-bbox="707 304 1028 427">Mainly skipjack and small yellowfin are caught by purse seine gear. Most catch is for canning.</p>		<p data-bbox="1485 304 2051 427">About 80 percent of the tuna catch in the Pacific Islands region is by purse seine gear. Most of the purse seine catch is taken within 5 degrees of the equator.</p>
<p data-bbox="405 499 517 523">Longline</p> 	<p data-bbox="707 539 1028 762">Most tuna caught are large size yellowfin, bigeye, and albacore. The prime yellowfin and bigeye often are exported fresh to overseas markets. Most of the albacore is for canning.</p>		<p data-bbox="1485 539 2051 762">About 13 percent of the tuna catch in the Pacific Islands region is by longline gear. There are two major types of longliners: (1) relatively large vessels with mechanical freezing equipment (often based outside the Pacific Islands), and (2) smaller vessels that mostly use ice to preserve fish and are typically based at a port in the Pacific Islands.</p>
<p data-bbox="383 823 539 847">Pole-and-line</p> 	<p data-bbox="707 863 1028 1023">Mainly skipjack and small yellowfin are caught by pole-and-line gear. Most catch is for canning or producing a dried product.</p>		<p data-bbox="1485 863 2051 1082">About 7 percent of the tuna catch in the Pacific Islands region is by pole-and-line gear. In the 1980s several Pacific Island countries had fleets of these vessels, but most no longer operate due to competition with the more productive purse seine gear. Most of the catch by this gear is made in Asian waters.</p>
<p data-bbox="427 1098 495 1121">Troll</p> 	<p data-bbox="707 1137 1028 1201">Large-scale trolling targets albacore for canning.</p>		<p data-bbox="1485 1137 2051 1265">Large-scale tuna trolling is carried out by some vessels based in the Pacific Islands. The actual fishing activity occurs in the cool water to the south of the region.</p>

Source: Gillett 2004.

Micronesia). After the war Japan was awarded control of these islands by a League of Nations mandate. For various reasons, including satisfying economic development obligations under the mandate, Japan directed substantial effort to developing various industries in Micronesia. In the early 1920s an eight-year survey of the marine resources of the area was followed by subsidies from Japan for the purchase of tuna boats, fishing gear, and processing equipment. Three commercial tuna pole-and-line fishing operations were established in Palau in the late 1920s. The Marine Products Experimental Station was established in Palau in 1931, and from this facility surveys on tuna were carried out as far away as the Marshall Islands. Japanese tuna fishermen and fishing companies began entering the area in ever-increasing numbers in the early 1930s. The primary interest was pole-and-line tuna fishing and secondarily tuna longlining, with some tuna trolling trials (Skipjack Programme, 1984; Peatie, 1988).

By the mid-1930s Japanese tuna fishing was well developed in the area with 45 pole-and-line vessels based in Palau, 52 in FSM, and 19 in the northern Mariana Islands. In addition, larger tuna longline vessels of 60 to 100 tonnes fished the area from their bases in southern Japan. Tuna catches in Micronesia reached the highest level of 33 000 tonnes in 1937. Most of the production was processed into a dried tuna product “katsuobushi” which was shipped to Japan. There were also at least two tuna canneries in operation. During this period there was little participation by indigenous local residents in the tuna industry; Okinawan fishermen manned the tuna fishing vessels and Japanese operated the processing facilities ashore. All commercial tuna fishing in the area came to a halt during World War II (Skipjack Programme, 1984; Smith, 1947; Rothschild and Uchida, 1968; Wilson, 1971; Ikebe and Matsumoto, 1937).

POST-WORLD WAR II

Tuna fishing activity in post WW II in Micronesia was remarkably different. Much of the fishery infrastructure and tuna vessels were destroyed by war activity and the Japanese and Okinawan fishermen had been repatriated. Under a United Nations trustee arrangement, the United States assumed control of the area, but had much less interest than Japan did previously in economic development, including fisheries. As part of the terms of surrender, geographic restrictions known as MacArthur Lines, were placed on the movements of Japanese vessels, which effectively prevented their tuna fishing in Micronesia. These lines were extended four times and finally the last MacArthur Line was lifted in April 1952, at which time the Japanese government began encouraging the construction of large longline and pole-and-line tuna vessels (Peatie, 1988; Matsuda, 1987). Nine Japanese longline/mothership expeditions took place in Micronesia in 1950 and 1951 under temporary permission of the USA military (Felando, 1987). Although Japanese fishing activity in what were then high seas areas gradually returned to the Micronesian region, USA government restrictions on economic activity ashore were held in place until the mid-1970s and precluded any return to the fish processing bases developed before the War.

