

Developing Sustainable and Equitable Pole and Line Fisheries for Skipjack



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Defending Our Oceans

Executive Summary

Skipjack, the main tuna species eaten across the world, accounts for over half the global tuna catch. Skipjack stocks are at least moderately exploited in all areas, and fully exploited in some areas, such as the Indian Ocean.¹

With all bluefin stocks severely depleted, and bigeye, yellowfin and some albacore stocks also in trouble, even the more robust skipjack fisheries are now under scrutiny for their impacts on juveniles of these more vulnerable species, as well as on the broader marine ecosystem. Growing consumer awareness about the crisis facing our oceans has increased demand for sustainably and equitably caught and produced tuna, particularly in key markets in Europe, the US and Japan.

Today the majority of the world's skipjack is caught by purse seiners set on Fish Aggregation Devices (FADs). Using this fishing method, bycatch levels of other species (including turtles and sharks and juveniles of bigeye and yellowfin tuna) make the practice unsustainable, even though the skipjack itself could be sustainably exploited at levels close to the current catch. High-tech purse seine fleets are often operated by companies from rich industrial fishing nations that leave coastal states with very little of the economic and social benefits derived from the exploitation of tuna resources. On average, coastal states receive a mere 6% of the value of the tuna caught in their waters.²

Greenpeace is advocating that coastal states develop domestic pole and line fisheries, which have the potential to be the most environmentally friendly method of fishing skipjack. The pole and line method is inherently much more selective than other mainstream industrial methods, and if conducted properly it has low bycatch levels.

The Maldives pole and line fishery catches around 30% of the West Indian Ocean skipjack³ and is one of the best-known examples of a successful coastal state-run tuna fishing operation that has yielded impressive socioeconomic benefits for the country. However, while the Maldives is well positioned to meet the rising demand for pole and line caught skipjack, there are a number of sustainability concerns with the fishery that need to be urgently addressed to ensure its long term success and the health of the marine environment. If proper fisheries management is introduced into the Maldives, Greenpeace believes it could serve as a model for other coastal states wishing to develop domestic pole and line fisheries.

Instead of selling their resources for a cheap price to distant water fishing fleets, many coastal states, including Pacific Island Countries (PICs), are in a prime position to develop sustainable pole and line skipjack fisheries. These could provide much needed employment; both in the fishery and across the region in related boatbuilding and maintenance, landing and processing facilities.



In the long-term, the production costs of pole and line are lower, and profit margins are higher than with purse seine. For example, the average cost of producing a ton of tuna caught with pole and line in the Eastern Pacific is about USD 479-525 per ton⁴; whereas the average cost of producing a ton of tuna caught by a purse seiner in the Eastern Pacific is upwards of USD 900 per ton⁵. Building a state-of-the-art purse seine vessel costs around €25 million⁶; and, even if completely controlled by the coastal state, still only provides 25-30 direct employment opportunities. A similar investment could build at least 20 pole and line vessels with freezing capacity⁷ that could directly employ up to 300 people.

Many retailers and tuna labels have indicated that they would be willing to change their entire skipjack supply to pole and line, if it was available. The UK supermarket Sainsbury's has already moved 90% of its canned tuna to pole and line caught methods, and plans to extend this to 100%⁸.

Coastal states, such as Pacific island nations, are well-positioned to build sustainable pole and line skipjack fisheries to meet this demand. Though there were problems with pole and line fisheries in the Pacific in the past, there is every reason to believe that the huge progress in recent years in fisheries science, coordination, information sharing and building up of technical capacity – largely thanks to the work of the Forum Fisheries' Agency (FFA) and the South Pacific Commission (SPC) - means they would easily be able to overcome the past challenges.

If Pacific island countries were to develop domestic pole and line fisheries today, the islands could regain control of their precious tuna resources, and reap significant environmental and socioeconomic benefits for the region.



1) Introduction

Skipjack is the main tuna species eaten across the world, and accounts for over half the global tuna catch. Skipjack stocks are at least moderately exploited in all areas, and fully exploited in some areas, such as the Indian Ocean⁹.

The majority of the world's skipjack is now caught by purse seiners set on Fish Aggregation Devices (FADs). Using this fishing method, bycatch levels of other species (including turtles and sharks and juveniles of bigeye and yellowfin tuna) make the practice unsustainable, even though the skipjack itself could be sustainably exploited at levels close to the current catch. Purse seine fleets are often operated by companies from rich industrial fishing nations that leave coastal states with very little of the economic and social benefits derived from the exploitation of tuna resources. On average, coastal states receive a mere 6% of the value of the tuna caught in their waters¹⁰.

Instead of selling their resources for a cheap price to distant water fishing fleets, many coastal states, including Pacific Island Countries (PICs), are in a prime position to develop sustainable pole and line skipjack fisheries, which could provide much needed employment; both in the fishery and across the region in the related boatbuilding and maintenance, landing and processing facilities needed.

