

The Promotion of Pole-and-Line Tuna Fishing in the Pacific Islands: Emerging Issues and Lessons Learned



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Executive Summary

The study	This study examines the various issues associated with promoting pole-and-line fishing and attempts to derive lessons from experience that may guide future development efforts. The study aims to determine what has been achieved in the promotion of pole-and-line fishing, where areas of opportunity lie, and how appropriate the current development models are.
Pole-and-line promotion	“Pole-and-line promotion” is considered in this study to be those activities that contribute to the creation, enhancement, or revitalisation of pole-and-line fisheries and/or the associated baitfisheries – at a level higher than that of a single entity.
Evolution of pole-and-line fishing in the Pacific Islands	Pole-and line catches from vessels based in the Pacific Islands area reached a maximum about 30 years ago. At that time the number of locally-based pole-and-line vessels operating in the region was about 100 to 120. This number declined to 14 in 2002, and to 12 in 2006. During a survey for the present study, the only pole-and-line vessels operating the central Pacific were one vessel each in the Solomons Islands, Palau, and Hawaii.
Current pole-and-line fishing in the Pacific Islands	The Hawaii and Palau operations are the unprofitable last remnants of fishing fleets in a classic decline. Emotional attachment to the vessels, rather than financial gain, plays a major role in continuing the fishing activities. The Solomon Islands operation represents a cautious re-entry into pole-and-line fishing by a large vertically-integrated firm
Pole-and-line production outside the Pacific Islands	The major pole-and-line producers are Japan (about 125,000 tonnes of skipjack and yellowfin annually), Indonesia (100,000 tonnes), and the Maldives (100,000 tonnes). The world’s production is about 400,000 tonnes annually, some of which is for domestic consumption. There are between 100,000 and 150,000 tonnes of pole-and-line caught skipjack and yellowfin on the international market.
Developments in the UK tuna market	There has been a flurry of NGO activity in the UK recently, intended to raise consumer awareness about fisheries sustainability issues and to pressure major brands to adopt more sustainable sourcing policies, including the purchasing of pole-and-line tuna. Several chains of retail stores have made some form of commitment to pole-and-line purchasing. It should be noted that those are not binding agreements, nor is there an obligation to continue the agreements in perpetuity. There has been recent talk of “a gold rush for pole-and-line tuna” and now pole-and-line tuna is apparently receiving a premium over purse seine tuna.
MSC certification of FAD-free tuna	A crucially important point relating to the demand for pole-and-line tuna is the MSC certification of FAD-free purse seine tuna. It is quite likely that current commitments to buying only pole-and-line tuna could evolve into commitments not to buy tuna from FAD-associated purse seine fishing – should a certified product become available.
Environmental and social considerations of pole-and-line fishing	The very positive environmental and social aspects of pole-and-line fishing are well-documented, and include benefits related to labour and catch composition. Pole-and-line vessels use between eight and nine times more labour per unit of tuna than purse seining. In general, the non-skipjack catch of pole-and-line fishing is lower than that of free-school purse seining and considerably lower than that from FAD-associated purse seining. There are, however, some aspects of pole-and-line fishing that have negative environmental implications: issues relating to baitfishing and relatively high fuel use.

Investment in pole-and-Line fishing	To some extent an examination of investment in pole-and-line operations can provide some insight into the success of pole-and-line promotion efforts. The very limited amount of recent investment in pole-and-line fishing in the region supports the contention that it is difficult to identify many cases of success in pole-and-line promotion. The lesson appears to be that “talk is cheap” when it comes to making investments in pole-and-line fisheries.
Success of pole-and-line promotion	In the last twenty years success in pole-and-line promotion has been elusive. In the Indian Ocean there is little evidence to indicate that any of the interventions have resulted in significant creation, enhancement, or revitalisation of pole-and-line fisheries, with the possible exception of the Maldives. In the Pacific Islands judging success is complicated by the recent nature of many of the FFA promotional activities. In a different sense, generation of demand for pole-and-line tuna by public campaigns has been quite successful, especially in the UK – where the current situation has been described as a “gold rush for pole-and-line tuna”.
The Greenpeace publication on pole-and-line fisheries	The Greenpeace publication “Developing Sustainable and Equitable Pole and Line Fisheries for Skipjack” appears to be the most widely circulated document promoting pole-and-line fishing – and therefore deserves some scrutiny. The statements in the publication on the environmental and social aspects of pole-and-line fishing are quite accurate and commendable. The document, however, indicates that the economics of pole-and-line fishing are more favourable than they actually are. The economic issues in question are not merely “details”, but rather are at the core of the difficulty of establishing pole-and-line fisheries in the Pacific Islands.
Baitfishing	In the Pacific Islands the availability of bait, rather than tuna, has often been the resource factor limiting expansion of a pole-and-line tuna fishery. The main lessons from extensive SPC baitfish work in the late 1970s is that the large islands in the west of the Pacific Island region have the best potential for bait-fisheries for pole-and-line fishing. Small islands in the east and atolls have the least potential.
Mitigating the scarcity of baitfish	There have been a large number of efforts over the last four decades to develop ways of getting around the scarcity of baitfish. There is no evidence to show that any of these attempts have resulted in a remarkable improvement in productivity, or a reversal of the demise of pole-and-line fishing. This has implications for proposals to revitalize pole-and-line fishing in the region that are based on innovative baitfishing schemes.
FFA baitfishing work	The major elements of the proposed FFA baitfishing schemes are the use of the Indonesian “ <i>bagan</i> ” baitfishing technique, community involvement in baitfishing, and the use of baitfish management plans. The strengths and weaknesses of these elements are discussed. In conclusion, it cannot be automatically assumed that bagans, community involvement, and management plans will resolve baitfishing problems experienced in the past.
Financial information	Information from a company in the Solomon Islands shows high production costs and low productivity of pole-and-line fishing relative to that of purse seining. Historical information from pole-and-line fishing in PNG shows that the real price of tuna today is less than half the price of what it was during the height of the fishery 30 years ago.
Economics of large-scale and small-scale pole-and-line operations	The economics of the <u>large-scale</u> pole-and-line operations are reasonably well known, at least to the types of companies capable of investing in such ventures. The economics of <u>small-scale</u> pole-and-line operations represent “uncharted territory” and there is considerable speculation involved in <i>anybody</i> making annual catch estimates, considering the unpredictability of small-scale producers, especially in a complex fishing operation located in a developing country that involves both tuna fishing and bait fishing.

Types of pole-and-line fisheries being contemplated

Many people promoting pole-and-line feel strongly that the development of the fishery should be led by the private sector, but the results of the present study indicate that most companies that may have an interest in pole-and-line have commercial-type priorities: catch lots of fish cheaply, stick them into cans, and sell them at a premium in the EU market – and certainly not get into the details of community-level development work. In some respects, the factors that make pole-and-line fishing attractive to NGOs and governments of Pacific Island countries are precisely the things that commercial tuna companies want to avoid: long-term village commitments, issues of social equity, and purchasing products from rural producers of unknown reliability. This situation is altered somewhat by community development obligations stipulated in on-shore investment agreements of some Pacific Island Countries.

Positive features and innovations

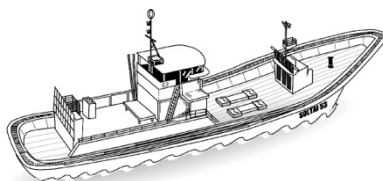
Numerous factors affecting pole-and-line success have degraded in the past few decades. It is important, however, to identify features/innovations perceived to have improved – and scrutinize them for their likelihood of occurring and magnitude of positive contribution. The most important positive factors/innovations that emerged in this study appear to be: (a) premiums for pole-and-line tuna, (b) new vessel designs, and (c) a new baitfishing scheme.

The opportunity for pole-and-line development

There is a great amount of uncertainty associated with this subject, as evidenced by the wildly differing opinions on pole-and-line potential held by the large number of people interviewed in the present study. Nevertheless, some thoughts on potential may be useful – if for no other reason than encouraging a rigorous debate on the subject. The opportunity for large-scale pole-and-line development in the region is highly dependent on a significant rise in the current premium for pole-and-line tuna. The future of the premium is far from clear, but a rise is unlikely to occur if the FAD-free purse seine fishery in the region is certified and remains certified. The opportunity for small-scale pole-and-line development is highly dependent on a significant amount of long-term support through government or donor funding. Following from this and using information presented in this report (trends in the fleet, success of pole-and-line promotion elsewhere, recent investment, bait-fishing potential), the opportunity for pole-and-line development in the Pacific Islands region could be described as “modest at best”, with considerable differences between countries.

The main lesson in pole-and-line promotion

The main lesson appears to be that the pole-and-line development or revitalization in the region is a very difficult task and certainly not as easy as stated in some of the NGO promotional literature. Experience from other regions seems to indicate that the Pacific Islands is not the only region struggling to succeed in pole-and-line promotion.



1.0 Introduction

1.1 Background

A significant amount of effort has gone into the promotion of pole-and-line tuna fishing in the past decade, including initiatives of the Forum Fisheries Agency, World Wide Fund for Nature, Greenpeace, other NGOs, government fisheries agencies, and private companies.

Much publicity has been generated on the value of pole-and-line fishing, and there is general agreement on the many positive environmental and social aspects of the fishing method. By contrast, many fisheries specialists in the Pacific Islands region express concern over the commercial viability of pole-and-line fishing operations, even considering recent market developments. The reality is that actual investment by the various stakeholders in the opportunities mentioned has been slow in forthcoming.

At this point, the way forward with pole-and-line development is uncertain. There is no consensus on the existence of opportunities or the interventions required to take advantage of any opportunities.

Now may be an appropriate time to review the situation. Ideally, wishful thinking associated with pole-and-line fishing should be separated from opportunities that are based on commercial realities and grounded in past experience.

The current study examines the various issues associated with promoting pole-and-line fishing and attempts to derive lessons from experience that may guide future development efforts. The study aims to determine what has been achieved in the promotion of pole-and-line fishing, where areas of opportunity lie, and how appropriate the current development models are.

1.2 Methodology

The 35-day study commenced with a visit to headquarters of the Forum Fisheries Agency (FFA) in Honiara to finalize details of the consultancy, carry out technical consultations with FFA's Development Division, and obtain the available reports and data on the FFA's work on pole-and-line promotion. Travel was subsequently undertaken to the three locations in the western and central Pacific Ocean (WCPO) where companies are currently conducting pole-and-line fishing: NFD in Honiara, the Kuniyoshi Fishing Company in Koror, and the M/V Nisei operation in Honolulu. Visits were also made to the offices of several agencies involved in promoting pole-and-line fishing.

The views of the wide range of stakeholders involved in pole-and-line fishing were obtained, including those of NGOs, operators of commercial fishing companies, crew of pole-and-line vessels, people involved in tuna trading, managers of chains of retail stores who have made commitments to purchase pole-and-line fish, and individuals that are especially knowledgeable as to the opportunities and limitations of pole-and-line tuna fishing. The list of the 70 people contacted during the study is given in Appendix 1.

The consultant recruited by FFA to conduct the study should not be considered an expert in pole-and-line fishing. He was exposed to the fishery in many Pacific Island countries while serving aboard the SPC-chartered Japanese pole-and-line vessel 1977-80, and subsequently maintained an interest in the subject. The consultant was involved in some tuna baitfish work in a few countries of the region in the 1980s/90s, did a limited amount of work on pole-and-line fishing in Indonesia and the Maldives, was on the board of directors of a pole-and-line fishing company, catalogued pole-and-line fishing capacity in the WCPO in the mid-2000s, and carried out two global studies of small-scale tuna fisheries.

The Forum Fisheries Agency funded this study - except for the travel component, which was paid for by the International Seafood Sustainability Foundation (ISSF). ISSF, however, maintained a distance from the study – and was not involved in formulating the terms of reference and did not have any editorial control over the present report. Operationally, the role of the foundation was limited to facilitating access to individuals and information.

This report is an abridged version of a document prepared for FFA. The earlier version contained information on internal processes and future FFA work programme priorities that would not be of much interest to a general audience. This latter version contains some updates and verification.

Some of the terms and conventions used in this report required clarification:

- All mentions of “pole-and-line fishing” refer to live-bait pole-and-line fishing for tuna.
- Pole-and-line fishing does not include the pearl-shell *bonitier* fishing of French Polynesia, as that technique is closer to trolling and does not use live bait.
- “Pole-and-line vessel” is taken to be equivalent to the term “baitboat” commonly used in the eastern Pacific, and “aku boat” used in Hawaii.
- “Pole-and-line promotion” is considered to be those activities that contribute to the creation, enhancement, or revitalisation of pole-and-line fisheries and/or the associated baitfisheries – at a level higher than that of a single entity.
- It is recognized that a significant amount of albacore is caught by pole-and-line, but for simplicity “pole-and-line tuna” (unless otherwise stated) refers to the typical mixture of skipjack and yellowfin caught by pole-and-line fishing in developing countries.
- For the purpose of this report, the “region” is defined as being the area of Pacific Island countries.
- Unless otherwise stated, all currency is expressed in US dollars.