In the early 1950s the activities of the Japan-based pole-and-line vessels were limited to fishing close to Japan by their need to carry live bait, but later improvements in technology allowed those vessels to increase their range from their Japanese bases. By the early 1960s Japanese pole and line vessels were fishing in the areas near the northern Marianas and Palau during their near-Japan off-season (Rothschild and Uchida, 1968; Skipjack Programme, 1984) and during the next ten years were fishing well south of the equator. Longline vessels also expanded their range; in 1952 their fishing area included most of Micronesia and by 1962 most parts of the Pacific between 40° north and south latitude had been explored by Japanese longline fishermen (Matsuda, 1987).

Significant American tuna initiatives were also under way. During World War II the USA government commandeered 49 California-based tuna pole-and-line vessels for service in the Pacific. Over 600 tuna fishermen served on these vessels. This activity was apparently quite instrumental in

creating awareness in American tuna fishermen of the size and fishery potential of the western Pacific region, and for the first time introduced them to previously unheard of places like the Marshall Islands, Micronesia, the Solomon Islands and Palau.

During the late 1940s and early 1950s exploratory cruises were carried out by USA tuna vessels. These expeditions used pole-and-line, longline, and purse-seine vessels that were both privately and government sponsored to do exploratory tuna fishing in the Line Islands of Kiribati, the Society Islands of French Polynesia and from the Marshall Islands to Palau (Felando, 1987). This was followed by other major American initiatives: the establishment of the Van Camp Seafood Company tuna cannery in Pago Pago, American Samoa in 1953 (see section below on canning), followed by the StarKist cannery in Pago Pago in 1963 and the Van Camp pole-and-line base in Palau in 1964. That base had from 8 to 15 pole-and-line boats and a freezing facility (Skipjack Programme, 1984).

The Japanese were also active in establishing facilities in the Pacific Islands area. Between the early 1950s and the early 1960s, tuna longline bases were established in Pago Pago (American Samoa), Santo Island (Vanuatu), Noumea (New Caledonia), Papeete (French Polynesia) and Levuka (Fiji). In most cases these facilities supplied raw product, mainly albacore, to canneries in Hawaii and the USA mainland (Doulman, 1987). At the same time, the Japan-based pole-and-line vessels continued to expand their range, with fishing operations eventually reaching even the southern parts of the Pacific Islands area, with 300 pole-and-line vessels participating seasonally in the fishery.

Quasi-government foundations played a major role in both the Japanese and American tuna ventures in the Pacific Islands. To promote Japanese foreign-based tuna fisheries, the Overseas Fisheries Cooperation Foundation (OFCF) and the Overseas Cooperation Foundation (OCF) provided technical and economic assistance. OFCF and OFC loans cover 70 percent of the capital required by joint ventures (Matsuda 1987). American tuna initiatives in the Pacific Islands region received support from the Reconstruction Finance Corporation (late 1940s), the Pacific Oceanic Fisheries initiative (1949–1959), and Pacific Tuna Development Foundation (starting in 1974).

CHANGE IN THE 1960s AND 1970s

Japanese companies had established through various arrangements substantial locally-based pole-and-line tuna fishing presence in several Pacific Island countries, including Papua New Guinea (1970), Solomon Islands (1971) and Fiji (1976). The longline fleets of Japan were fishing throughout the Pacific Islands, as well as the broader Pacific Ocean and into the Indian and Atlantic Oceans. A number of events occurred which had a negative effect on the profitability of Japanese tuna fishing operations. These included the oil price shocks of 1972/1978 and the claims of extended maritime jurisdiction. The latter resulted in Japan having to pay for access to places which had previously been considered high seas areas. Japan concluded its first access agreement in the Pacific Islands region with Papua New Guinea in 1978. By 1981 Japan had access agreements with nine countries and territories in the region (Doulman, 1987).

New players appeared on the Pacific Islands tuna scene. In the mid-1960s, the Republic of Korea and Taiwan (Province of China), began large-scale tuna longline fisheries and by the 1970s they were a major competitor to Japanese in longlining for albacore. During the same period, the Japanese economy developed and the value of the yen strengthened, resulting in reduced returns from Japanese albacore longlining. Concurrently, the increasing affluence of the Japanese consumer created greater demand for sashimi grade tuna. The Japanese fleet responded to these signals, developed ultra-low temperature on-board freezing, and switched effort out of albacore longlining and into that for frozen sashimi (Lightfoot, 1997). Part of this switch involved fishing deeper to catch bigeye in cooler water (Langley, 2003). The sashimi longliners were usually newer and based outside the Pacific Islands area, rather than at the Japanese bases established several years earlier.

The albacore longliners from the Republic of Korea and Taiwan (Province of China) tended to move into those bases.