Greenpeace is advocating that coastal states develop domestic pole and line fisheries, which have the potential to be the most environmentally-friendly method of fishing skipjack if managed correctly. Because the pole and line method is inherently much more selective than other mainstream industrial methods, such as purse seine or long line, pole and line fisheries have low levels of bycatch if conducted properly. As the fish are caught one-by-one, the operation can be stopped at any stage if undersized fish get hooked.

To ensure the sustainability of skipjack fisheries, any increase in pole and line must go hand-in-hand with adequate capacity reduction in other sectors of the fishery.

The quality of pole and line caught skipjack is also much higher than that of fish caught using other methods, as every fish caught is brought on board alive. Moreover, high histamine levels should not be a problem in pole and line caught tuna, provided the fishing boat does

not catch more tuna than it is capable of chilling adequately.

Currently only a handful of countries, such as the Maldives in the Indian Ocean, have developed pole and line skipjack fisheries. This means there is not enough supply to meet the growing demand for sustainable and equitably caught and produced tuna in European, US and Japanese markets.

Many retailers and tuna labels have indicated that if it was available they would be willing to change their entire skipjack supply to pole and line. The UK supermarket Sainsbury's has already moved 90% of its canned tuna to pole and line caught methods, and plans to extend this to 100%¹¹.

Coastal states are well-positioned to build sustainable pole and line skipjack fisheries to meet this demand. In the long-term, the production costs are lower and profit margins are higher than with purse seine.

For example, the average cost of producing a ton of tuna caught with pole and line in the Eastern Pacific is about USD 479-525 per ton¹²; whereas the average cost of producing a ton of tuna caught by a purse seiner in the Eastern Pacific is upwards of USD 900 per ton¹³. Pole and line fisheries in the Maldives¹⁴ and Ghana¹⁵ are also reported to be more economical and environmentally-friendly than purse seine fisheries.

Pole and line skipjack also commands higher prices; in the Netherlands, for example, Maldivian pole and line skipjack in brine is sold for €1.90, whereas a similar tuna product caught with a purse seine can sell for a little as €0.80.¹⁶ In the UK market, the premium payable for pole and line caught skipjack can be up to 5%.

For coastal states, pole and line fisheries also offer greater employment opportunities. Building a state-of-the-art purse seine vessel costs around €25 million¹⁷ and, even if completely controlled by the coastal state, provides only 25-30 direct employment opportunities. In contrast, a similar investment could build at least 20 pole and line vessels with freezing capacity¹⁸, which could directly employ 225-300 people. Additionally, the maintenance and supply needs of a locally-owned and operated fleet could provide a sustained source of indirect employment.

Skipjack tuna are unloaded at a cannery where they are going to be processed.



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1.1) The pole and line skipjack fishery, and associated bait fishery¹⁹

Pole and line is a simple method of catching tuna with hook and line attached to a long pole. **The fishing method is comprised of two interlinked fisheries; one for live bait and one for tuna.** The target species of pole and line fisheries are skipjack, albacore or yellowfin tuna. In skipjack fisheries, between 70-100% of the final catch is the target species.^{20,21} Most of the remaining catch is other species of tuna, including juvenile yellowfin, which is mostly kept on board and used for local consumption. Skipjack are caught from free-swimming schools or around FADs and seamounts. Schools of skipjack prefer to swim close to the ocean surface seeking prey; when they find it they enter a “feeding frenzy”, during which they will bite anything that moves in the water, including the hook of a pole and line.

When live bait is released into a school of skipjack, the hungry tuna display this same feeding frenzy behaviour, and the tuna are easily caught one after the other. The fish are either landed within hours of catch, or stored in ice or frozen in brine on board the vessel.

Numerous different types of fishing boat can be used for pole and line fishing. In the Maldives, for example, the fishing is done from the stern, whereas Japanese-style boats fish from the bow. An average-sized vessel uses up to 20 poles at a time.

Bait fisheries target various species of small pelagic fish such as sprats, anchovies, caesio or juvenile fusiliers. Fishing operations are mostly at night, with a typical night-baiting exercise taking place near a beach or lagoon reef (or inside an atoll) in water between 4-20 metres deep.

Bait fish are attracted by use of a light. Once the school surfaces and forms a tight aggregation, a net is quickly hauled and the bait dumped into the flooded hull or a holding tank.

Developing aquarist skills to keep bait fish alive is one of the biggest technological challenges of the pole and line fishery²². Both the fishing distance from bait fish grounds and the time the fishing boat can stay at sea catching tuna are determined by how long the bait fish lives. Commonly-used techniques enable bait to be kept alive for around seven days²³, although Japanese long-range pole and line fleets are reportedly able to keep their catch alive for as long as three months²⁴. It would also appear that the longer bait can be kept alive, the fewer are needed during tuna fishing operations, as fishermen will use them more sparingly to extend the time they can stay out at sea²⁵.