2.0 General Information on Pole-and-Line Fishing

2.1 The History of Pole-and-Line Fishing in the Pacific Islands

Various forms of live-bait pole-and-line fishing for tuna have been practiced for centuries by Pacific Islanders. The classic treatise “*Offshore Fishing in the Society Islands*”¹ contains a chapter on traditional live-bait tuna in fishing French Polynesia. Similar fisheries existed in other parts of Polynesia and in Melanesia (e.g. Manus Island of Papua New Guinea).

Commercial pole-and-line fishing began in the Pacific Islands when Japan directed substantial effort to developing various industries in its territories in Micronesia that were taken from Germany during World War I.² Three commercial tuna pole-and-line fishing operations were established in Palau in the late 1920s. The primary interest was pole-and-line tuna fishing and secondarily tuna longlining. 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. Japanese tuna catches in Micronesia reached the highest level of 33,000 tonnes in 1937. Most of the production was processed into the dried tuna product “katsuobushi” which was shipped to Japan. 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.

¹ Nordhoff, C. (1930). Notes on the Offshore Fishing in the Society Islands. Volume 39, Numbers 2 and 3, Journal of the Polynesian Society.

² Much of this section is a condensation of the information in: Gillett, R. (2007). A Short History of Industrial Fishing in the Pacific Islands. Publication 2007/22, Asia-Pacific Fishery Commission, Food and Agriculture Organization of the United Nations, Regional Office for Asia and the Pacific Islands, Bangkok.

Tuna fishing activity in post WW II 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. 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 and during the next ten years were fishing well south of the equator.

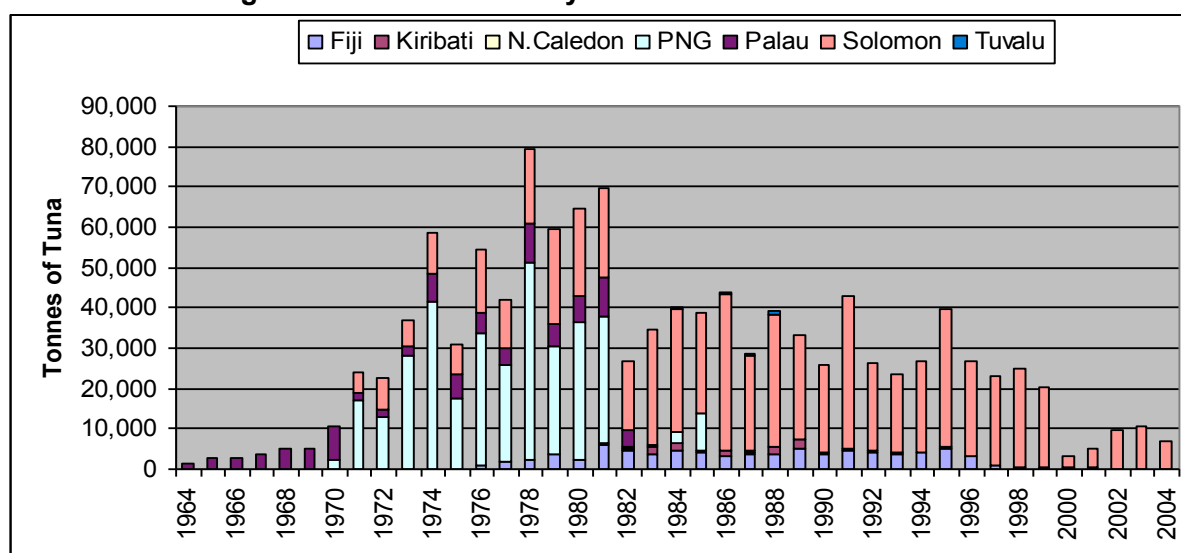
Significant American tuna initiatives were also underway. During World War II the US government commandeered 49 California-based tuna pole-and-line vessels for service in the Pacific. This activity was apparently quite instrumental in creating an awareness in American tuna fishermen of the size and fishery potential of the western Pacific region. During the late 1940s and early 1950s exploratory cruises were carried out by US 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 Micronesia from the Marshall Islands to Palau. This was followed by other major American initiatives, including the Van Camp pole-and-line base in Palau in 1964.

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 in 1977. Japanese companies had established through various arrangements 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).

Another important tuna development in the Pacific Islands area in the 1970s was the start of the era of government-owned national tuna fishing companies. Many of these were involved in pole-and-line fishing, including Fiji (Ika Corporation), Tuvalu (NAFICOT), and Kiribati (Te Mautari), and the joint venture (Solomons/Japan) firm Solomon Taiyo. Additional attempts to establish pole-and-line fishing occurred in other Pacific Island Countries: the Federated States of Micronesia (Pohnpei, Chuuk), New Caledonia, Samoa, Tonga, Cook Islands, and French Polynesia.

The rise and fall of the Pacific Island pole-and-line fisheries is shown in Figure 1³.

Figure 1: Tuna Catches by Pacific Island Pole-and-Line Fleets



³ Constructed from various SPC yearbooks, especially: L Lawson, T. (1998). Tuna Yearbook 1997. Secretariat of the Pacific Community, Noumea.

As can be seen from Figure 1, the pole-and-line catches from vessels based in the Pacific Islands area reached a maximum about 30 years ago. At that time the number of locally-based pole-and-line vessels operating in the region was about 100 to 120 vessels. The number of pole-and-line vessels had declined to 14 in 2002 (based in Solomon Islands, Palau, Fiji), and to 12 in 2006⁴. During a survey for the present study (March 2011) the only pole-and-line vessels operating the central Pacific were one vessel each in the Solomon Islands, Palau, and Hawaii.

There are several reasons for the decline in the pole-and-line fishery. One of the most important is the inability to compete economically with the more efficient purse seining – the early 1980s corresponded to a period when the number of purse seine vessels operating in the Pacific Islands increased rapidly. Also to be considered is that several of the Pacific Island pole-and-line fleets were actually operated by government fishing companies, an arrangement that is rarely profitable in any fishery. A study of the demise of the PNG fishery⁵ concluded that additional factors involved were low profitability, the cyclical downturn in the tuna market which occurs every 3-4 years, a recession in the USA, prevailing high interest rates, and a movement by canners to disengage from fishing operations.

2.2 Current Pole-and-Line fishing in the Pacific Islands

There are currently only three pole-and-line vessels operating from bases in the Pacific Islands. Appendix 2 describes the activities of the Honolulu-based pole-and-line vessel “Nisei”, the Koror-based “Marine Star”, and the Noro-based “Solomon Endeavor”.

In summary, the Honolulu and Koror operations are the unprofitable last remnants of fishing fleets in a classic decline. Emotional attachment to the vessels, rather than financial gain, plays a major role in continuing the fishing activities. Both of those operations sell fish exclusively to domestic fresh fish markets.

The Solomon Islands operation represents a cautious re-entry into pole-and-line fishing by a large vertically-integrated firm with substantial experience in the fishery, both in the Solomon Islands, and in the international trading of tuna. That company, National Fisheries Developments Ltd (NFD), also operates purse seiners in the Solomon Islands. NFD remains somewhat sceptical of the economics of the pole-and-line fishery, but on the other hand, has some pole-and-line assets and is located in a country where there is strong government support for pole-and-line development. When contemplating further investments in the Solomon Islands, NFD must weigh investing in pole-and-line fishing with investing in purse seining or processing.

Japan-based pole-and-line vessels have also been very active in the Pacific Islands region. The activities of that fleet in the Pacific Islands area reached a peak in 1977 when over 300 pole-and-line vessels fished the area and caught 154,296 tonnes of tuna⁶. The distant water vessels (larger than 300 GRT) fish skipjack in the tropical waters and the north equatorial current area from the late 4th quarter to the early 2nd quarter, and turn to north of around 35°N, east of 150°E where they target albacore from June to October.⁷ Those vessels, now numbering about 30, catch about 30,000 tonnes of tuna in the Pacific Islands area, and transport live bait from Japan for their fishing activities. Many Japanese pole-and-line vessels make use of crew from Indonesia and Kiribati.

⁴ Gillett, R. (2008). A Study of Tuna Industry Development Aspirations of FFA Member Countries. Forum Fisheries Agency, Honiara, 70 pages.

⁵ Doulman, D. and A. Wright (1983). Recent Developments in Papua New Guinea's Tuna Fishery. Volume 45, Marine Fisheries Review, Oct/Dec.

⁶ Lawson, T. (1998). Tuna Yearbook 1997. Secretariat of the Pacific Community, Noumea.

⁷ Fisheries Agency of Japan (2010). National Tuna Fisheries Report of Japan. Annual Report to the Western and Central Pacific Fisheries Commission, Sixth Regular Session, Scientific Committee.

2.3 Factors Responsible for the Continuation of Pacific Island Pole-and-Line Fishing

For the current study it was originally anticipated that the current pole-and-line operations based in the Pacific Islands would be examined to determine the factors that allow them to continue – with a view to replicate those favourable factors in other countries. There is, however, little point in doing so when the concerned operations appear to be the last stages in the demise of a fishery – as is the case in Palau and Hawaii. Similarly, the Solomon operation is moving ahead slowly (for various reasons) with existing pole-and-line vessels and without much new investment, and therefore would not be a model that is relevant to other Pacific Island countries.

2.4 Current Pole-and-Line Fishing in Other Regions

In the Pacific Ocean in areas outside the Pacific Islands region the main pole-and-line fleets are:

- Indonesia: A survey of the number of longline and pole-and-line vessels operating in northeast Indonesia in 2005 estimated 132 pole-and-line vessels greater than 30 GRT.⁸ There are also about 100 small outboard powered pole-and-line vessels (9 to 13 m) fishing, mostly out of Sulawesi⁹. Estimates of the total pole-and-line tuna catch vary widely, from 60,000 to 240,000 tonnes¹⁰, most of which is used for domestic consumption.
- Japan: Small pole-and-line vessels supply about 50,000 tonnes of skipjack to domestic markets, mostly for sashimi.¹¹ Only three vessels remain in the pole-and-line fleet of Okinawa,¹² - the source of many of the fishermen for pole-and-line fleets that operated in Micronesia (both waves of development), PNG, and the Solomon Islands. The skipjack and yellowfin catches of the distant water pole-and-line fleet (apart from the catches in the Pacific Islands area given above) is about 35,000 tonnes annually.
- Eastern Pacific: The only pole-and-line vessels currently fishing in Latin America are a couple of vessels operating out of Baja California, Mexico. Annual tuna landings in recent years were about 500 tonnes.¹³ Around 35 vessels that are based in the USA and target albacore have bait tanks, racks, and poles for fishing close to the coast¹⁴.

In the Indian Ocean there are only two significant pole-and-line fisheries. The Maldives fishery produces about 100,000 tonnes of skipjack and yellowfin. The approximately one thousand pole-and-line vessels in that country range in size from 20 to 100 ft. The catch is disposed of in several ways: consumed domestically, canned for export, smoked/dried for export to Sri Lanka, and exported frozen for canning in Thailand.

The other Indian Ocean pole-and-line fishery is located in India's Lakshadweep group of islands. About 10,000 tonnes of tuna is produced from vessels that range in size from 25 to 34 ft.¹⁵ Most of the catch is smoked for domestic consumption.

⁸ Gillett, R. and M. McCoy (2006). Report of a Survey to Establish the Capacity of Longline and Pole-and-Line Fleets in the Western and Central Pacific Ocean. Gillett, Preston and Associates Inc. for the Pacific Island Regional Office, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, Administrative Report AR-PIR-07-01.

⁹ J. Ingles

¹⁰ Lower estimate: Williams, P. and P. Terawasi (2009). Overview Of Tuna Fisheries In The Western And Central Pacific Ocean, Including Economic Conditions – 2008. Scientific Committee, Fifth Regular Session, Port Vila, Vanuatu. Upper estimate: Ingles, J., J. Flores, I. Musthofa, and P. Mous (2008). Getting off the Hook – Reforming the Tuna Fisheries of Indonesia. WWF- Coral Triangle Initiative.