Another important tuna development in the Pacific Island area in the 1970s was the start of the era of government-owned national tuna fishing companies. These included: Fiji (Ika Corporation), Tuvalu (NAFICOT), Kiribati (Te Mautari), Tonga (Sea Star), and the Federated States of Micronesia (National Fishing Corporation and 13 other national/state fishing companies). Some of the experienced gained from these companies included:

- None of these national fishing companies have been profitable in the long term. Some have never had a profitable year. Several of the investments and losses are staggering – the Government of the small country of FSM has invested over US\$100 million in several companies.
- There has been a great reluctance to privatize these firms. This seems to come from (a) an absence of local investors with sufficient resources and a reluctance to bring in foreigners, (b) personal agendas of government officials associated with the national company (director fees, perks, overseas travel), and (c) government officials wishing to avoid an embarrassing accounting of large historical losses which would become apparent in an asset sale.
- Bold decisions to privatize or sell were rarely made. Assets decayed to near zero value while waiting for government action. For a few companies, a conveniently-timed disaster provided the catalyst for sale, or simply liquidation.

TUNA PURSE-SEINING

Primarily due to expanding Japanese tuna catches in the 1950s, the California-based pole-and-line fishery (almost 300 vessels) experienced severe financial difficulties. The fleet survived largely through technical innovations that led to the feasibility of using purse seine gear for capturing tuna. In the subsequent years nearly 100 California bait boats were converted to purse seiners and new tuna purse seiners were constructed. The technique later was taken up by Japanese tuna fishermen for use in temperate waters off Japan. By the late 1960s between 60 and 70 small Japanese tuna purse seine vessels (50 to 200 GRT) were fishing seasonally (Gillett, McCoy and Itano, 2002; Gillett and Lewis, 2003).

Tuna purse-seining in tropical waters was another matter. The characteristically clear water and deep thermocline in the equatorial Pacific create conditions unfavourable for purse-seining – the tuna schools tended to be smaller, faster-moving, and dive deeper than in the eastern Pacific or off Japan. The government of Japan and subsequently that of the United States of America sponsored many experimental purse-seining expeditions to the equatorial Pacific area. The Japanese persisted and were the first to have success. The main innovation was the pre-dawn setting of deep nets around logs in the area between Micronesia and Papua New Guinea. By the late 1970s there were several fully commercial Japanese and American purse seine operations in the western equatorial area of the Pacific Islands.

The number of purse seine vessels operating in the Pacific Islands increased rapidly during the early 1980s. The USA purse seine fleet moved in quickly from the eastern Pacific due to the very strong El Niño event of 1982–83 and pressure to reduce dolphin mortality in their traditional fishing grounds. In 1983, 62 USA seiners caught 179 000 tonnes of tuna in the Pacific Islands area.

During the period from the mid-1980s to 2003 the regional purse seine fleet expanded, albeit at a slower rate, and the national composition of the fleet became more diverse (Table 1).

Table 1: Number of active purse seine vessels in the Pacific Islands

	1988	1995	2002	2003
Japan	39	33	35	34
USA	32	43	29	20
Korea, Republic of	23	30	28	27
Taiwan (Province of China)	1	42	41	38
China	0	0	3	4
Solomons	4	3	2	1
PNG	0	3	6	7
FSM	0	5	7	9
Marshalls	0	0	5	6
Kiribati	0	1	1	1
Vanuatu	0	2	11	15
NZ DW	0	0	4	4
Australia DW	3	0	0	0
Spain	0	0	1	1
Neth. Antilles	0	0	1	1
Panama	0	0	0	1
USSR	5	0	0	0
Philippines DW	9	13	23	22
Indonesia DW	3	0	0	0
TOTAL	119	175	197	191

Source: Gillett and Lewis (2003); DW = distant water, as opposed to domestic fishing.

One of the major purse seine operational patterns concerns disposal of the catch. The Republic of Korea, Taiwan (Province of China) and China transship their catch onto to large carrier vessels, and do so mostly in ports of the Pacific Island countries. The Japanese return all catch to Japan. The USA fleet and most vessels from the Philippines that operate in the Pacific Islands offload the bulk of their catch directly to canneries.

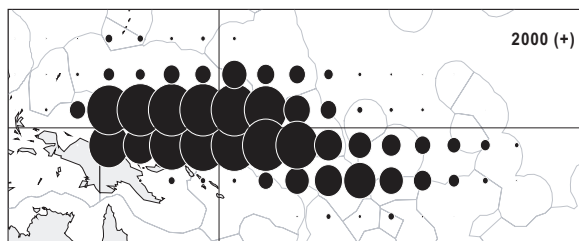
The region's first conservation-oriented management move in the tuna fisheries was the Palau Agreement for the Management of the Western Pacific Purse Seine Fishery. The Palau Arrangement was signed in October 1992 by Federated States of Micronesia, Marshall Islands, Nauru, Palau and Tuvalu. Kiribati and Papua New Guinea signed the following year. The arrangement places a ceiling on the number of purse seine licenses that can be issued by the seven Pacific Island countries party to the agreement. The limit was originally set at 164 vessels and progressively increased to the present 205. For several years there has been discussion of modifying the Palau Arrangement so that purse seine vessel fishing days (rather than vessel numbers) are used as the basis for management.