1.2) Sustainability issues with bait fisheries

Because the bait fisheries use tightly woven nets there is some bycatch of non-target reef species, usually somewhere between 0-30%.²⁶

To date, few studies exist on the ecosystem-level impact of the removal of large amounts of bait fish from lagoons, but it is clear these species provide an important basis for tropical coastal and oceanic food chains. So, although it is generally considered hard to overfish small fecund fish species such as sprats, the importance of these species to the tuna fishery, to reefs and lagoons, as well as to open ocean ecosystems means they must be managed according to ecosystem approach and the precautionary principle.

The impacts of the bait fishery on other reef-associated fish species also needs to be carefully regulated, as conflicts with the food needs of local communities have been reported in the past. They must also be monitored to ensure they do not use destructive methods that damage marine habitats.

2) The Maldivian pole and line skipjack fishery²⁸

The Maldives pole and line fishery catches around 30% of the West Indian Ocean skipjack²⁹ and is one of the best-known examples of a successful coastal-state-run tuna fishing operation that has yielded impressive socioeconomic benefits for the country.

The Maldives is spread over 1200 low-lying atoll islands, and has an exclusive economic zone of 1.2 million km²³⁰. Tuna has been the staple diet for the Maldivian population for countless generations. Skipjack is the target of all major fishing operations in the islands, accounting for over 75% of fish landings. Other higher-value tuna species caught in the Maldives include yellowfin and bigeye.

Over the years the skipjack fishery has been developing steadily and catch has been increasing. Technological developments have enabled fishing operations to increase the area they fish in, but most fishing still takes place within 75 miles of the coast.

If managed sustainably, the Maldives could serve as a model for other coastal states, but there are serious concerns that have to be addressed first; the fishery is open access, with no entry or landing restrictions for locals, and there is no management plan for either the bait or tuna fishery. These concerns are outlined in section 2.3.

2.1) Development of the Maldivian pole and line fleet and tuna processing industry

Skipjack has been caught on the Maldivian islands by the pole and line method for at least 600 years; traditional pole and line boats – *dhonis* - were made of coconut planks and operated by sails and paddles, today they are engine-powered and made of wood or fibreglass. The mechanisation of dhonis from the mid 1970s revolutionised the Maldives fisheries industry, allowing for greater speed and manoeuvrability on the fishing grounds, as well as improved maintenance of bait on board.

The development of fleets in the Maldives is ongoing; larger and faster fibreglass *Masdhoni* (large dhoni) have been built on the islands since 1997. In 2003 the number of fishing vessels was estimated at approximately 1300, a slight decline from previous years, but the size and power of the vessels has increased steadily³¹. Despite some studies indicating that the fleets are already operating uneconomically in some sectors of the fishery due to overcapacity³², there is talk about building even more-powerful Masdhonis, something Greenpeace is very concerned about.

The first processing (canning) factory was established in a joint government and private venture in 1977, and in 1979 the Maldives Fisheries Corporation was formed³³. In 2006, the cannery was upgraded from 50t to 1000t capacity. Other facilities include freezer storage, and a loining plant as well as a privately-owned cannery.

In the early 2000s, parts of Maldives Industrial Fishers Company (MIFCO), including some of its processing facilities, were put up for sale to private investors. The private company Horizon is one of the new generation skipjack pole and line operators in business in the Maldives today and buys from a fleet of 60-70 local boats in a similar fashion to MIFCO.

Workers sort processed tuna at a cannery plant in Felivaru, in the north atolls.



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2.2) Socioeconomic benefits of the pole and line industry for the Maldives

The fact that the Maldives has not sold its tuna resources cheaply to distant water fishing nations has enabled the country to establish a prosperous domestically controlled fishery.

Fishing contributes about 7% of the Maldivian GDP³⁴ and is the largest contributor to exports. There are almost 20,000 paid fishermen, out of a total population of 294,000³⁵. The canneries and processing facilities employ additional people; the cannery in Felivaru, for example, employs an additional 800 mainly local workers. The total fish catch was a record 186,000 metric tons in 2005, and export revenue is over USD 100 million,³⁶ of which tuna (including yellowfin) contributes 97%. The tuna is landed locally by the fleets and contributes to food security for the islands; as 20-30% of the catch is consumed locally.³⁷

There is no fixed salary for fishermen, or captains in Maldives; they get their wage by part system³⁸. The socioeconomic benefits of the catching sector, combined with upstream (boatbuilding), downstream (canning, processing) and other associated employment (administration, science, monitoring and surveillance), are huge. Although the industry is now in the hands of the private sector as well as government, government interventions have been instrumental in keeping the industry and livelihoods afloat during hard times when tuna availability has been low or global market prices have fluctuated.

The main markets for Maldivian pole and line skipjack

At the time of research³⁹, skipjack products from Maldives were sold to Japan (for *Katsuobushi*), Thailand (the main market for frozen loins), with canned products going mainly to Europe (including the United Kingdom, Germany, Italy and the Netherlands) under various tuna brands and supermarket own labels.