¹¹ A. Hamilton

¹² R. Stone

¹³ MSC

¹⁴ K. Schaeffer, IATTC

¹⁵ M. Herrera; Zacharia, S. (2007). Fisheries of Lakshadweep with Special Reference to Livelihood Issues, Technical Digest, Issue 10 2007.

The significant pole-and-line fisheries in the Atlantic have produced the following amounts of skipjack and yellowfin in recent years:¹⁶

- Ghana¹⁷ 30,000 tonnes
- Brazil 20,000 tonnes
- Senegal 5,000 tonnes
- Spain 5,000 tonnes (other than Canary Islands)
- Canary Is. 2,500 tonnes
- Azores 1,000 tonnes
- France 1,000 tonnes

Some of the above Atlantic skipjack/yellowfin catches above are actually from pole-and-line fisheries targeting albacore (e.g. that of Spain). An official of a Spanish research centre¹⁸ comments on the Spanish pole-and-line fleets:

Most of the Spanish pole-and-line activity is based in the Basque Country. Currently there are around 52 vessels using pole-and-line in the northeast Atlantic, and 44 of those are Basques. This fleet has declined sharply during the last decades: in 1990 there were 150 pole-and-line vessels based in Basque ports, 113 in 1995, 96 in 2000, 44 in 2010. The reason for this trajectory has been the lack of profitability of a manpower very intensive technique. There are also some pole-and-line vessels in Andalucía and in the Canary Islands. The trend in number of vessels in both cases is negative.

The pole-and-line fisheries of Indonesia and the Maldives are by far the largest in the developing world. Due to adverse economic conditions, in recent years many vessels in those two fisheries have switched from pole-and-line fishing to yellowfin handline fishing.

With respect to certification of sustainability:¹⁹

- Three US west coast albacore pole-and-line fisheries have received Marine Stewardship Council (MSC) certification.
- Two vessels belonging to the Tosakatsuo Suisan Company, which are part of the Japanese distant-water skipjack pole-and-line fleet, received Marine Stewardship Council certification in November 2009. By the time of the first annual audit in October 2010, 25 vessels (4 offshore, 21 inshore) had become members of the client group.
- Two vessels of the “Mexico Baja California pole-and-line yellowfin and skipjack tuna” are in MSC assessment.
- The “St. Helena pole-and-line and rod/line yellowfin, bigeye, albacore and skipjack tuna fishery” received a negative response for MSC certification in September 2010.
- The Maldives pole-and-line skipjack tuna fishery is technically still in assessment “with a revised timeline”, but Maldivian officials indicate that the fishery did not “get through the MSC”.²⁰
- Tuna from pole-and-line fisheries in Brazil, Senegal, Maldives, and Azores has Friend of the Sea certification.

2.5 Global Pole-and-Line Production

From the above sections some idea of the major pole-and-line producing areas can be obtained. Figure 2 compares the annual catches in recent years of the major producing countries/areas. Some explanation for the figure is required. Due to the very large range in estimations of Indonesian catches, a figure of 100,000 tonnes was semi-arbitrarily chosen.

¹⁶ ICCAT

¹⁷ According to Miyake et al. (2010), Ghanaian catches may include those by purse seine due to the fact that baitboats are often used as auxiliary boats for the purse seine fishery and receive a part of the purse seine catch as their share

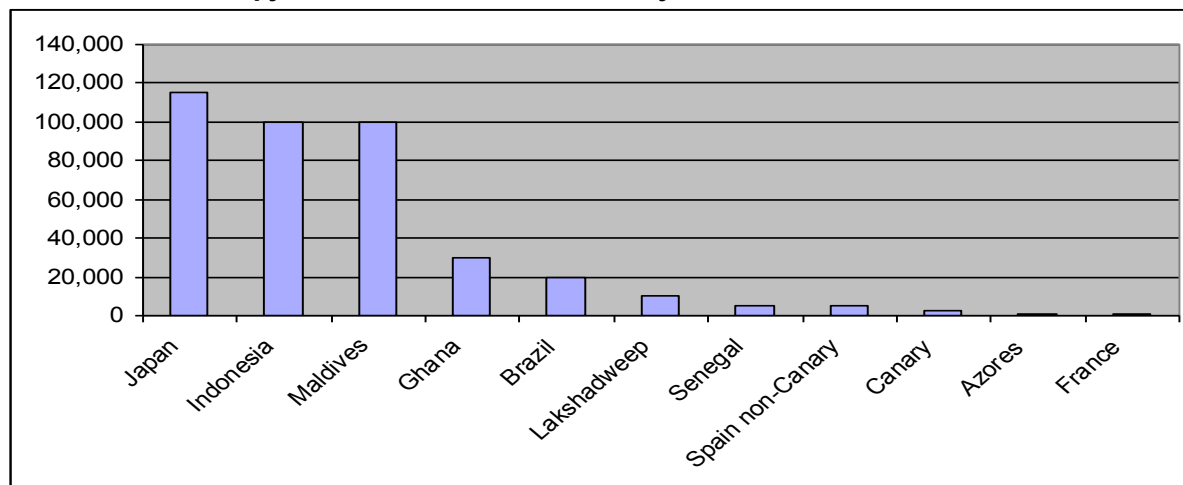
¹⁸ J.Santiago, AZTI

¹⁹ MSC and FoS websites

²⁰ M.S.Adam, Maldives Marine Research Institute

The catches by Japan are those reported for the entire WCPFC area. Some skipjack/yellowfin catches in the figure are from pole-and-line fisheries targeting albacore.

Figure 2: Estimations of Annual Catches of Skipjack and Yellowfin in the Major Pole-and-Line Fisheries



Annual catches of skipjack and yellowfin in the major pole-and-line fisheries in the figure above amount to a total of about 390,000 tonnes. This is in general agreement with that given by an eminent tuna specialist²¹: from the 1970s to the mid-2000s the world's pole-and-line catches fluctuated, mainly between 300,000 and 400,000 tonnes. An FAO publication²² places pole-and-line fishing into perspective with other tuna fisheries and gives information on species composition of the global pole-and-line catch (Figures 3 and 4).

²¹ Joseph, J. (2005). Past developments and future options for managing tuna fishing capacity, with special emphasis on purse-seine fleets. In: W. H. Bayliff, J. I. de Leiva Moreno & J. Majkowski (eds.) Proceedings of the Second Meeting of the Technical Advisory Committee of the FAO Project "Management of tuna fishing capacity: conservation and socio-economics" Madrid (Spain), 15-18 March. Fisheries Proceedings No.2, Food and Agriculture Organization of the United Nations, Rome.

²² Miyake, P. A Brief History of the Tuna Fisheries of the World. , In: W. H. Bayliff, J. I. de Leiva Moreno & J. Majkowski (eds.) Proceedings of the Second Meeting of the Technical Advisory Committee of the FAO Project "Management of tuna fishing capacity: conservation and socio-economics" Madrid (Spain), 15-18 March. Fisheries Proceedings No.2, Food and Agriculture Organization of the United Nations, Rome.

**Figure 3:
The Evolution of Tuna Fishing Methods**

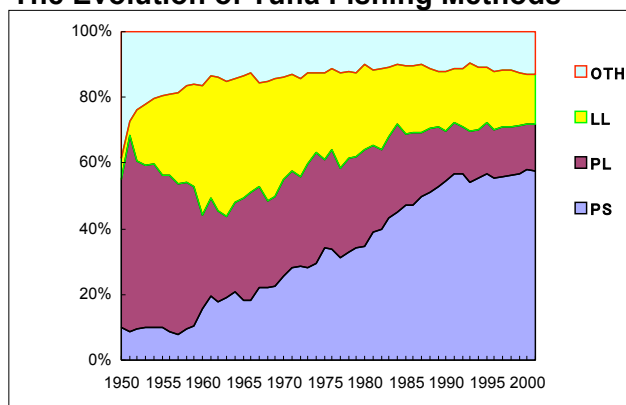
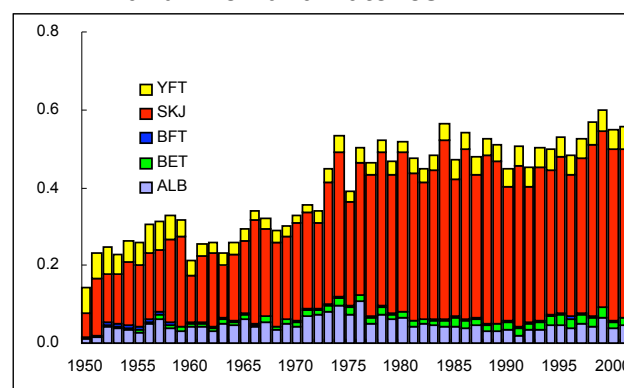


Figure 4: Composition of Global Pole-and-line Tuna Catches



In general, pole-and-line catches globally have remained fairly constant over the last few decades, but the share of world catches taken by pole-and-line has dropped as purse seine catches have increased.

2.6 The Marketing of Pole-and-Line Tuna

The aspects of marketing of pole-and-line tuna that are relevant for the present study are the amount of such tuna on the international market, recent market developments, and issues relating to any premium paid for pole-and-line tuna.

Much of the tuna produced from pole-and-line fisheries in developing countries is used for domestic consumption. Almost all the catch from the Lakshadweep Islands, most of the catch from Indonesia, and a substantial portion of the catch from the Maldives is marketed locally. It is likely that almost all of the Japanese pole-and-line catch (both coastal and distant-water) is for domestic use.

During the present study, enquiries on the amount of pole-and-line tuna on the international market were made to knowledgeable individuals, including those associated with fishing companies, canneries, retail supermarket chains, NGOs, and regional fisheries management organisations (Appendix 1). The general consensus of opinion is that there is between 100,000 and 150,000 tonnes of pole-and-line caught skipjack and yellowfin on the international market.

The origin of the internationally marketed pole-and-line tuna is not clear. European traders feel that most such tuna for canning purposes comes from the Maldives - about 30,000 tonnes annually for canning²³, according to traders (another 30,000 tonnes goes to Sri Lanka, mainly in dried form). At least a portion of the Indonesian exports are for non-canned products for the Japanese market (e.g. raw, smoked).

In the FFA Fisheries Trade News²⁴ there is information on recent developments in the UK canned tuna market:

There has been a flurry of NGO activity in the UK recently, intended to raise consumer awareness about fisheries sustainability issues and to pressure major brands to adopt more sustainable sourcing policies. In mid-January, Greenpeace released preliminary results of its 2011 tinned tuna league table which ranks the UK market's major canned tuna brands

²³ This is somewhat more than that listed in the official Maldives export documentation: MoFA (2010). Exports of Marine Products, 2009. Ministry of Fisheries and Agriculture, Male, Maldives.

²⁴ Hamilton, A., E. Havice and L. Campling. FFA Fisheries Trade News. Volume 4: Issue 1 & 2 January-February 2011. Forum Fisheries Agency, Honiara.

according to their sustainability, in terms of factors such as fishing methods, species used, labelling and public support shown for sustainability initiatives such as the establishment of marine reserves. Sainsbury's, Marks & Spencer and Waitrose were ranked in the top three positions because they already supply pole and line caught canned tuna. Princes and Tesco, on the other hand, were ranked in the bottom two positions, given the majority of their canned tuna is caught by purse seine vessels using fish aggregation devices, which is considered the least sustainable tuna fishing method. Several major UK tuna brands have since made commitments towards improving their sustainable sourcing policies.

In order to gain some insight into future demand for pole-and-line tuna fishing, it is important that this situation be analysed carefully for what it actually is. The readily available information on the UK canned tuna market happenings consists mainly of (a) information from a very effective public campaign promoting a move to pole-and-line caught tuna and (b) statements by complying retailers. These two types of information alone do not provide a good overview of what is actually happening in the market. Box 1 below is an attempt to do so – bearing in mind that a fully comprehensive and objective portrayal is beyond the scope of the present study.

Box 1: A European Tuna Marketer's Experience in Sourcing Pole-and-Line Tuna

Experience over the past two decades in tuna trading/marketing by Atuna, a well-known firm that operates in 12 major European importing countries, provides some insight into sourcing pole-and-line tuna. The company feels that if there were to be a solid supply of pole-and-line tuna, many retailers would feature the product, subject to the following criteria;

- The supply must be continuous in flow and must be year-round)
- The quality must meet the highest standards on histamine
- The price must be no more than 15 percent over normal FAD skipjack
- There must be more than one reliable supplier/source
- The supplier must be EU approved
- It must be IFS/BRC²⁵ approved (food safety)
- Vessels catching the tuna must have non-IUU documentation
- The country of origin must be part of a RFMO
- There must be reliable catch data
- There should be some proof that the fishery is sustainable
- A traceability system must be in place that demonstrates that this is not purse seined fish sold as pole-and-line
- The associated bait fishery must not be overfished
- There is no significant catch of juvenile bigeye and yellowfin
- There are also a number of preferred criteria: an observer onboard the catching vessel, SA8000 standard for social compliance, and at least starting the process of MSC pre-assessment.