Major events affecting purse-seining in the Pacific Islands region during the last two decades have been:

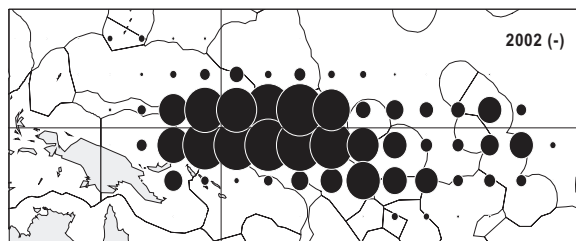
- Strong El Niño events, especially that of 1982–83, resulted in good purse seine fishing in the Pacific Islands and the opposite in the eastern Pacific. In general, during El Niño year the purse seine fishery moves to the east of its normal location between Papua New Guinea and the Federated States of Micronesia (Figure 3).

Figure 3: The shift in the purse seine fishing activity

A: regular year (2001)



B: El Niño year (2002)



Source: SPC

- The USA Multilateral Tuna Treaty was signed in 1987 and came into force in 1988. Since that time, the USA purse seine fleet has enjoyed access to most of the region except closed areas in some EEZs.
- In 1999 the price of skipjack on the world market dipped below US\$400 per tonne for the first time since purse seining in the Pacific Islands area began, causing many seiners to cease operation and some to go into bankruptcy.
- There has been a general increase in the proportion of tuna caught by purse-seining relative to that by longline or pole-and-line. About 80 percent of the tuna in the region is presently caught by this gear.

RECENT POLE-AND-LINE AND LONGLINE DEVELOPMENTS

In the past two decades, there have also been significant changes in the pole-and-line and longline fisheries. Pole-and-line fleets were established at various times in the 1970s and early 1980s in most of the countries of the western part of the Pacific. This was primarily because of the live bait situation – without sufficient live bait supplies, pole-and-line is not feasible and these resources are more prevalent around the mainly large islands in the west of the region. The only pole-and-line vessels based in the Pacific Islands at present are those in the dwindling fleet of ageing vessels in the Solomon Islands. The decline of pole-and-line vessels has been due to a variety of factors, including:

- Most of the pole-and-line operations were owned by government fishing companies, which has proven to be inherently inefficient.
- The baitfish situation was a major constraint at small islands (e.g. Tuvalu, Kiribati), and limiting even at large islands.
- Competition with purse seine vessels was proving increasingly difficult as those vessels increased their production and tuna prices fell.

With respect to tuna longlining, the two most important changes in the Pacific Islands in the last two decades have been:

- The entry of vessels from China into the fishery. The number of Chinese longline vessels based in the region increased rapidly during the early 1990s, peaking at 457 vessels in 1994. It is estimated that during 2004 there were a total of about 110 Chinese tuna longline vessels locally licensed and based in five Pacific Island countries: Fiji, Marshall Islands, FSM, Tonga, and Palau. Those in the Micronesian area target bigeye and to a lesser degree yellowfin for the fresh sashimi market. Chinese vessels based in Fiji and Tonga catch primarily albacore for the cannery market (McCoy and Gillett, 2005).