Although high production (processing) costs in the Maldives give the products a slight disadvantage in these markets, this is offset by the lower operational costs of the pole and line method compared with purse seining⁴⁰.

2.3) Improving the sustainability of the Maldivian skipjack pole and line fishery

As outlined above, the Maldivian pole and line fishery has yielded impressive socioeconomic benefits for the country. If managed properly it could serve as a model for others to follow and for markets to turn to in search of sustainably caught products. However, there are serious concerns that must be urgently addressed to ensure a sustainable and prosperous future for the fishery.

Though the Maldives has, through historical circumstances, ended up developing its fishery in a relatively selective and therefore environmentally-friendly manner, there has been little effort to base the fishery on modern and precautionary fisheries principles. There is no known stock assessment for the skipjack tuna stock in Maldivian waters. It is not clear if the stock is exclusive to the Maldives or is part of the broader Indian Ocean stock⁴¹. Indian Ocean skipjack tuna stocks are currently fully exploited⁴² and there are reportedly a few signs of biological overfishing of skipjack tuna stocks within the Maldives EEZ⁴³.

A reputation for sustainability is crucial to the future of this fishery. A tuna management plan based on the ecosystem approach and the precautionary approach must be developed immediately - one that does not fall into the trap of outdated single-species management based around maximum sustainable yield - and an appropriate cap on the number of vessels involved in the fishery must be determined.

Members of the Indian Ocean Tuna Commission (IOTC)⁴⁴ have grossly mismanaged tuna stocks in the region. Yellowfin tuna in the Indian Ocean is now depleted and highly susceptible to overfishing⁴⁵. Ensuring that highly migratory tuna stocks exploited in the region are sustainably managed is the responsibility of all countries with tuna fisheries in the region, including the Maldives. It is therefore essential that Maldives takes an active role in improving the performance of the IOTC. In a welcome move, the new democratically elected Maldivian Government announced its intention to join the IOTC at the Food and Agriculture Organisation (FAO) Committee of Fisheries meeting in March 2009.⁴⁶

2.4) The Maldivian bait fishery

The Maldivian live bait fishery has been carried out for centuries on the reefs and lagoons of the country's numerous atolls. The main bycatch species taken by the Maldivian bait fishery are surgeon fish (*Acanthuridae*) and wrasses (*Labridae*).

In 1984, annual catches were around 5000 tons of livebait a year, sufficient to support a catch of almost 100,000 tons of tuna⁴⁷. Recent estimates suggest that 25,000 tons of various baitfish species are currently caught throughout the country. In the past several years, fishermen have claimed that baitfish resources are depleted in some locations⁴⁸.

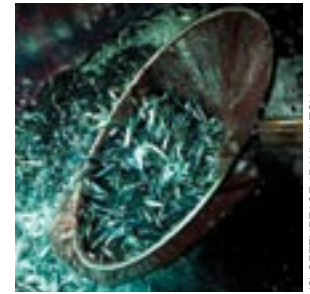
Given that the number of boats is still increasing and that their catch and bait holding capacities are growing, the future sustainability of the bait fishery is in question – as, consequently, is that of every aspect of the skipjack pole and line fishery in the Maldives.

Given the enormous importance of the live bait fishery, it would be prudent to initiate stock assessment activities and to establish a precautionary, ecosystem-based management plan. At present, lack of catch and effort data is a major constraint that needs to be overcome. The selectivity of the bait fishery, and impact on other reef species also needs to be addressed.

Notwithstanding the selectivity of the method itself, the overall sustainability of a pole and line fishery also depends on the associated bait fishery. This is often where the coastal states fall short in having adequate monitoring and management plans in place to ensure the level of bait collected is sustainable. As the long-term success of the pole and line operations depend on the bait, it is of utmost importance that the conditions are set right for the operations and adequate management plans are in place.

A note on traceability: When Greenpeace visited the Maldives, the Maldives Industrial Fishers Company (MIFCO) was able to trace fish back to the date it was caught, but not yet to the boat that caught it. 100% traceability is increasingly becoming a requirement for markets and the Maldives would be wise to explore this early on.

Bait fish used to catch skipjack tuna with the pole and line fishing method.



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2.5) Fish Aggregation Devices (FADs) and bycatch

Traditionally dhonis mostly fished free-swimming schools of skipjack, but since the early 90s FADs have been used to keep the fish schools in fixed locations. There are currently 42 anchored FADs in strategic locations around the Maldives. Fishing captains interviewed by Greenpeace in October 2008 said that they first go to the closest FAD to check fish availability, before using binoculars to search for free-swimming tuna. Anecdotal discussions suggest that 70-80% of the skipjack in the Maldives is now caught around anchored FADs⁴⁹.