Some European retailers are willing to pay more for pole-and-line tuna, subject to above standards. Others are willing to compromise on some of the above criteria, but then do not want to pay hardly more than the usual uncertified purse seine product.

Outside of the UK market, no leading EU retailer has committed to buy only pole-and-line product. In the UK market, only three major retailers have made a public and firm commitment. There is great difficulty in currently meeting the above criteria, and consequently commitments are set far in the future.

(source: Atuna)

An important aspect of marketing pole-and-line tuna is the price, specifically any premium paid above that for purse seined tuna. Recently, a company that is one of the major players in pole-and-line tuna, Thai Union, indicated²⁶ that vessels in the Maldives receive on average about US\$200 more per tonne for pole-and-line tuna than what is paid elsewhere for purse seine tuna.

Some considerations and observations associated with a pole-and-line premium are:

- Some European tuna procurement specialists refer to the current situation as a “gold rush” for pole-and-line tuna, in which there is not enough such tuna to meet demand. They feel that the premium for pole-and-line tuna is likely to rise, but soon a point will be reached in which price-sensitive consumers will switch to an alternate product, such as mackerel.
- When discussing the above price premium of US\$200 per tonne with an executive of a major tuna fishing company based in the Pacific Islands, that individual stated it is “not proven yet”. Similarly, a European tuna marketer was sceptical.
- The recent premium paid for pole-and-line tuna exported to Europe does not affect those fishing companies that sell pole-and-line tuna domestically, such as two of the three remaining pole-and-line companies in the Pacific Islands (Appendix 2).
- In Section 7.2 some comments are given, putting the US\$200 premium into perspective with tuna prices at the height of the pole-and-line industry.
- The recent commitments to pole-and-line tuna are an important development in the UK market – and are receiving much attention. But it is important to realize that the UK only represents about 10% of the global market for canned tuna.²⁷

Where does this lead? A few of the interviewed representatives of the UK retail chains mentioned a scenario that goes like “what we foresee is that retailers may tone down their full commitments to

²⁵ The IFS is a quality and safety standard published by a union of German supermarket chains. The BRC (British Retail Consortium) was published by a union of British supermarket chains.

²⁶ PNA Industry Consultation, February 2011.

²⁷ Miyake, M., P. Guillotreau, C. Sun. and G. Ishimura (2010). Recent Developments In The Tuna Industry: Stocks, Fisheries, Management, Processing, Trade And Markets. FAO Fisheries and Aquaculture Technical Paper. No. 543. Rome.

pole-and-line and follow some of the retail leaders in committing not strictly to 100% pole-and-line, but instead committing to a complete ban on FAD purse seining.” On the NGO campaign side, several observers of the situation foresee a scenario in which the NGOs, due to lack of sufficient pole-and-line product on the market, will tone down pole-and-line promotion and switch part of their efforts to promoting FAD-free purse seining.

2.7 Some Observations on the Global Situation

A major uncertainty in the pole-and-line tuna supply/demand situation is how much of the large amount of Indonesian pole-and-line tuna presently used for domestic consumption could be made acceptable to EU and North American markets. According to some estimates, domestic consumption in that country could be well over 100,000 tonnes. A cannery in Indonesia recently announced it was substantially increasing its pole-and-line canning. There are, however, questions over quality and certification for EU markets.

In the large pole-and-line fisheries of Indonesia and the Maldives many vessels have recently switched from pole-and-line fishing to yellowfin handline fishing. This has important implications for small-scale tuna fishery development in the Pacific Islands, with respect to both the current profitability of pole-and-line fishing and development opportunities.

Several chains of retail stores have made some form of commitment to pole-and-line purchasing. It should be noted, however, that those are not binding agreements, nor is there an obligation to continue the agreements in perpetuity. In the past such commitments for other types of fishery products have been dropped with changing circumstances.

A crucially important point relating to the demand for pole-and-line tuna is the certification of FAD-free purse seining. As indicated above, it is quite likely that current commitments to buying only pole-and-line tuna could evolve into commitments not to buy tuna from FAD-associated purse seine fishing – should a certified product become available. According to an MSC representative, it is quite likely that a FAD-free purse seine fishery in the western and central Pacific Ocean will receive MSC certification in 2011²⁸.

3.0 The Major Environmental and Social Considerations of Pole-and-Line Fishing

The very positive environmental and social aspects of pole-and-line fishing are well-documented, and include benefits related to labour and catch composition.

The lack of employment opportunities is arguably one of the most serious long-term problems faced by many Pacific Island Countries. In the past significant employment was generated by the fishery – probably something like 2,500 jobs for Pacific Islanders on-board vessels during the height of the fishery²⁹, plus those related to shore support and ancillary industries.

Pole-and-line vessels are relatively employment intensive compared to purse seiners. Using data collected in the study, the labour use in pole-and-line and purse seine fishing can be quantified and compared:

- In 1995, perhaps the last typical year in the Fiji pole-and-line fishery, there were eight local vessels employing around 260 people.³⁰ With a tuna catch that year of about 4,000 tonnes, this equates to 15.4 tonnes of tuna per crew per year at sea. During the same year an average Taiwanese purse seine vessel fishing in more equatorial areas used about 30 crew to catch 4,200 tonnes of tuna, or 140 tonnes of tuna per crew per year at sea.
- Currently, an efficient pole-and-line vessel in the Solomon Islands would be expected to catch about 1,400 tonnes/year³¹, and use 30 to 32 crew, of which almost all are Solomon

²⁸ B.Holden, MSC

²⁹ This is about the number of jobs at a mid-size tuna cannery.

³⁰ Smith, D. and J. Tamate (1999). Fiji Islands Skipjack Pole and Line Fishery. Forum Secretariat, Suva.

³¹ P.Roberts, NFD

Islanders. This equates to 45.2 tonnes per pole-and-line crew per year at sea. An efficient NFD purse seiner would be expected to catch about 10,000 tonnes per year and use about 26 crew of which 18 or 19 are Solomon Islanders, or about 384.6 tonnes per purse seine crew per year at sea.

In the above examples, pole-and-line vessels use between eight and nine times more labour per unit of tuna than purse seining:³²

Also to be considered is that pole-and-line fishing requires more shore support (i.e. clerks, managers) per tonne of tuna. Labour requirements of pole-and-line vessels tend to be less sophisticated than purse seiners, and therefore it is possible to employ a higher percentage of local crew. Indeed, some of the pole-and-line vessels in Fiji and the Solomon Islands had entirely local crew.

The downside of a labour-intensive fishery is paying for the labour. This feature has caused financial problems for pole-and-line fisheries in other parts of the world (e.g. eastern Atlantic, Japan) and it may be a major constraint in developing pole-and-line fisheries in those Pacific Island countries with relatively high labour costs. Costs for the relatively large amount of labour can be reduced to some extent by incentive-type pay schemes.

With respect to the bycatch issue:

- In the height of the PNG pole-and-line fisheries 30 years ago, skipjack accounted for an average of 88.4% of the catch per year, yellowfin 11.4%, and other species 0.2%.³³
- Overall, in the tropical areas of the WCPFC region skipjack tends to account for more than 85% of the total pole-and-line catch, with yellowfin tuna (5–10%) and a small component of bigeye tuna (1–6%) make up the remainder of the catch.³⁴

As to the other species in the pole-and-line catch, most are mahimahi, rainbow runner, and the non-target tuna species (e.g. *Euthynnus*, *Auxis*). Catches of sharks and billfish are extremely low, while catches of marine mammals and turtles by pole-and-line gear are virtually non-existent.

In general, the non-skipjack catch of pole-and-line fishing is lower than that of free-school purse seining and considerably lower than that from FAD-associated purse seining. Quantitative comparisons of bycatch between the gear are complicated by the various fleets involved, areas of fishing, and the use of observer vs. logbook data. Also to be considered is the growing use of FADs in some pole-and-line fisheries. Additionally, it should be noted that the baitfishing component of pole-and-line operations has its bycatch concerns.

In addition to the employment benefits mentioned above, a “social consideration” that is often overlooked in the pole-and-line promotional literature is the fact that pole-and-line fishing is fun. Many fisheries specialists with knowledge of the fishery feel that it is the *most* exciting kind of fishing in the world. The potential for obtaining a “premium” for pole-and-line tuna through sportfishing deserves some attention. At least some attention that pole-and-line fishing is currently receiving is due to nostalgic attachment to an exciting fishery.

There are, however, some aspects of pole-and-line fishing that have negative environmental implications: issues relating to baitfishing and relatively high fuel use.

The baitfishing that supports pole-and-line fishing occurs in inshore areas, and has the potential to over-exploit some of the vulnerable species and interfere with food supplies of adjacent villages. This difficulty and possible mitigation measures are discussed in more detail in Section 6.4 below. A major lesson learned from previous experience in the Pacific Islands is that simply formulating

³² The fact that tuna troll fisheries are even more labour intensive than pole-and-line fisheries should be considered when contemplating replacing troll fishing with small-scale pole-and-line fishing. A DevFish study of the Tarawa troll fishery in 2008 showed that about 3 tonnes of tuna are produced by a crewmember per year at sea.

³³ Doulman, D. and A. Wright (1983). Recent Developments in Papua New Guinea's Tuna Fishery. Volume 45, Marine Fisheries Review, Oct/Dec 1983.

³⁴ Williams, P. and P. Terawasi (2009). Overview Of Tuna Fisheries In The Western And Central Pacific Ocean, Including Economic Conditions – 2008. Scientific Committee, Fifth Regular Session, Port Vila, Vanuatu

fishery management plans does not make problems go away: the hard part is implementing and enforcing the plans.

Pole-and-line fisheries are relatively fuel-intensive. A World Bank fishing fuel study³⁵ found that purse seiners operating in the Pacific Islands use about 200 to 400 litres diesel per tonne of catch. In the present study, the operators of the pole-and-line vessel in Palau (Appendix 2) indicate that in recent years approximately 504 litres of fuel is used per tonne of catch. According to the management of NFD in the Solomon Islands, “a pole-and-line vessel uses about 1.5 to 2 tonnes of marine gas oil for 3 to 4 tonnes of fish. A seiner involved in FAD fishing uses 6 to 7 tonnes daily for 20+ tonnes of fish”³⁶. Assuming a seiner daily catch of 25 tonnes and the standard tonne-to-litre conversion factor for diesel of 1176.47, this equates to an average of 588 litres of fuel per tonne of pole-and-line tuna and 306 litres of fuel per tonne of FAD-associated purse seine tuna. These few cases cited here should not be considered a thorough comparison of fuel use. Nevertheless, they suggest that currently in the region it takes much more fuel to catch tuna by pole-and-line than by purse seine.

4.0 The Promotion of Pole-and-Line Fishing

“Pole-and-line promotion” is considered in this study to be those activities that contribute to the creation, enhancement, or revitalisation of pole-and-line fisheries and/or the associated baitfisheries – at a level higher than that of a single entity.

4.1 Promotion of Pole-and-Line Fishing in the Pacific Islands Region

Currently and in the recent past most of the promotion of pole-and-line fishing in the region is associated with the Forum Fisheries Agency (FFA), either as part of the work programme of the Agency’s Fisheries Development Division or through the DevFish Programme³⁷, which is managed by that Division.

Both the Division and DevFish have benefited from the services of Robert Stone, an individual who has been a highly successful pole-and-line fisherman in Fiji and an innovator in the Pacific Island tuna industry. His technical knowledge of the fishery and enthusiasm for communicating his knowledge to a Pacific Island audience have done much to enhance the understanding of pole-and-line fishing in the Pacific Islands region.

The significant FFA-associated initiatives include:

In late 2007 DevFish recruited a consultant to design a project to be implemented in the Solomon Islands at a later time. The articulated scheme consisted of using Indonesian vessels of around 15.6 m. Because the Indonesian-style vessels are too small to carry the type of baitfishing nets used by Japanese pole-and-line vessels, live bait are to be caught from a floating platform, called “*bagan*” in Indonesia. The vessels are to be managed as a commercial venture by an experienced and financially sound fishing company, and the fish are to be used in the manufacture of “*arabushi*”.³⁸

Changing management and ownership of the Soltai plant and vessels saw a need to revise the above scheme for the Solomon Islands. Using funding from the Japan Promotion Fund, a project was designed that was called: “In-Country Support to Solomon Islands: Implementation of a pilot project to develop artisanal tuna supplies for processing”. It included:^{39 40}

³⁵ Wilson, J. and M. McCoy (2009). The Energy Costs and Fishing Study. In: Fisheries in the Economies of Pacific Island Countries and Territories. Pacific Studies Series, Asian Development Bank, World Bank, Forum Fisheries Agency, Secretariat of the Pacific Community, and Australian Agency for International Development, 520 pages.