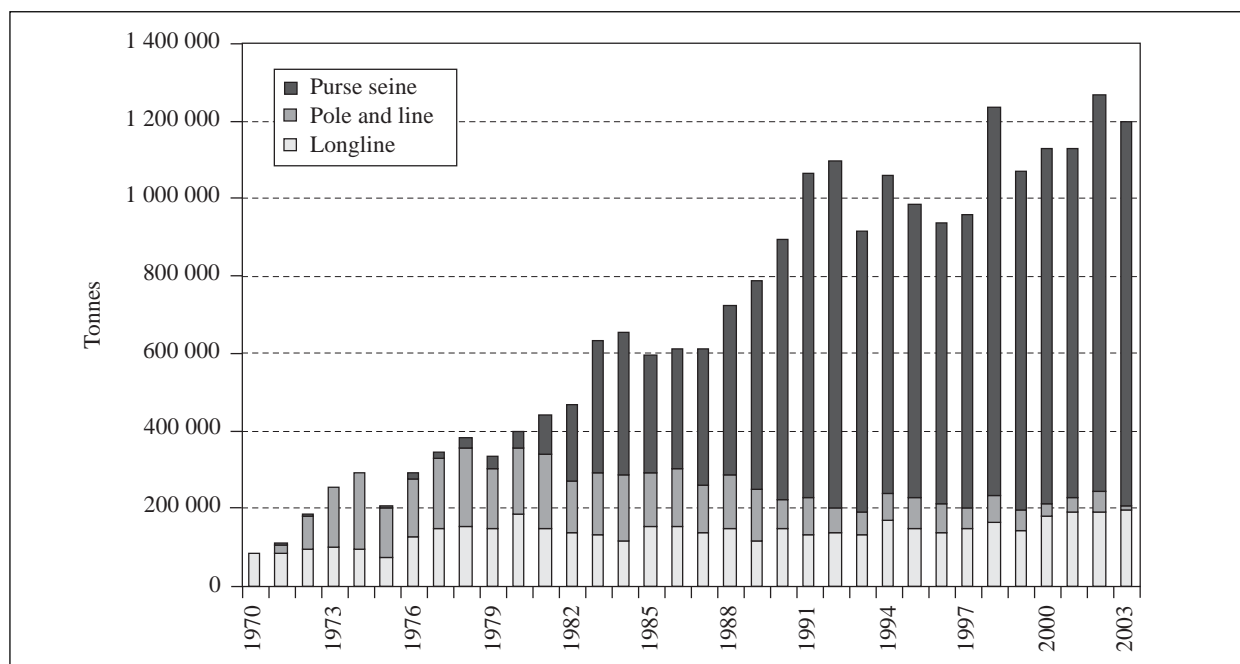
Figure 4: A tuna longliner leaving its base in Pohnpei, Federated States of Micronesia



- The development of domestic longlining in most countries. The 1990s saw the gradual increase in the number of Pacific Islands domestic vessels, such as those from Samoa, Fiji, French Polynesia, New Caledonia and Solomon Islands. These fleets operate in subtropical waters, with albacore the main species taken (Langley *et al.* 2003).

Chapman (2004) estimates there were about 1 900 longline vessels operating in the region in mid-2002, about half of which were based in Pacific Island countries/territories. Figure 5 gives the industrial tuna catches by gear type in the region for the past several decades.

Figure 5: Industrial tuna catches in the Pacific Islands area, 1970 to 2003



Source: SPC unpublished data.

THE TUNA CANNERIES

No discussion of industrial tuna fishing in the Pacific Islands would be complete without some mention of the role played by the tuna canneries, especially those in American Samoa.

In the late 1940s the British colony of Fiji was developing a pole-and-line tuna fleet. Because the market for tuna at that time was almost exclusively in the USA, access to American consumers under favourably import tariff conditions was considered essential. Using duty-free provisions enjoyed by American Samoa for access to American markets, a Fiji fishing company was instrumental in establishing a small canning operation in Pago Pago. Harold Gatty (an aviation pioneer), using connections obtained by being the navigator aboard the first circumnavigation flight, acquired Rockefeller Foundation money (\$1.5 million) for a cannery in Pago Pago. Fish caught in Fiji were transhipped to a USA flag vessel and unloaded at Pago Pago. Although a clever concept, it was years ahead of the catching technology. The tuna production from the pole/line tuna fleet in Fiji fluctuated wildly. The cannery was not able to operate profitably on this inconsistent supply, processed only 6 tonnes of fish, and soon closed. The American Samoa government eventually purchased the cannery for US\$40 000. Undaunted, Gatty went on to establish in association with Pan Am Airways the first transpacific air service and later became a founder of what was to become Fiji's Air Pacific. (Gillett, 1994).

After the first cannery attempt, American Samoa obtained additional advantages when in 1953 the unloading of fish by non-USA flag vessels directly in Pago Pago was allowed. The biggest legal advantage, however, concerns tariff provisions mentioned above. Under Headnote 3(a) of the USA Tariff Schedule, products from American Samoa can be exported to the USA if the local component is at least 30 percent of the value. This is a substantial advantage as canned tuna imported into the USA from other countries are subject to a 35 percent duty for an oil pack or from 6 percent to 12.5 percent for tuna canned in water. These provisions enticed the Van Camp Seafood Company to establish a cannery in 1953 at the site of the original venture. In 1963 StarKist Foods opened a second cannery alongside Van Camp.

The two American Samoa canneries receive fish off-loaded from USA purse seine vessels and Asian longliners, as well as fish brought to American Samoa by refrigerated carrier from other places in the Pacific and even from other oceans. It is estimated that approximately 200 000 tonnes of tuna is processed annually at the two canneries in American Samoa. These canneries currently supply about 50 percent of the USA market for canned tuna (Gillett, McCoy and Itano, 2002).