Though bycatch in the Maldivian fishery is considered to be within sustainable limits⁵⁰, the catch levels of juvenile yellowfin tuna are of concern and are estimated to be around 15% of the total catch (see Appendix 1). Immature yellowfin often swim within schools of skipjack, and are particularly attracted to FADs. If not managed correctly, this yellowfin bycatch could jeopardise the future of the Maldives pole and line fishery.

If incentives are provided, and management principles introduced (i.e. legal landing limits and requirement to return juveniles live into the sea), the catch of yellowfin could largely be avoided. Fishermen who hook a yellowfin could let it go without causing harm to the fish⁵¹. Alternatively, alterations to the boats could be made so that the fish is landed on a net so that it can be returned to sea unharmed. Fishing masters can also avoid yellowfin-rich schools of tuna, in the same way that they are able to steer clear of schools that contain large amounts of young skipjack.

Although the use of FADs has increased the efficiency of the fishery it should be closely monitored, as studies have indicated it may lead into recruitment overfishing⁵². The removal of large numbers of adult skipjack tuna can cause short-term recruitment overfishing, while the removal of large numbers of juveniles may lead to a smaller spawning stock in future years⁵³. Feeding and other behavior of the tuna could also be impacted by extended stays at the floating objects instead of free-swimming in search of prey.

The Maldives provides an example of a traditional fishery that has fed its people, created impressive socioeconomic benefits and wealth to the Islands over the course of its history. The pole and line fishery is now the largest supplier of skipjack to the markets where demand for pole and line products is rising. Should the bait or the tuna fisheries suffer the consequences for the communities involved would be devastating. To ensure the long-term supply of this tuna, and the associated benefits to the Islands, the Maldivian government needs to urgently base the fishery on precautionary and ecosystem based approaches. If it does so, it can serve as a sustainable model for other coastal states.

3) Prosperous coastal pole and line fisheries in the Pacific?

The Maldives has developed a primarily domestic industry, from boatbuilding to tuna processing, and provides only limited foreign access to its waters. It is a strategy that has yielded impressive socioeconomic benefits to the country. By opening up their waters to foreign fleets, the island nations of the West and Central Pacific Ocean (WCPO) have followed a less-profitable path⁵⁴.

3.1. Current set up of WCPO tuna fisheries

The WCPO is home to the most abundant tuna resources in the world⁵⁵ yet Pacific Island Countries (PICs) only receive a meagre 6% of the USD 3 billion the industry is worth⁵⁶. The total value of access agreements to PICs is close to USD 80 million;⁵⁷ a large proportion of many islands' GDP.

An astonishing 80% of the fishing in the WCPO is by Distant Water Fishing Nations (DWFN); mainly operating purse seiners and longliners.⁵⁸ Although the remaining 20% of vessels are flagged to PICs, many of these are owned and controlled by foreign countries and companies who all too often reap the lion's share of the profits. Development aid from DWFNs is often linked to fishing access agreements, further exacerbating inequitable exploitation of Pacific waters⁵⁹.

The high costs of mainstream fishing methods, such as purse seining, have made it difficult for PICs to develop their domestic fishing industries. The most recent attempts to increase financial and social benefits from tuna in the region have been through the development of domestic tuna processing facilities, as well as some operations exporting fresh tuna for sashimi markets. Out of the PICs, the Solomon Islands, Fiji, the Marshall Islands and Papua New Guinea have canning and loining factories, but these are small by international standards. Among other coastal states in the Pacific region, the Philippines and American Samoa have large canning facilities, and Thailand, the world's largest producer of canned tuna, processes the majority of the WCPO-caught tuna⁶⁰.

It makes far greater economic sense for PICs to invest in pole and line fisheries, which generally have much lower production costs and higher profit margins than purse seining (see introduction). Apart from the canning centres, and refuelling and supply facilities for the fleets across the islands, the PICs derive few socioeconomic benefits from their tuna; many communities live in poverty with few employment opportunities.

Most PICs have expressed their dissatisfaction with this. The 2007 Greenpeace report *Taking Tuna Out of the Can: Rescue Plan for the World's Favourite Fish*⁶¹ shows how allowing foreign fleets to harvest their tuna resource has been disastrous for coastal states.

The Maldives, in contrast, has reaped many socioeconomic benefits from its domestic pole and line fisheries. Many PICs share similar resources, geographical and environmental conditions with the Maldives, there is no reason why they too cannot develop a domestic pole and line skipjack fishery and restrict the number of foreign purse seining fleets in their waters.

Taiwanese fisherman at work transshipping tuna from a Taiwanese purse seiner.



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3.2. Historical pole and line operations in the WCPO

Although today pole and line comprises a small share of current WCPO catches (214,935 tons in 2007), particularly relative to purse-seining (1,739,859 tons in 2007)⁶², it was once the main commercial fishing method for skipjack tuna in the region.