³⁶ P.Roberts, NFD

³⁷ Development of Tuna Fisheries in the Pacific ACP Countries, an EU-funded project.

³⁸ DevFish brochure

³⁹ The FFA Document: “In-Country Support To Solomon Islands: Implementation of a pilot project to develop artisanal tuna supplies for processing”

⁴⁰ The details in the list have undergone a revision (R.Stone).

- Design of bait catching unit and small-scale pole and line vessel
- Analysis of small-scale pole and line business
- Building of bait catching units
- Building of small-scale pole and line vessel
- Purchase of fibreglass pole and line vessel in Indonesia or Maldives
- Development of a small-scale management office with the sole purpose of managing and controlling the fleet of small vessels.
- Training of both bait catching unit crew and vessel crew
- Commercial activity
- Community based management strategy.

PNG requested FFA inputs to assist in the design of a pilot artisanal tuna supply project for Kavieng. This initiative was proposed by the staff of the National Fisheries College⁴¹, and is based on (a) the fact that a pole-and-line fishery was located in the area in the 1970s/80s and, (b) reports of high concentrations of tuna schools close to the harbour by the SPC tagging vessel. The visit of a DevFish-sponsored consultant resulted in the NFC buying an old pole-and-line vessel and repairing it. That consultant (the same that designed the Solomons project above) visited Kavieng in July, 2009 to provide technical information for an assessment that followed.⁴² Using EU/ACP funding, a study was then carried out to assess the feasibility of new investment in a small fleet of pole and line vessels, sourcing live bait from community fishermen, with the processing of the catch at an extended local processing unit.⁴³

Kiribati, Tuvalu and the Marshall Islands requested that pole-and-line pilot projects be developed for their countries. In Kiribati a pilot project was designed with the objective of demonstrating that a relatively small-scale fishing technique can profitably supply tuna for small artisanal processing. The project is intended to: (a) Create sustainable, socially acceptable and economically viable small-scale baitfishery, (b) Create sustainable, socially acceptable and economically viable small-scale tuna handline and pole-and-line fishery, (c) Ensure that vessel designs recommended by FFA to be built or purchased for use in Kiribati takes into account all possible developments that have occurred over recent years in the small-scale pole-and-line fisheries of Japan, Maldives and Indonesia, and (d) Ensure that the catch supplied to the processing facility meets the legal and quality requirements of the market place. It was recommended that two pole-and-line vessels be constructed.⁴⁴

There has been additional work on baitfish in Kiribati. FFA staff have recommended that baitfish abundance be monitored, which would require some investment by commercial firms.

FFA has also had some smaller initiatives dealing with pole-and-line fisheries: designs for pole-and-line vessels (mentioned above), suggestions in tuna management plans, and participation in some pole-and-line promotion meetings: "Workshop on The Establishment of Sustainable and Equitable Pole-and-Line Skipjack Fisheries in the Pacific" in September 2009, and "Friends of the Pole and Line Working Group" in 2010 in September 2010.

There have also been a number of non-FFA pole-and-line promotion activities in the Pacific Islands. These include:

- The production of a paper by Greenpeace on the advantages of pole-and-line fisheries: Stone R., L. Toribau, S. Tolvanen (2009). Developing Sustainable and Equitable Pole and Line Fisheries for Skipjack (see Section 5.1 below).

⁴¹ Interestingly, NFC was established in 1977 through financial assistance from the Japanese Government, to provide a trained workforce for the domestic pole-and-line industry that was prominent at the time (Sokimi 2005).

⁴² Scott, I. (2010). Feasibility Assessment & Business Planning for Exports to the EU of Tuna Products Based on a Sustainable Pole & Line Fishery in Kavieng. Secretariat of the ACP Group of States or the European Commission. Also: H.Walton (per.com.)

⁴³ Scott, I. (2010). Feasibility Assessment & Business Planning for Exports to the EU of Tuna Products Based on a Sustainable Pole & Line Fishery in Kavieng. Secretariat of the ACP Group of States or the European Commission. Also: H.Walton (per.com.)

⁴⁴ Stone, R. (undated. "working document"). Implementation of a pilot project to develop artisanal tuna supplies for processing. Forum Fisheries Agency, Honiara. Also: R.Stone (per.com.)

- In the mid-2000s SPC carried out sea safety training in the Solomon Islands for captains of pole-and-line vessels. Some baitfishing trials (*bouki-ami* and the *basnig* lift nets) were also carried out in Kavieng during a review of the National Fisheries College.⁴⁵
- The Australian Centre for International Agricultural Research supported a scientist stationed in Kiribati in 1990/91 to work with the staff of the Fisheries Division. In addition to research on baitfish for pole-and-line fishing, the project looked at methods to improve the overall efficiency and viability of baitfishing and thus of the pole-and-line fleet as a whole. This included ways to change the timing of fishing, alternative sites and bait, and improvements to baitfishing techniques.⁴⁶
- A study by the Forum Secretariat⁴⁷ of the Fiji pole-and-line fishery was carried out in 1999, with the view of identifying measures to increase the profitability in the fishery. The measures included: access to bait, fish prices, tax free status, crew training, vessel licensing and certification, and promotion of the fishery.
- In 1987 FAO sponsored the visit of a Fiji pole-and-line fisherman to the Solomon Islands to review the pole-and-line operations of NFD.
- In 1986 the US National Marine Fisheries Service in Honolulu held a workshop focused on reversing the decline in Hawaii's pole-and-line fishery. The meeting came up with a list of 22 ideas for revitalising the industry. Interestingly, one activity identified was to have the new governor declare the pole-and-line industry "a disaster area".
- In 1984 SPC and FAO collaborated in the development of a baitfishery and pole-and-line fishing in Tuvalu. The project used a Maldivian-type coral head lift net to capture cardinalfish that were used in fishing on a 10 m government-owned catamaran equipped with sprays.⁴⁸

4.2 Promotion of Pole-and-Line Fishing in Other Regions

Most of the readily available information on promotion of pole-and-line fishing outside the Pacific Islands comes from Indonesia and the Indian Ocean.

In Indonesia most, if not all, pole-and-line promotion work is centred on the baitfish issue. According to fishery specialists familiar with tuna fishing in the country, there have been no large initiatives in recent decades promoting the actual fishing, but there have been many studies and workshops examining the biological, social, environmental and financial issues associated with baitfishing for pole-and-line fishing. A WWF initiative is being planned that is focussed on altering the balance in Indonesia between pole-and-line and purse seine. As such, it is primarily a fisheries management tool for reducing capacity⁴⁹.

In the Maldives there has been much work by a World Bank fisheries project in the mid-2000s, one goal of which was to identify future needs for pole-and-line fishing. A number of recommendations were made that are relevant to profitability in the pole-and-line industry, including privatization of the cannery, training the staff of commercial banks to better understand the fisheries sector, expanding existing port facilities, formulating a public investment policy to influence fishing vessel design/construction, reducing the size of the fishing fleet; modifying the tax regime, and developing of mechanisms to undertake industry-relevant research: product technology, quality control and vessel/gear design.⁵⁰

In both the Maldives and Indonesia there has been a move by pole-and-line vessels to convert to hand-line fishing because of poor profitability. This change appears to be a commercial response to markets and not as a result of promotional activities.

⁴⁵ M.Blanc, W.Sokimi; SPC

⁴⁶ Rawlinson, N., D.A. Milton and S.J.M. Blaber (1992). Tuna Baitfish and the Pole-and-line Industry in Kiribati. Australian Centre for International Agricultural Research, Canberra.

⁴⁷ Smith, D. and J. Tamate (1999). Fiji Islands Skipjack Pole and Line Fishery. Forum Secretariat, Suva.

⁴⁸ Gillett, R. D. (1985). Tuvalu Baitfish Survey and Development Project. Tuna and Billfish Assessment Programme Technical Report No.14, South Pacific Commission, Noumea, New Caledonia.

⁴⁹ Sources: J.Ingles, L.Pet, J.Pet

⁵⁰ World Bank (2007). Maldives Marine Fisheries - Laying a Foundation for Future Success. Agriculture and Rural Development, South Asia Sustainable Development Department

In the southwest Indian Ocean there have been numerous attempts to promote pole-and-line fishing. According to an individual with a long involvement in tuna development and management in that region, in the late 1980s pole-and-line fishermen from the Maldives were sent to the Comoros to demonstrate the technique and fishermen from Zanzibar were sent to the Maldives to learn the technique. In the early 1990s FAO promoted pole-and-line tuna fishing in Mozambique⁵¹ and in Zanzibar in separate projects. In the late 2000s there was an attempt to establish pole-and-line operations in the Seychelles and off Tanzania. Of all these attempts, which spanned 25 years, none was successful.⁵²

In Ghana in 2006 there was a Dutch-funded pole-and-line initiative involving two Dutch fishing companies, Ghanaian exporters, fishermen's associations, a local NGO, and a Filipino partner. The objective was "to establish a commercial supply chain for fresh tuna loins that enhances the livelihood of poor artisanal fishing communities, meets internationally recognized sustainability criteria (social and environmental), informs Ghana's fisheries policy, adds value to the Ghanaian economy and delivers reasonable profits that are equitably distributed throughout the supply chain". An evaluation indicated that the project "was unable to make much progress in any of these areas", with the conflict between commercial and social objectives being a major reason.⁵³

Staff of the Inter-American Tropical Tuna Commission indicate that they are unaware of any efforts in eastern Pacific Ocean to promote or revitalize pole-and-line fishing.⁵⁴

On a different level, the NGO campaign focused on UK retailers (mentioned in Section 2.6 above) could be considered a pole-and-line promotion activity. That campaign, largely formulated and implemented by Greenpeace, included a "Tuna League Table", documentary films, support from celebrity chefs, and publications such as "Taking Tuna Out of the Can: retailer's roles in rescuing the world's favourite fish". The Tuna League Table, launched by Greenpeace in 2008, uses data obtained from retailers and brand suppliers. According to the Greenpeace website, those data are evaluated by Greenpeace against a set of criteria broadly designed to test each company's commitment to sustainability in relation to their tinned tuna products:

- The fishing methods used by the companies' suppliers of tuna.
- Views on the establishment of marine reserves, including specifically the proposal for a reserve in the "Pacific Commons"
- Species of tuna stocked
- Labelling: the credibility of the claims made

4.3 Development Models and Associated Success

As can be seen in Sections 4.1 and 4.2 above, a wide variety of development models have been used in pole-and-line promotion activities.

The larger FFA-associated efforts involve the formulation (or input into the formulation) of comprehensive pole-and-line baiting/fishing projects to be funded at a later time by an unspecified donor. Other initiatives appear to be based on the concepts of (a) providing technical information to ongoing commercial firms, and (b) doing financial feasibility studies. Additional aspects of the FFA pole-and-line development model mentioned by FFA Development Division staff are (1) that they are "in response to country requests", and (2) "the private sector is the preferred in-country vehicle".

An examination of the non-FFA pole-and-line promotion activities shows that many fall into the following categories:

- Comprehensive pole-and-line baiting/fishing projects funded by conventional donors to the fisheries sector

⁵¹ FAO (1993). Pilot project for the development of the tuna fishery - Mozambique. FI:DP/MOZ/86/038.

⁵² D.Ardill, formerly of IOTC.

⁵³ Harrison, T. (2009). The 'Sustainable Development of the Fishing Industry' PPP in Ghana. Available at <http://www.iblfi.org/en/whatwedo/partnership/~media/0028CBABE449444C847C9CE0A66E116B.ashx> and KIT (2006). Sustainable tuna filet through Dutch - Ghanaian partnership. Royal Tropical Institute. <http://www.kit.nl/-/INS/3829/Royal-Tropical-Institute/About-KIT/News/Archive/Sustainable-tuna-filet-through-Dutch---Ghanaian-partnership>

⁵⁴ K.Schaefer, IATTC

- Generation of government support: pointing out to coastal states the environmental, social, and financial benefits of pole-and-line fishing.
- Mitigating a production bottleneck: Research projects on baitfish to improve pole-and-line fleet profitability
- Identification of economic and policy measures to reverse fleet declines
- Demonstration of Maldivian fishing/baiting techniques
- Generation of demand for pole-and-line tuna by campaigns targeting retailers and consumers.