Other tuna canneries have subsequently been established in the Pacific Islands region. These are the Pacific Fishing Company cannery at Levuka, Fiji, the Soltai cannery at Noro in the Solomon Islands, and the RD cannery at Madang, Papua New Guinea. Over the past few decades there have been a large number of proposals for additional tuna canneries. Reasons that these plans have not come to fruition include lack of sufficient fresh water, stiff competition from efficient Asian facilities, and the fact that cannery proposals have been used as ploys for such matters as gaining fishing access and labour concessions in neighbouring countries.

SOME THOUGHTS OF HISTORICAL PATTERNS IN THE DEVELOPMENT OF INDUSTRIAL FISHING IN THE REGION

The original development of industrial tuna fishing in the Pacific Islands has largely been tied to events affecting the tuna fleets of Japan and the United States. These include hardships facing those fleets, government sponsorship for those vessels to explore the Pacific Islands, as well as shortages of fish supply and restrictive management measures in their traditional fishing grounds.

Financial shocks to the Japanese and USA fleets resulted in considerable innovation that both enabled the survival of the fleets and affected their presence in the Pacific Islands area. This included the development of sashimi freezer longlining by the Japanese and the tuna purse seining by the Americans.

In both longlining and purse-seining, the other Asian players (Taiwan (Province of China), Republic of Korea, and most recently China) have become increasingly successful. This has not occurred through innovation but rather by coupling existing technology with low production costs and aggressive fishing practices.

One of the greatest lessons learned in the development of industrial fishing in the region concerns government-owned tuna fishing companies. It was an extremely expensive learning process, but now the general consensus in the region is that the government is very poor at running large and complex fishing operations. A report by the Forum Fisheries Agency (Gillett, 2003) concluded: "That era of government tuna enterprise failure is well documented, especially by the development agencies based outside of the region. The circumstance surrounding those failures is also vivid in the minds of those individuals who were active in fisheries development during that period. Learning from past difficulties, most of the fisheries officers encountered expressed the sentiment that the government should refrain from commercial involvement and focus on improving the policy environment."

Another important lesson is that, for tuna purse-seining, resource adjacency is not a guarantee of success. In previous decades many Pacific Island countries had the belief that by being close to the tuna fishing ground, they had an inherent advantage over other countries whose vessels were based at considerable distance from the fishing activity, or even outside the region. Many countries learned that this was not the case.

SHRIMP TRAWLING IN PAPUA NEW GUINEA

Besides industrial tuna fishing which occurs in the waters of all Pacific Island countries, the only other significant form of industrial fishing in the Pacific Islands region is shrimp trawling in Papua New Guinea (PNG).

The history of the PNG shrimp trawl fishery is poorly documented. Philippson and Lindley (2005) indicate that the fishery began 36 years ago in the Gulf of Papua which is located in the south of Papua New Guinea. According to an individual working in Papua New Guinea in the mid-1970s (R. Kearney, personal communication), the first fishing was by an Australian shrimp company. This was followed by involvement of Japanese fishing companies in the early 1970s.

Kailola (1995) gives some information on the development of the four shrimp trawl fisheries in PNG.

- *The Gulf of Papua* fishery has operated commercially since the late 1960s. In 1976, three companies operated with three licences each. In 1978, two old vessels were commissioned by a joint venture company to fish inside the 3-mile limit and in the same year an old trawler returned to Japan and was not replaced. In 1981, four national companies chartered vessels to operate inside the 3-mile zone while one foreign-owned vessel operated outside the 3-mile zone. This brought the total for that year to 19 vessels. Except for 1981 however, the average number of vessels operating in the Gulf of Papua fishery has been 13-14. During 1986, the number of licensed operators increased to 21, with the introduction of Australian chartered vessels.

- *The Orangerie Bay* fishery is known to be seasonal and geographically restricted to an area of 15.5 sq km. It has been fished intermittently by small class vessels (9–16 m length) since 1981.
- The *Torres Strait* fishery was entirely Australian until 1987 when two PNG vessels entered and by August of that year there were four PNG vessels (Australian boats chartered to PNG companies).
- The *Western Province artisanal* fishery commenced after a 1982 survey to determine the potential for low technology fishing using small boats or canoes. Beam trawls, beach seines and light weight otter trawls were employed and fishing was conducted in 1 to 6 m of water, from Sui on the mouth of the Fly River to Sigabaduru west of Daru. Almost all areas to within ten nautical miles of the shore were trawlable, depending on the state of the tide.

According to Philippon and Lindley (2005), the boats in the PNG shrimp trawl industry are universally old. None presently in the fleet are less than 15 years old and some are more than 30. Generally they are fully amortized. Boats change hand regularly in the fleet.