The first substantial fisheries development in the Pacific was Japanese pole and line fleets after World War I. By the mid-1930s, Japanese tuna fishing was well developed in the area with 45 pole-and-line vessels based in Palau, 52 in the Federated States of Micronesia, and 19 in the Northern Mariana Islands.

Most of the production was processed into a dried tuna product *arabushi*, which was shipped to Japan for the production of *katsuobushi* (See Box 1). There were also at least two tuna canneries in operation. At the time, there was little participation by local residents in the tuna industry. All commercial tuna fishing in the area was stopped during World War II.

The Japanese fishery resumed in the 1950s and at the same time the US government began exploratory fishing across the Pacific. By the mid 1970s, Japanese companies had established a 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).

This period also saw an increase in PIC government-owned national tuna fishing companies focusing on pole and line. Fisheries were established in 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).

At the height of its success, Fijian company IKA provided 260 jobs and contributed around 4 million Fijian dollars to Fiji's GDP⁶³. Ultimately, however, none of the national companies remained profitable, and just one small pole and line fleet survives today. The reasons for this, and the ways in which it would be different today are described in subsequent sections.

In the late 1970s pole and line fleets in the WCPO averaged a catch of around 400,000 tons a year, before slowly declining to just above 200,000 tons a year in 2007⁶⁴.

The rapid increase in demand for tuna since the 1980s was met by the growth of purse seine fleets, which allowed this demand to be met with a significant increase in supply. Purse seine caught skipjack has accounted for all the growth in catch since 1985.

The immediate impact of this increased supply was a drop in the price of tuna; the lower prices made many of the already inefficiently managed pole and line vessels unprofitable.

Today, there are 28 Japanese long-range pole and line boats fishing in the WCPO; their total catch in recent years has been around 60,000 to 70,000mt⁶⁵. The only Pacific Island-owned fleet has just nine boats operating out of the Solomon Islands^{66,67}. Other pole and line fisheries targeting skipjack and other species are found in the coastal waters of Indonesia, the Philippines, Mexico, Hawaii and mainland US.

Factors contributing to the past failure of the pole and line industry

The fact that just one pole and line operation in the PICs has survived is astonishing, particularly given the fact that pole and line boats generally have lower operating costs than purse seining fleets, and therefore have a bigger profit margin when they are paid world market prices for their catches.

A combination of bad decisions and poor management practices left Pacific pole and line operations vulnerable to changes in fishing and market conditions. Perhaps the most egregious example was the unnecessarily large size of the vessels donated to the Pacific countries as part of Japanese aid packages. Almost all of these vessels were designed as training pole and line vessels with no thought to basic operational budgets and business principles. Once island governments obtained the vessels they could not afford to run them, so handed them over to national companies - or in some cases private companies - to run. The vessels could not be operated profitably and every one of them was ultimately sunk or tied up⁶⁸.

Some sections of the fleets suffered a poor catch performance that was attributable to a crew payment system whereby the captain and officers were paid a salary, but crew members were paid according to the weight of fish caught. With pay not linked to catch, the captain and officers had little incentive to search for, and then catch, fish⁶⁹.

Other challenges in the Pacific fisheries included issues over the sustainability of the bait fishing operations; they were often conducted near communal lands and waters without either proper consultation with the local communities who owned the resource, or clear stock assessments of key bait fish species. Better stock assessments and local community consultation must be essential components of any future pole and line fishing operations in the region.

In recent years the Pacific has seen huge progress in fisheries science, coordination, information sharing and building up of technical capacity – largely thanks to the work of the Forum Fisheries Agency (FFA), and the South Pacific Commission (SPC). If these institutions undertook coordination of the development of domestic pole and line fleets, there is every reason to believe they would be successful today.

3.3. Potential markets for Pacific pole and line skipjack

There is a fast-growing market demand for pole and line caught skipjack, mainly fuelled by growing consumer awareness about the crisis facing the world's oceans and commercial fisheries.

With all bluefin stocks severely depleted, and bigeye, yellowfin and some albacore stocks in trouble, even the more robust skipjack fisheries are now under scrutiny for their impacts on the juveniles of these more vulnerable species, as well on the broader marine ecosystem.

As a more selective fishing method, pole and line is best placed of all skipjack fishing methods to produce high quality and sustainable products. Additionally, when a fishery is owned and operated by coastal states, with value adding, boat building and other services carried out in the region, it also can be seen as an equitable product. This means the product has the potential to be classed as socially responsible under fair trade market standards⁷⁰.

These elements of sustainability and fairness, together with the higher quality of pole and line caught skipjack tuna, enable the products to achieve higher market prices (see introduction) in the more developed markets of North Europe, the US and increasingly Japan.

Most pole and line caught canned skipjack tuna in these markets, come from the Maldives, with some also imported from the Atlantic (mainly the Azores, Senegal and to a lesser extent Ghana).