In the last twenty years success in pole-and-line promotion has been elusive. In the Indian Ocean there is little evidence to indicate that any of the interventions have resulted in significant creation, enhancement, or revitalisation of pole-and-line fisheries⁵⁵, with the possible exception of the Maldives. In the Pacific Islands judging success is complicated by the recent nature of many of the FFA promotion activities – some individuals feel that fisheries development takes substantial time and there has not been adequate time for FFA’s work to come to fruition. Nevertheless, uptake on that work has been slower than anticipated by FFA staff – and it is difficult to identify success in the non-FFA pole-and-line promotion activities.

Generation of demand for pole-and-line tuna by public campaigns has been quite successful, especially in the UK – where the current situation has been described as a “gold rush for pole-and-line tuna”. As one person stated: “If there is adequate demand for pole-and-line, then everything else will fall into place. If there is inadequate demand, then none of the tinkering by agencies and NGOs will have much impact”. Whether this increased demand will have a lasting impact on the creation/enhancement/revitalisation of pole-and-line fisheries will depend on numerous factors, including consumer response to higher canned tuna prices, the degree to which the increased demand in the UK translates into higher prices for fishing companies, the degree to which the pole-and-line premium compensates for additional costs of pole-and-line fishing, and campaigner/retailer responses to (a) the realisation of the limited global supply of pole-and-line tuna, (b) any certification of FAD-free purse seining.

4.4 Investment in Pole-and-Line Fishing in the Region

The FFA Regional Tuna Management and Development Strategy states “successful domestic development depends on national and foreign private investment.” To some extent an examination of investment in pole-and-line operations can provide some insight into the success of pole-and-line promotion efforts.

There has only been a small amount of recent investment in pole-and-line fishing in the region in recent years. The National Fisheries College in PNG has invested about US\$65,000 in the purchase of an old pole-and-line vessel and its refurbishment. According to College staff, this should not be considered an investment in pole-and-line fishing but rather in a training vessel that could be used in pole-and-line fishing. This investment appears to be the only one to date to follow from FFA-associated pole-and-line promotion efforts – bearing in mind that those efforts are fairly recent.

Other information on investment is:

- NFD in the Solomon Islands is taking a very cautious approach to re-entry into pole-and-line fishing. According to the company manager, about SI\$1.5 million (US\$215,000) has been spent in the last two years on the three pole-and-line vessels under their management.
- Some of the industrial fishing companies with operations in Papua New Guinea seem to have an attitude similar to that of NFD towards investing in the pole-and-line fishing: a “wait-and-see” position.

⁵⁵ D.Ardill

- Very little has been invested in pole-and-line fishing by the company that operates the single pole-and-line boat in Palau. Upon enquiry to the crew on the level of any investment, the response was “just look at this vessel – and tell us if any money has been spent.”
- In the late 1990s an entrepreneur in Fiji invested about F\$350,000 (US\$217,000) in the remnants of the government-owned pole-and-line fleet. Due to the closure of the local market for skipjack, that investment was sold to Russian interests a few years later, and the vessels were converted to longliners.

The very limited amount of recent investment in pole-and-line fishing in the region supports the contention in Section 4.3 above that it is difficult to identify many cases of success in pole-and-line promotion. The lesson appears to be that “talk is cheap” when it comes to making investments in pole-and-line fisheries.

5.0 Aspects of Pole-and-Line Publicity and Pole-and-Line Advocacy Groups

5.1 An Examination of the Greenpeace Publication

The Greenpeace publication “Developing Sustainable and Equitable Pole and Line Fisheries for Skipjack” appears to be the most widely circulated document promoting pole-and-line fishing – and deserves some scrutiny. It states that “Greenpeace is advocating that coastal states develop domestic pole and line fisheries, which have the potential to be the most environmentally friendly method fishing skipjack”. From the tone of the brochure and the language used, it appears that the fisheries specialists are not the target audience, but rather the general public and/or policy makers in Pacific Island countries. As such, it is important that the document not contain technical information that is incorrect or misleading, as the target audience may be unable to identify any inaccuracies.

Following from this, it may be useful to examine this Greenpeace publication from a technical perspective. A close reading of the publication in conjunction with knowledge of fisheries economics in the region and of pole-and-line operations can offer additional insight into pole-and-line promotion efforts.

In general, the statements in the publication on the environmental and social aspects of pole-and-line fishing are quite accurate:

- *“...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.”*
- *“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.”*

The statements in the publication on management requirements are especially relevant and address problems experienced in the past:

- *“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.”*
- *“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.”*
- *“National tuna management and bait fish management plans need to be established in advance, with regular scientific monitoring of the fishery and its impacts.”*

Important statements concerning the economics of tuna fishing are misleading and/or simply incorrect. There are several assertions that pole-and-line has lower production costs than purse seining:

- *“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 ton; 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 ton.”*

- *“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.”*
- *“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.”*

People familiar with the tuna industry in the WCPO and the Indian Ocean generally agree that production costs of pole-and-line vessels are substantially greater than with purse seine. NFD in the Solomon Islands estimates their pole-and-line production costs (including the required extra shore support) to be 40% greater than purse seine⁵⁶. Intuitively, if the profit margins are favourable, then existing or new companies would pursue the opportunity. It is therefore not “astonishing” that only one pole-and-line operation exists, it is normal for companies to move out of a relatively unprofitable fishery. Although the cited example from the Eastern Pacific may be accurate,⁵⁷ the baiting situation off Mexico is far more favourable than anywhere in the Pacific Islands (i.e. quantities, hardness) and in the entire eastern Pacific the pole-and-line fleets have dwindled to just a few Mexican-based vessels – hardly an indicator that pole-and-line is relatively profitable in that region. One of the statements has the qualifier “when they are paid world market prices for their catches”. The reality is that world market prices are paid in the world marketplace (e.g. Bangkok) not in relatively remote locations.

The Greenpeace report acknowledges the failure of past pole-and-line operations in the Pacific Islands – but asserts that conditions are now more favourable:

- *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.*
- *Despite the past problems of pole and line tuna fishing in the Pacific, there is every reason to believe such fisheries could be successfully reestablished in most areas.*

Many of the important factors affecting pole-and-line profitability have degraded in the last few decades. The real world market price for skipjack is currently less than half of what it was at the height of the pole-and-line fisheries in the region (Section 7.2 of this report) and the premium currently offered for pole-and-line fish does not come close to compensating. Other important factors have become worse in recent years, including the price of fuel for the mainly fuel intensive pole-and-line vessels, more stringent crew safety requirements for the mainly labour intensive pole-and-line vessels, decreased abundance of surface schools, and baitfishing grounds being locked up in marine protected areas.

The economic issues in question here are not “details”, but rather are at the core of the difficulty of establishing pole-and-line fisheries in the Pacific Islands. Quite simply, the Greenpeace document indicates that the economics of pole-and-line fishing are more favourable than they actually are.

5.2 Implications of Pole-and-Line Publicity on Purse Seining

Canned tuna sales in the major markets have suffered in the past from publicity relating to methyl mercury and dolphin mortality. An important issue is whether the current publicity in favour of pole-and-line fishing could evolve into a public back-lash against purse seining. After all, care must be taken in promoting the tiny pole-and-line fishery when it has the potential to harm a fishery with a catch that is worth more than \$1.7 billion in waters of FFA member countries.

There are currently publicity statements such as:

- “We want ALL skipjack tuna to be caught by pole and line, a traditional method of fishing which is highly selective and does not target sharks or turtles” - Ethical Consumer Magazine

⁵⁶ P.Roberts, NFD

⁵⁷ The information on production costs was not available at the site indicated in the Greenpeace document: <http://www.maredden.com/ingles/>

- “Consumers should avoid all canned tuna not labelled as troll or pole-caught. Like other premium products, if the label doesn’t say troll or pole-caught then it’s safe to assume an environmentally damaging gear was used.” – Monterey Bay Aquarium Seafood Watch

The latter organisation was contacted to gain insight into the potential for their campaign to affect purse seining. The response:

Since tuna caught with unassociated purse seine and FAD purse seine (which we consider unsustainable) is mixed together in the canning process, and there is no way for consumers to ensure they are getting just unassociated purse seine tuna, our recommendations for consumers suggest that consumers either look for tuna cans labeled “pole-and-line” or “troll” caught, or avoid canned tuna. We don’t necessarily feel that all purse seine fishing would need to be replaced by pole-and-line fishing, but do recommend that because of the ecological and bycatch issues associated with FADs, consumers avoid purse-seine caught tuna until such time as unassociated purse seine caught tuna can be distinguished in the marketplace. At this point, since the different types of purse seine caught tuna can’t be distinguished by consumers, our recommendation could be construed as a suggestion to avoid all purse-seine caught skipjack.⁵⁸

Some of the fish traders listed in Appendix 1 were contacted on the same issue. The results were inconclusive – there was no consensus on whether the current publicity promoting pole-and-line fishing could have a substantial impact on the overall sales of tuna. One interesting feature to emerge from those discussions is the general feeling of the need for a system to distinguish FAD from FAD-free purse seine tuna (Section 2.7 above).

5.3 Dedicated Pole-and-line Advocacy Groups

There appear to be two advocacy groups that are focused exclusively on pole-and-line fishing: Friends of the Pole and Line Development Group and International Foundation for the Promotion of Pole-and-Line Fishing.

Friends of the Pole and Line Development Group aims to at first instance analyse the gaps and challenges in existing Pacific pole and line redevelopment and to build a multi-year programme to ensure the success of these projects. In the longer term it also aims to look into the possibility of increasing the communication, coordinated advocacy and skill sharing between pole and line producers in different parts of the world. The first formal meeting of the Group was held in Bali in September 2010. The report of that meeting indicates that after funding is secured to operate, a legal identity will be created, followed by a website and a discussion document to attract further funding and buy-in from the industry. The next stage will include a scoping exercise on the existing and potential pole-and-line fisheries looking at where and how the product reaches the market place. With this information a detailed engagement strategy can be formed.⁵⁹

International Foundation for the Promotion of Pole-and-Line Fishing appears to be simply a Facebook page. The information on the Foundation given on the page is limited to the statement: “at an era of greed a very patient way of fishing need to take publicity”. The page offers a forum for discussion of issues relating to pole-and-line fishing. Groups participating in discussions included Greenpeace, Ethical Consumer Magazine, and MSC.⁶⁰

6.0 Baitfish

6.1 Historical Context

As can be seen from Figure 1 (Section 2.1 above), the pole-and line catches from vessels based in the Pacific Islands area reached a maximum about 30 years ago. It has been estimated that at the height of the pole-and-line fishery in the region in 1978 about 79,178 tonnes of tuna were caught using about 2,474 tonnes of baitfish⁶¹, or a tuna-to-baitfish ratio of 32 to 1.

⁵⁸ R.Pelc, Monterey Bay Aquarium Seafood Watch

⁵⁹ Source: A.Bassford; FOPL (2010). “Friends of the Pole and Line Working Group” Bali Workshop outcome paper; www.oursource.org/friends-of-the-pole-a-line-development.

⁶⁰ <http://www.facebook.com/pages/INTERNATIONAL-FOUNDATION-FOR-THE-PROMOTION-OF-POLE-AND-LINE-FISHING/102642289774346>

⁶¹ Gillett, R. (2011). Replacing Purse Seining with Pole-and-Line Fishing in the Western Pacific: Some Aspects of the Baitfish Requirements. Marine Policy 35, pages 148–154.

In the Pacific Islands the availability of bait, rather than tuna, has often been the resource factor limiting expansion of a pole-and-line tuna fishery.^{62 63} This feature has led to a very large number of efforts over the last four decades to survey baitfish resources and to develop ways of getting around baitfish shortages.