Production in the PNG shrimp trawl industry has been variable over the past two decades. About 600 tonnes of shrimp worth about US\$4 million was exported in 2004.

Despite interest in experimental shrimp trawling in other parts of the Pacific Islands (e.g. New Caledonia, Fiji, Tonga), no sustained fishing operations have developed. The main lesson learned from that work is that most Pacific Islands have conditions unfavourable for shrimp trawling due to rugged underwater topography, limited trawlable area, and extreme depths. Another important point is that the magnitude of shrimp trawling in the Pacific Islands is actually quite small compared with industrial tuna fishing, with the value of fishing for tuna being about 400 times greater.

OTHER EXPERIENCE WITH INDUSTRIAL FISHING

Other forms of fishing considered to be industrial in scale have occurred at various times in the Pacific Islands. Although large vessels have sometimes been used in this activity, the fact that much of it has taken place inside the reef stretches the working definition of “industrial fishing” used in this paper. This large-scale activity has included:

- **Spearfishing:** This fishery is generally thought of as small-scale, but several rather large-scale operations have been noted in the region, including activity in the northern Marianas, the Solomon Islands, Fiji and Tonga. Typical is the case of the *Wellbeing No. 3*, which was operating in Fiji in late 2005. The 200 GRT vessel carried 15 divers and on a recent two-week trip to the islands to the east of Fiji returned to Suva with 16 tonnes of fish. The vessel is reportedly owned and operated by a Korean company. That company has a second vessel under repair in Fiji and another operating in the Solomon Islands. According to divers aboard the *Wellbeing No. 3*, sometimes (but not always) the spearfishing is done in conjunction with villagers.
- **Lobster fishing:** Pacific Island spiny lobsters have been a magnet for New Zealand and Australian fishermen for years. Fisheries officers in most Pacific Island countries have at least one story to tell about a failed Antipodean lobster-fishing or exporting venture. Many of these ventures use large vessels (some up to 350 GRT) and they all fail, some spectacularly. The issue of why Australians and New Zealanders continue to throw themselves, lemming-like, into Pacific Island lobster ventures is discussed by Adams and Dalzell (1993). They show many reasons why a large-scale operation is not viable and

end with a plea for Pacific rim lobster fishermen and Pacific Islanders alike to embark on such joint ventures with their eyes open – only after some careful research.

- **Live fish collection:** This activity is similar to spearfishing described above in that it uses small-scale fishing techniques (usually hook/line fishing) but the catch is sometimes transferred to a large carrier vessel for transport to East Asia. These carrier operations started in the west of the Pacific Islands area (Palau, PNG) about 15 years ago and have expanded their range eastward reaching as far as Fiji.
- **Illegal giant clam fishing:** This reached its height in the 1970s and 1980s reaching as far east as the Marshall Islands and Fiji. Using mainly old longline vessels from Taiwan (Province of China), divers harvest giant clam muscle from mainly isolated reefs in the east of the region. In recent decades this fishery has been much less active due to declining abundance of giant clams together with increased surveillance capability of Pacific Island countries.
- **Bottom fishing** is an activity that is normally carried out in the Pacific Islands region from vessels less than 15 m in length. Some exploration in larger vessels has been carried out (e.g. in FSM and the Solomon Islands by the Japanese) and large commercial vessels have operated in Fiji and Tonga, but those operations have not continued for very long.

The above large-scale activities are largely based on fishery resources that cannot sustain the fishing pressure that industrial fishing usually entails. Such fishing operations have been sporadic at best, but are likely to re-appear periodically in the future due to market demand.

Perhaps the most important lesson learned in the history of industrial fishing activity in the Pacific Islands is that past sustainable operations have been mainly associated with the tuna resources. Similarly, most industrial-scale opportunities for the foreseeable future are likely to be related to tuna.

REFERENCES

- Adams, T. & Dalzell, P. 1993. Pacific Island lobster fisheries: bonanza or bankruptcy? Fisheries Newsletter, South Pacific Commission Fisheries Programme – Number 67 (October-December 1993), pp. 28–33.
- ADB. 2001. Tuna: A key economic resource in the Pacific Islands – A report prepared for the Asian Development Bank and the Forum Fisheries Agency. Pacific Studies Series, 95 pp.
- Alexander, A. 1902. Notes on the boats, apparatus, and fishing methods employed by the natives of the south sea islands, and results of fishing trials by the Albatross. Report of the Commissioner, Part XXVII, USA Commission of Fish and Fisheries, Washington, 741–829 pp.
- Chapman, L. 2004. Nearshore domestic fisheries development in Pacific Island countries and territories. Information Paper 8, 4th Heads of Fisheries Meeting, Secretariat of the Pacific Community, Noumea, New Caledonia.
- Doulman, D. 1987. Distant-water fleet operations and regional fisheries cooperation. Pp. 33–52. *In*: Doulman, D. 1987, The development of the tuna industry in the Pacific Island Region: An analysis of options. Pacific Islands Development Program, East-West Center, Honolulu.
- Felando, A. 1987. USA tuna fleet ventures in the Pacific Islands. Pp. 93–104. *In*: Doulman, D. 1987. Tuna issues and perspectives in the Pacific Islands. Pacific Islands Development Program, East-West Center, Honolulu.
- Gillett, R. 1994. Pago Pago – Tuna canning in American Samoa. Seafood International Magazine, Volume 9, Issue 11, pp. 15–17.