There is not a big enough supply of pole and line caught tuna to meet rising global demand for sustainably caught tuna. As earlier indicated many retailers and tuna labels have indicated a willingness to change their entire supply to pole and line if there was availability.

Box 1: Fushi or smoked tuna market in Japan

Islands with sustainable forests with sufficient timber offcuts as well as a good water supply are well-positioned to process skipjack into arabushi for shipment to Japan, where it is processed into katsuobushi⁷¹. The Pacific islands have skipjack with the right fat content for katsuobushi; with appropriate manufacturing processes, such fish will always obtain a premium price. The katsuobushi market is far more valuable than the canned tuna market even when premium prices can be obtained for canned pole and line caught fish.

A schoolgirl from Pohnpei, Federated States of Micronesia displays tins of skipjack tuna.



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3.4. Conclusions and recommendations

Despite the past problems of pole and line tuna fishing in the Pacific, there is every reason to believe such fisheries could be successfully re-established in most areas. Greenpeace considers a number of Pacific Island nations to be in a prime position to develop a world-class supply of sustainable and equitable high quality tuna products.

A number of key PICs have committed to focus more on domestic fishing operations and to increase the economic profitability of the domestic and regional tuna industry for coastal states. Given the sustainability issues associated with current mainstream fishing methods such as purse seining and long lining, and the technological skills and logistical requirements needed to build such fleets, particularly purse seiners⁷² the region would be wise to develop its industry along the lines of the strategy adopted by the Maldives, though with better long-term sustainable management plans.

Correctly managed, re-establishing pole and line fisheries in the Pacific could reap significant socioeconomic benefits to the region, and position it as a long-term source of sustainable and equitable tuna products for world markets.

Those tuna-rich PICs which have potential for successful bait fisheries (see table 1) should consider developing domestic pole and line operations as a priority. The socioeconomic benefits to the countries and communities involved, as demonstrated in the Maldives, are far greater than those of other tuna industry developments.

PICs certainly have people to carry out the labour and pole and line fishing is also a more attractive fishing job compared to long lining or purse seining. Crew on a pole and line vessel in the Maldives for example, only fish until the bait runs out, an hour or two of actual tuna fishing a day. A good part of each day is spent at home, with parts of the night and early mornings focused on bait fishing. Even for those sections of the fleet that may have to spend longer periods at sea, this is usually only a week or so, a far shorter period than the months almost all longliners and modern purse seiners stay at sea.

Moreover, additional employment opportunities can be created through the construction and servicing of the boats. In the Maldives as well as in the Philippines and Indonesia these boats are built locally. There is no reason why regional boat building could not be established in the Pacific to service the needs of the industry.

The costs involved in the set up of the pole and line tuna fishing industry will in the long-term be outweighed by the benefits of a domesticated labour-intensive tuna industry. However, there is still a need to attract investment into the fishery. The global market for the products means local and regional funding partners, including government, private sector and foreign aid agencies, should easily be able to raise the capital needed.

National and regional public private partnerships could also be explored and market players interested in future purchase of the tuna could help provide investment in the support needed to establish facilities that would help meet the strict hygiene, safety and traceability conditions required for modern day market access.

To ensure long-term sustainability, it is essential that governments set appropriate conditions from the outset. National tuna management and bait fish management plans need to be established in advance, with regular scientific monitoring of the fishery and its impacts. Mechanisms must be put in place to ensure that these developments do not result in overcapacity in the fishery. The principles of precautionary and ecosystem based management of the resources must be part of any management plan and governments should commit to establishing marine reserves as part of an ecosystem approach. Social and labour standards need to be regulated and the governments need to monitor the socioeconomic impacts of the industry to ensure the benefits are equitably felt across communities, rather than accumulating in the hands of the few.

The PICs must also cooperate with each other to ensure the maximum benefits of their shared tuna resources are spread across the region. They should pool those processing facilities that already exist, and take care when building new ones⁷³. They must continue to work together under the auspices of the FFA and the Western and Central Pacific Fisheries Commission (WCPFC) to ensure sustainable management of tuna resources across the entire region.

Pacific Country Pole and Line Fishing Potential

Territories and Countries	Habitat	Baitfish Catch	Baitfish Species	Pole and Line potential
Wallis and Futuna	HI	291	AN	B/C
Fiji	HI	180	SA,AN,SP	B
Solomon Islands	HI	148	AN,SA	A
New Caledonia	HI	130	AN,SA	B
Fed. Sts of Micronesia	CO	121	AN, HH SA	B
Papua New Guinea	HI	120	AN,SA	A
Average		165		
Tuvalu	AT	100	SP	C
Palau	AT	97	AN, SP	B
Western Samoa	HI/LL	80	AN	C
French Polynesia	CO	78	SA,SP	C
Marshall Islands	AT	76	SA,HH	B
Kiribati	AT	57	SA,SP,AN	C
Average 81		81		
Cook Islands CO 39 15	CO	39	SP	D
American Samoa HI/LL 36 5	HI/LL	36	AN, SP	D
Vanuatu HI/LL 35 5	HI/LL	35	SP, AN	D
Tonga CO 34 32	CO	34	AN,HH,SP,SA	C
Average 36		36		
Pitcairn Islands IS	IS	0	0	0
Niue IS	IS	0	0	0
Nauru IS	IS	0	0	0
Tokelau AT	AT	0	0	0
Norfolk Island IS	IS	0	0	0

The Albatun Tres, the world's biggest tuna fishing vessel, known as a super super seiner. The ship can take 3000 tonnes of tuna in a single fishing trip which is almost double the annual catch of some Pacific island countries.