6.2 The SPC Baitfish Survey Results

In the years 1977 to 1980 SPC's Skipjack Survey and Assessment Programme carried out baitfish research in all Pacific Island countries and territories. The advantage of that comprehensive research is that a similar sampling scheme was used at all locations – and therefore the results are directly comparable across the region. Table 1 summarizes the results of the survey.⁶⁴

Table 1: SPC Baiting Results

	No.Bouki-Ami Hauls	Av. Catch Per Haul (kg)	Percent Anchovy⁶⁵
Papua New Guinea	57	120	71.4
Solomon Islands	60	148	43.0
New Caledonia	40	130	62.5
Fiji	71	180	22.0
Vanuatu	5	35	29.4
Samoa	14	80	69.5
Society Islands	27	33	5.7
Marquesas islands	44	127	0.0
Tuamotu Islands	27	44	0.0
Kiribati	21	57	0.0
Tonga	32	34	23.8
Palau	34	97	56.2
Ponape	36	140	71.2
Niue	0	0	0.0
Cook Islands	15	39	0.0
American Samoa	5	36	89.4
Marshall Islands	8	76	0.0
Yap Islands	2	129	81.8
Wallis and Futuna	36	291	82.3
Truk Island	8	86	0.0
Kosrae	10	80	68.0
Norfolk Island	0	0	0.0
Tuvalu	15	100	0.0
Nauru	0	0	0.0
Tokelau	0	0	0.0
Pitcairn Islands	0	0	0.0

Using the above and other data, individual baitfish assessments were done by SPC for all Pacific Island countries/territories and are available from SPC. The major lesson from the SPC baitfish work is that the large islands in the west of the Pacific Island region have best potential for bait-fisheries for pole-and-line fishing. Small islands in the east and atolls have the least potential. In progressing from west to east in the region, the amount of habitat for baitfish production decreases and the number of species considered to be desirable baitfish also diminishes.

⁶² Doulman, D. and A. Wright (1983).

⁶³ An individual involved with pole-and-line fishing in Fiji had an alternative opinion: vessel engine problems were more serious than baitfish availability (W.Sokimi).

⁶⁴ SPC (1981). An Assessment Of Baitfish Resources In The South Pacific Commission Area. Thirteenth Regional Technical Meeting On Fisheries.

⁶⁵ A variety of species of variable quality make up baitfish catches. The relative amounts of anchovy (a desirable species) in the catch gives much information on the quality of the baitfish catches.

6.3 Atoll Baitfishing

Because countries made up of atolls are a major focus of the FFA pole-and-line work, it may be useful to comment on atoll baitfishing.

There have been baitfishing assessments of atoll baitfish resources in the region over the last 30 years by SPC, ACIAR, FAO, NMFS, and others. The major lessons learned from those studies are that, compared to high islands, atolls produce less bait per unit of effort (about 50% less per haul in the SPC work), have more variability in amount of catches, have catches composed of less desirable species, and tend to interact more with local food fisheries. These and other factors caused SPC to conclude: "It is clear that atolls in general offer much less potential for commercial baitfish operations than high islands."⁶⁶

This conclusion (which is shared by many individuals with knowledge of baitfisheries) should not be equated with atolls not being able to support baitfishing for pole-and-line fishing, but rather that the situation is considerably more difficult than on high islands – bearing in mind that lack of baitfish has been a limiting factor for pole-and-line fishing even on many high islands. The very limited baitfish resources of atolls, does not completely eliminate opportunities of pole-and-line development, but it adds a major constraint to the long list of factors working against the viability of pole-and-line fishing based in those areas.

6.4 Past Efforts to Overcome Baitfish Inadequacies

Inadequate baitfish resources have often placed restrictions on the development of pole-and-line fisheries and consequently there have been a large number of efforts over the last four decades to develop ways of getting around the scarcity of baitfish.

Setting the Japanese-style stick-held liftnet ("*bouki-ami*") at night in conjunction with lights has been the primary bait-catching method in the region for several decades. Some of the efforts to overcome past baitfish inadequacies involved using alternative baitfishing gear/techniques. A non-exhaustive listing of these schemes would include:

- Drive-in techniques – divers scare baitfish into an area where they can be more easily netted; used by the Japanese in Micronesia prior to WWII
- Hawaiian-style beach seining - used by NMFS on exploratory cruises (e.g. Marshall Islands) and SPC to catch baitfish where they were scarce (e.g. Marquesas, Tonga)
- Maldivian-style coral head lift nets – used by a fishing operation in Chuuk in the early 1980s and by an FAO project in Tuvalu in the mid-1980s
- Using light-boats (or additional light-boats) with bouki-ami gear – an ACIAR project encouraged this in Kiribati in early 1990s.
- Basnig net – this simple two-boat lift net was trialled by SPC in Kavieng in 2005.
- Catching pelagic anchovy (*Encrasicholina punctifer*) by lift net outside lagoons – this has been done on rare occasions where such baitfish has been encountered in calm seas when baitfish was required (e.g. SPC tagging programme).

In addition to the above alternative fishing techniques, there have been some attempts to relieve problems related to inadequate baitfish by reducing the mortality of baitfish that have been captured. This has included "hardening bait" (delaying the operation of transferring bait from the net to the pole-and-line vessel), more gentle bait handling during transfer, and improvements to vessel bait tanks, including water circulation and the colour of the tanks.

The use of separate baiting operations was attempted in New Caledonia in the early 1980s. Using some Indonesian expertise, baitfish were caught by a non-pole-and-line vessel and transferred to a floating pen for later transfer to a pole-and-line vessel.

⁶⁶ SPC (1984). An Assessment of the Skipjack and Baitfish Resources of the Northern Mariana Islands, Guam, Palau, Federated States of Micronesia, and the Marshall Islands. South Pacific Commission, Noumea.

The main alternatives to the local capture of baitfish for pole-and-line fishing are the culture of baitfish and transportation of baitfish into the region from other areas:

- The cultivation of baitfish for pole-and-line fishing has been undertaken at several locations in the Pacific Islands, including the Gilbert Group of Kiribati, Fiji, Samoa, American Samoa, and the Tuamotu Islands of French Polynesia. This has involved mainly milkfish and mollies, but also several other species.
- Baitfish has been transported into the region for pole-and-line fishing for many decades by Japan-based pole-and-line vessels. In recent decades that fleet has used such technology as refrigerated bait wells to reduce the mortality of temperate bait species in warm seas.

What have been the lessons from the above attempts at mitigating baitfish shortages?

- Many of the alternative baitfishing techniques involved much rigorous effort (e.g. setting nets by diving, herding baitfish by swimming), something that crews used to the relatively easy bouki-ami technique were not enthusiastic about.
- The techniques that were carried out in daylight and/or near villages created much friction with local residents.
- The main difficulty with the above culture and transport schemes is that they add substantial costs to pole-and-line fishing – which (even without those extra expenses) already has difficulty with high production costs relative to purse seining
- Many of the new baitfishing techniques were trialled after pole-and-line fishing had begun its decline in the region: (a) many “fishery innovators” had already abandoned pole-and-line fishing in favour of longlining or purse seining, and (b) marginal increases in baitfish availability were not sufficient to compensate for some of the major factors working against pole-and-line fishing, such as prices paid for fuel and prices received for tuna.

There is no evidence to show that any of the attempts of baitfishing innovation have resulted in a remarkable improvement in productivity over the bouki-ami, or a reversal of the demise of pole-and-line fishing. This has implications for proposals to revitalize pole-and-line fishing in the region that are based on innovative baitfishing schemes.

6.5 Proposed Baitfishing Schemes

Because baitfishing has been a major constraint on the former pole-and-line fisheries and because there are indications of additional constraints on baitfishing today (e.g. exclusion from marine protected areas), it is logical that FFA has focused significant attention on the baitfishing issue in its present pole-and-line promotion efforts. Staff of the Agency’s Development Division are to be commended for “thinking outside the box” and putting much effort into researching ways to circumvent baitfish shortages.

From the available FFA literature, it appears that the major elements of the proposed FFA baitfishing schemes are the use of the Indonesian “*bagan*” technique, community involvement in baitfishing, and the use of baitfish management plans. From a lessons learned perspective (the theme of the present report), it should be noted that there is no heritage of using *bagan* in the Pacific Islands, limited experience of local community involvement in baitfishing activity, and some experience of using baitfish management plans.

The methodology used in this report is to list the positives/negatives or advantages/disadvantages of the three elements, based to a degree on the opinions of knowledgeable people listed in Appendix 1. In that way, individuals/organisations considering involvement in those schemes may have more information on which to base decisions. This may be more useful than simply speculating on how the three elements could improve baitfishing in the future.

Bagan technique:Positives:

- Allows for pole-and-line fishing by vessels too small to use adequate size bouki-ami gear
- Can be operated as a separate commercial operation
- Capital requirements and level of technical sophistication are such that communities could conceivably operate the fishing gear
- Models of such operations are available in Indonesia

Negatives:

- Bagan use is unproven in the Pacific Islands; limited to Indonesia where economic, social, and baitfishing resource conditions are very different.
- Does not "create bait" or increase the productivity of baitfishing grounds.
- Bagans operated as separate commercial entities add additional expenses onto the already marginally viable pole-and-line fishing.
- Vessels large enough to carry a bouki-ami would probably need some form of coercion to spend the extra money on bagan bait.
- Bagans are characteristically less mobile than pole-and-line boats and skipjack fishing grounds often move around. Consequently, pole-and-line boats would have difficulty providing a guarantee of bait purchase, yet would require a guarantee of bait availability from bagan operators.
- This gear adds complexity to pole-and-line fishing (e.g. two commercial entities, required coordination) when there is a need in small-scale tuna fishing for simplification.

Community involvement in baitfishing:Positives:

- Relief of a major problem in past pole-and-line fisheries: friction between pole-and-line operators and communities adjacent to baitfishing grounds.
- Allows coastal communities to share in the wealth generated by tuna resources.
- Contribution to mitigating urban drift.
- Creation of a constituency against de-forestation in upstream areas.

Negatives:

- Community involvement is reliant on a form of baitfishing that is unproven in the region.
- One of the major lessons in fisheries development in the region during the past half century is that rural fishers cannot be relied upon to reliably produce commercial quantities of product. Regular baitfish would be required, but it is uncertain how reliable this would be from community baitfishing operations.
- Many knowledgeable people feel that pole-and-line operations must be driven by the private sector, but commercial fishing company express a great reluctance to get involved in community-level fisheries development.
- Donor support and/or subsidies may be required for a long period.

Baitfish management plans:Positives:

- Issues are highlighted and measures to address issues are formulated and agreed to prior to issues reaching crisis points.
- Management of a baitfishery is not extremely difficult (e.g. controls on total catches and/or boat-nights).

Negatives:

- Substantial time and money would often be required to adequately consult with all stakeholders – and arrive at a situation that is acceptable to all parties.
- Simply formulating fishery plans does not make problems go away: the availability of a plan is no guarantee that it will be adhered to.
- There are difficulties associated with determining optimum production from a baitfishing site.

Given both the positives/negatives, it can be seen that the situation is complex – and there are likely to be major differences between countries and even communities. It follows from the information presented above that it cannot be automatically assumed that bagans, community involvement, and management plans will resolve baitfishing problems experienced in the past. Furthermore, even if baitfishing problems are significantly mitigated, this does not guarantee the profitability for pole-and-line fishing.

7.0 Financial Information on Pole-and-Line Operations

For the present study it was originally intended to use financial information obtained from the three remaining pole-and-line operations in the Pacific Islands (Appendix 2) to explore financial aspects of pole-and-line fishing, especially profitability. The extremely poor condition of two of those companies eliminated most of the possibilities for obtaining meaningful financial information from commercial operations in the region. The sole remaining possibility for obtaining such information was from National Fisheries Developments (NFD) in the Solomon Islands.

7.1 NFD Revenue and Cost Information

NFD cooperated fully with the study and provided a significant amount of information, allowing some insight into the various forces that affect the commercial decisions of fishing companies contemplating the operation of pole-and-line vessels. It should be noted, however, that the data is unverified and company-supplied. On the other hand, in this case there appears to be little incentive for the company to mis-report this information.

NFD provided two types of analysis that are very relevant to promoting pole-and-line fishing. The company management stresses that this analysis should be considered indicative rather than definitive, as they are based on a limited amount of recent pole-and-line operational data, only direct vessel costs are considered (i.e. certain costs are not included such as insurance, depreciation, interest), and that NFD is an atypical purse seine company in that it has pole-and-line assets and a large amount of shore infrastructure.

Calculations by NFD management using recent data show:

- **On the revenue side:** A new purse seine vessel of the type NFD operates would cost about US\$12 million. This equates to about three or four new pole-and-line vessels of the size that NFD would be comfortable in operating. That class of pole-and-line vessel would be expected to catch about 1,250 tonnes of tuna per year, or 5,000 tonnes for four vessels (less if three vessels). The aforementioned purse seiner would also be expected to catch 5,000 tonnes. In this example, if a premium of \$100 per tonne⁶⁷ is given for pole-and-line fish, the gross revenue would be about \$0.5 million greater for the pole and line vessels.
- **On the cost side:** The direct cost of producing pole-and-line tuna is about 17% higher than the purse seine tuna. If the costs of shore support are included, the production costs of pole-and-line are about 40% greater. This is because a purse seine vessel can operate with next to no shore support, whereas even a few pole-and-line vessels need a lot of support. Such support can easily run to an additional US\$200 to \$300 per tonne of catch.