- Gillett, R. 2003. Domestic Tuna Industry Development in the Pacific Islands: The Current Situation and Considerations for Future Development Assistance. Report 03/01, Forum Fisheries Agency, Honiara, 198 pp.
- Gillett, R. 2004. Tuna for Tomorrow? – Some of the science behind an important fishery in the Pacific Islands. Asian Development Bank and Secretariat of the Pacific Community, Manila, 35 pp.
- Gillett, R. 2005. Artisanal Fisheries in the Pacific Islands: Some Terminology Considerations for Discussions on Fisheries Subsidies within the Framework of the World Trade Organization. Gillett, Preston and Associates, for the Commonwealth Secretariat, 18 pp.
- Gillett, R. & Lewis, A. 2003. A Survey of purse-seine fishing capacity in the Western and Central Pacific Ocean, 1988 to 2003. Gillett, Preston and Associates, for the USA National Oceanic and Atmospheric Administration, 59 pp.
- Gillett, R., McCoy, M. & Itano, D. 2002. Status of the USA western Pacific tuna purse-seine fleet and factors affecting its future. JIMAR Contribution 02-01, Pelagic Fisheries Research Programme, Joint Institute for Marine and Atmospheric Research, University of Hawaii, Honolulu, 64 pp.
- Ikebe, K. & Matsumoto, T. 1937. Survey report on bonito bait in the waters around the Saipan Island. South Seas Fisheries News. 1937(6): 2–12.
- Kailola, P. 1995. Fisheries Resources Profiles: Papua New Guinea. Report No. 95/45, Forum Fisheries Agency, Honiara, Solomon Islands.
- Langley, A., Hampton, J., Williams, P. & Lehodey, P. 2003. The Western and Central Pacific Tuna Fishery: 2002 Overview and Status Of Stocks. Oceanic Fisheries Programme Tuna Fisheries Assessment Report No. 5, Secretariat of the Pacific Community, Noumea.
- Lightfoot, C. & Friberg, C. 1998. The frozen albacore longline fishery: likely profitability and potential development opportunities for Pacific Island Countries. Report 98/2, Forum Fisheries Agency, Honiara.
- Matsuda, Y. 1987. Postwar development and Expansion of Japan's Tuna Industry. Pp. 71–91. *In*: Doulman, D. 1987. Tuna Issues and Perspectives in the Pacific Islands. Pacific Islands Development Program, East-West Center, Honolulu.
- McCoy, M. & Gillett, R. 2005. Tuna longlining by China in the Pacific Islands: A description and considerations for increasing benefits to FFA member countries. Gillett, Preston and Associates, for the Forum Fisheries Agency, 85 pp.
- Peattie, M. 1988. Nanyo – the rise and fall of the Japanese in Micronesia, 1885–1945. Pacific Islands Monograph Series No. 4, Center for Pacific Islands Studies, University of Hawaii, Honolulu.
- Philippson, P. & Lindley, R. 2005. Review of the cost structure and building sustained competitive advantage in the Papua New Guinea domestic fishing industry. Gillett, Preston and Associates, Noumea, New Caledonia.
- Rothschild, B. & Uchida, R. 1968. The tuna resources of the oceanic regions of the Pacific Ocean. *In*: The future of the fishing industry in the United States. University of Washington Publications in Fisheries, 4: 19–51.
- Skipjack Programme, 1984. An assessment of the skipjack and baitfish resources of the Northern Mariana Islands, Guam, Palau, Federated States of Micronesia, and Marshall Islands. Final County Report No. 18, Skipjack Survey and Assessment Programmes, South Pacific Commission, Noumea.
- Smith, R. 1947. Fishery resources of Micronesia. USA Department of the Interior, Fish and Wildlife Service, Fishery Leaflet; 1947(239): 1–46.
- Wilson, P. 1971. Truk live-bait survey. NOAA Technical Report, NMFS Circular. 1971(353): 10 pp.

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