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Source: Compiled by Robert Stone from existing literature and data from the region, principally: A.D. Lewis "Tropical South Pacific Tuna Baitfisheries". ACIAR Proceedings No. 30. Proceedings of a workshop, Honiara, Solomon Islands, 11-13 December 1989

Notes.

1. Wallis and Futuna have a good potential for pole and line development but the bait area is limited so caution should prevail.
2. Potential for development or re-development of pole and line fishery has been indicated from A-D
A 59-99 GT class, B 59 GT class, C Artisanal, D small scale artisanal
3. Gross tonnage (GT) is a method of measuring size of a vessel and refers to volume rather than weight.

Habitat:

- HI - high islands dominant
- CO - high islands and atolls
- AT - atolls
- IS - high islands no reef
- LL - limited lagoon

Baitfish catch:

kilogrammes per haul (average)

Baitfish species:

- Dominant species -
- AN - anchovy
- SA - sardine
- SP - sprat
- HH - hardyhead

Pole and Line potential:

Potential for development or re-development of pole and line fisheries.

- A - 55-99 GT class
- B - 59 GT class
- C - Artisanal
- D - Small-scale artisanal

Carbon emissions and the tuna industry

Climate change is the greatest threat facing our planet, and our oceans. Low-lying islands and coastal regions are already suffering impacts, including impacts on food security. The fishing industry will be hit by rising sea-levels, increasing acidification, changing currents and temperatures and intensified storms; and countries in tropical regions are predicted to be some of the hardest hit.

The fishing sector of the Pacific and elsewhere must ensure CO₂ emissions from their activities, from fishing to processing and transport, are kept as low as possible.

The carbon footprint of food products entering markets, especially in Europe and the US, is an increasingly prominent issue, particularly among the sustainable, organic and fair trade food sectors where pole and line skipjack has the biggest potential.

From catch to packaging to transport, most seafood products currently have an unacceptably high carbon footprint.

It is important that any future pole and line industry in the Pacific takes a holistic approach to reducing its CO₂ emissions from ship to shelf. Since most of the pole and line boats for the Pacific need to be built from scratch, energy-efficient vessel designs that emit as little CO₂ as possible must also be explored. Electric engines, sails for extra propulsion and solar energy, together with energy-efficient and sustainable materials, are the obvious options. Bulk shipping should be the preferred mode of transport where possible and, as production of tin cans has a heavy carbon price, alternative environmentally friendly packaging should be explored.

appendix 1

A table showing the catch of skipjack and yellowfin in the Maldives pole and line fishery between 1985 and 2005 and the percentage catch of yellowfin. Graph adapted from a presentation by Dr. M. Shiham Adam, 4 November, 2008

Maldivian Skipjack and Yellowfin Catch (tonnes) 1985 - 2005

Year	Skipjack	Yellowfin	Total	% Yellowfin Catch
1985	42,005	5,715	47,720	12%
1986	45,099	5,178	50,277	10%
1987	41,676	6,522	48,198	14%
1988	57,966	6,366	64,332	10%
1989	57,671	5,972	63,643	9%
1990	59,724	5,225	64,949	8%
1991	58,715	7,649	66,364	12%
1992	58,269	8,628	66,897	13%
1993	58,452	10,006	68,458	15%
1994	68,453	12,859	81,312	16%
1995	69,406	12,319	81,725	15%
1996	65,794	12,276	78,070	16%
1997	68,066	12,838	80,904	16%
1998	77,489	13,822	91,311	15%
1999	91,721	14,155	105,876	13%
2000	79,455	12,139	91,594	13%
2001	87,847	14,540	102,387	14%
2002	113,652	21,502	135,154	16%
2003	103,864	19,546	123,410	16%
2004	109,438	22,441	131,879	17%
2005	131,121	21,461	152,582	14%

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- 73** There are already indications that more tuna canning facilities have been established globally than what is sustainable so investments into new facilities should be done cautiously.

GREENPEACE

Greenpeace is an independent global campaigning organisation that acts to change attitudes and behaviour, to protect and conserve the environment and to promote peace.

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April 2009

GPI REFERENCE JN225

DESIGN & LAYOUT
GPI Communications

COVER IMAGE
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Printed on 100% recycled post-consumer waste with vegetable based inks.