The above two examples give some insight as to the reservations of re-embarking into pole-and-line fishing by a company that knows well the Solomons, the purse seine fishery, the pole-and-line fishery, and tuna marketing. In addition to NFD's thinking on revenue and costs, the company feels that a pole-and-line premium of \$100 per tonne is achievable today, but the longer term prospects are by no means clear yet, however good they appear to be.

7.2 Some Historical Financial Information

It is likely that a paper written in the early 1980s on the PNG fishery⁶⁸ contains more financial information on pole-and-line fishing in the region than in any other publically-available document. Box 2 below summarizes the important information.

⁶⁷ This amount of premium was confirmed by NFD management in October 2011

⁶⁸ Doullman, D. and A. Wright (1983). Recent Developments in Papua New Guinea's Tuna Fishery. Volume 45, Marine Fisheries Review, Oct/Dec 1983.

Box 2: Financial Information on the PNG Pole-and-Line Fishery

During the height of the PNG pole-and-line fishery in the late 1970s operations were carried out by two companies, StarKist and New Britain Fishing Industries and took place around Kavieng and in the East New Britain Province.

Between 1979 and 1981 (the period covered by this analysis), an average of 41 boats operated on a full-time basis during each fishing season. Most were 59 GRT class vessels, about 12 m [sic] long. In 1979 catch was 26,944 t of tuna and averaged 28,357 t per year over the review period.

PNG's mean annual FOB tuna price rose from \$786 in 1979 to \$1,080 in 1980, easing to \$1,040 in 1981. Over the three year period a mean price of \$969 was recorded.

The average operating cost of a typical 59 GRT pole-and-line boat in PNG's domestic fishery in 1981 was \$565,000, though costs ranged from \$384,000 to \$728,000 for individual boats across the fleet. The major cost item for these boats was fuel which accounted for approximately 35 percent of the total operating costs.

Catch per fishing day in the period ranged from 3.6 t on average per day in 1980 to 3.3 t in 1979 and 1981. The distribution of catcher boat landings between 1979 and 1981 shows that on average 20 percent of the fleet took less than 499 t of tuna per year, while 49 percent landed less than 699 t. Economic investigations have revealed that catcher boats need to take 800-850 t of tuna per annum at long-term average prices to operate at a break-even position. Thus over the review period, at least 50 percent of PNG's domestic fleet operated at a loss.

From 1979 to 1981 an annual average of 1,020 nationals and 630 foreigners were employed as crew on the pole-and-line vessels. During 1981, the mean annual wage paid to nationals employed on catcher boats was \$3,200, including bonuses. In comparison, mean wages and bonuses paid to Okinawans and Koreans employed in similar capacities were approximately \$14,000 and \$13,000, respectively.

Financial benefits accrued to the PNG Government through taxation and royalty payments to the baitfish owners. Total payments by industry to government and baitfish owners averaged \$2.1 million per year over the review period.

In early 1982 both Star-Kist and NBFI announced that their fishing operations would be suspended until the world tuna market improved. Factors responsible included low profitability, the cyclical downturn in the tuna market which occurs every 3-4 years, a recession in the USA, prevailing high interest rates, and a movement by canners to disengage from fishing operations.

Some important features of the PNG case above are the relatively high price of tuna during those years (US\$969) and the large portion of the fleet operating at a loss during that period (more than half the fleet).

The price of tuna during that period deserves additional attention as it has some relevancy to the issue of premiums currently paid for pole-and-line tuna. An FOB price of US\$969 per tonne during the height of the PNG pole-and-line fishery is equivalent to about \$3,000 expressed in 2011 dollars⁶⁹. Bearing in mind that many important factors affecting profitability besides tuna prices have degraded significantly in the last three decades (Section 5.1), a price today for pole-and-line tuna (including premium) of \$1,400 does not seem very attractive.

This simplistic analysis is consistent with the statement on pole-and-line by a representative of a large purse seine company in PNG: "We are not sure on the economics of the game unless the market will really pay a much higher premium for it."

7.3 Financial Considerations Related to Scales of Operation

Consideration of the viability of a pole-and-line fishing is quite different for the various scales of fishing operations. In the promotional literature it is not always clear whether the operations under discussion are industrial or small-scale or somewhere in between.

⁶⁹ Based on a compounding factor of 3.55 for 30 years.

The economics of the large scale pole-and-line operations are reasonably well known, at least to the types of companies capable of investing in such ventures. To a certain degree, if there was money to be made, they would be doing in now. There appears to be little that pole-and-line promoters can tell these companies about the economics of their business that would catalyse change to increase pole-and-line fishing. If the premium for pole-and-line rises substantially, some movement is likely. Other less likely factors that could alter the economics include management restrictions on purse seining that do not apply to pole-and-line and direct action by NGOs (such as was done recently to chains of retail stores). Community development obligations stipulated in on-shore investment agreements of some Pacific Island Countries could affect company decisions on large-scale pole-and-line fishing.

The economics of small-scale pole-and-line operations represent “un-charted territory” and there is considerable speculation involved in *anybody* making annual catch estimates, considering the unpredictability of small-scale producers, especially in a complex fishing operation that involves both tuna fishing and bait fishing and which occurs in a developing country. Comparisons to financial performance of small-scale pole-and-line fishing in Indonesia are difficult due to fuel subsidies, economies of scale, and differences in social/economic conditions.

The issue of the feasibility of small-scale pole-and-line operations was discussed with several knowledgeable individuals. There was a variety of opinions on the subject, but a general agreement that such a fishery, after initial establishment costs, would require a subsidy or donor support for a very long time, especially for a fishery in a rural area. The justification for this includes:

- Analogies were drawn to the time and expense of the much less complex process of establishing marine protected areas in areas of Melanesia.
- The time/expense required in the region in the past to commence and bring to fruition development projects of at least moderate complexity. As an example, a project to develop bottomfishing in Tonga (far less complex than what is being suggested for pole-and-line) commenced in 1983 and was completed in 1993.⁷⁰
- The complexity of the type of pole-and-line operation under consideration is much greater relative to what has been successful in the region in the past. That pole-and-line model involves two fishing vessels (baitfishing, tuna fishing), coordination between the vessels, ice production, formulation/approval/implementation of baitfish management plans, issues of mechanical maintenance and spare parts in rural areas, fuel availability, village financial transactions, and many other issues. Furthermore, the culture of baitfish to supply pole-and-line vessels is being suggested for some areas.
- There is a large spectrum of social issues that constrain commercial fisheries development in rural areas of the Pacific Islands. This is expressed in an FFA paper: “Artisanal vessels are usually associated with a plethora of social and economic activities as well as weather associated factors that dictate the day to day activity of the vessel owner and crew.”⁷¹

The above should not be considered an argument against development of pole-and-line fisheries, but rather draw attention to the need for government and/or donor support for a substantial period of time.

The issue of who is to pay for the long-term development of a small-scale pole-and-line fishery is interesting – in that the papers of the various promoting organisation (FFA, Greenpeace, Friends of Pole and Line, etc.) all indicate that some other agency will pay. Many of the people interviewed in the current study had views on this topic:

- There are few, if any, agencies these days that fund fisheries development projects that entail things such as building boats, master-fishermen, project managers “like a 1970s-style UNDP/FAO project”.
- The big fishing companies should fund such work out of corporate social responsibility.

⁷⁰ Ministry of Fisheries (1993). Artisanal Fisheries Development Project TON/81/C011 Completion report.

⁷¹ Stone, R. (undated, “working document”). Implementation of a pilot project to develop artisanal tuna supplies for processing. Forum Fisheries Agency, Honiara.

- Staff of the FFA Development Division indicate that, as both Solomons and PNG require a community development component to investment proposals, funding could come from that source.
- “If Greenpeace thinks that this work is so feasible and profitable, they should put their money where their mouth is.”

8.0 Some Miscellaneous Observations

Limited expertise: The amount of expertise utilized in the promotion of pole-and-line fishing appears quite limited. During the course of this study it became apparent that only a very small number of the 70 people listed in Appendix 1 are intimately familiar with the opportunities and limitations of pole-and-line fishing. The number of such people currently dispensing advice on the subject is even smaller. In such a situation it is easy to see why the thinking of some agencies appears impractical.

Fishing capacity: The issue of fishing capacity⁷² does not receive much attention in pole-and-line promotion efforts in the Pacific Island region. By contrast, much of the interest in pole-and-line on the part of NGOs in Indonesia is to use pole-and-line as a fisheries management tool to reduce fishing capacity. Greenpeace has stated “any increase in pole and line must go hand-in-hand with adequate capacity reduction in other sectors of the fishery”. This appears to be a (rare) case of similarity to the ISSF position: “With near universal consensus that there is already excess capacity in tuna fisheries – meaning more vessels than the resource can support – any growth in pole and line fleets must be met with a reduction in the capacity to catch of other fisheries. Without that, any growth in pole and line fishing would not be sustainable.”⁷³ In the Pacific Islands, pole-and-line development appears to be focused on deriving greater benefits from the tuna resources, but according to FFA Development Division staff, decreasing fishing capacity in the tuna fisheries is also important.

Indonesia: In previous sections of this report it is noted that much of the recent pole-and-line promotion efforts in the Pacific Islands region depend on replicating Indonesian pole-and-line fishing and baiting techniques. Although there may be considerable value in such an approach and it is commendable that the Asian techniques were investigated, it would be unwise to be overly-dependent on models from a country where conditions affecting pole-and-line are very different: scales of operation, fuel subsidies, work ethic, social arrangements, fishery resources, and many other factors. The domination of commercial activities in the Indonesian province of Papua (where the indigenous population is Melanesian) by transmigrants from western Indonesia offers some insight into this situation. Also to be considered is the contraction of pole-and-line fishing in Indonesia in recent years.

9.0 Analysis of Pole-and-Line Promotion and the Potential of Pole-and-Line

Many people promoting pole-and-line feel strongly that development of a fishery should be led by the private sector, but the results of the present study indicate that most companies that may have an interest in pole-and-line have commercial-type priorities: catch lots of fish cheaply, stick them into cans, and sell them at a premium in the EU market – and certainly not get into the details of community-level development work. In some respects, the factors that make pole-and-line fishing attractive to NGOs and governments of Pacific Island countries are precisely the things that commercial tuna companies want to avoid: long-term village commitments, issues of social equity, and purchasing products from rural producers of unknown reliability. This situation is altered somewhat by community development obligations implicit in on-shore investment agreements in both PNG and the Solomon Islands.

⁷² The term “Fishing capacity” is used here to mean the potential catch if the vessels in the fishery are fully utilized.

⁷³ <http://iss-foundation.org/2011/03/04/greenpeace%E2%80%99s-simplistic-approach-lacks-depth-needed-for-sustainable-tuna-fisheries/>

It can be seen that there is a huge difference between encouraging a large commercial tuna company to participate in pole-and-line fishing and developing a rural small-scale pole-and-line fishery. These two scales can be thought of as ends of a spectrum – and analysis can be simplified by conceptually separating them:

- Large-scale: There are a limited amount of interventions that could or should be undertaken to catalyse pole-and-line fishing at the producer end. To some degree, if there is a real opportunity, this type of pole-and-line fishing will “fly” unassisted by outside agencies. Also, there is some question whether it is appropriate for development agencies and NGOs and to assist large fishing corporations.
- Small-scale: Much assistance is required to develop such a fishery. Government or donor funding would be necessary to establish the operations and to maintain them for what is likely to be a very long time. Factors to be considered are the enthusiasm of the private sector to be involved, willingness of long-term donors, and the complexity of such operations.

The above has considerable relevance for future efforts to promote pole-and-line fishing (Section 11.0 below).

For decades, conditions overall have been unfavourable for pole-and-line fishing in the Pacific Islands as well in many other regions – as evidenced by the decline in fleets in the Pacific Islands, eastern Pacific and in the Atlantic and by lack of success of pole-and-line promotion efforts. Previous sections of this report have mentioned several factors affecting pole-and-line success that have degraded in the past few decades. From a development perspective it is important to identify those features/innovations perceived to have improved – and scrutinize them for their likelihood of occurring and magnitude of positive contribution. The most important positive factors that emerged in this study appear to be:

- Premium for pole-and-line tuna: Consumer-oriented promotion efforts have achieved some degree of success in creating market demand - it appears that prices have risen recently. The rise has not been enough yet to entice the large fishing companies of the region into pole-and-line fishing. Given the current demand situation, prices are likely to rise more, but the increase will not be infinite and at some as yet undermined point consumer resistance will set in. MSC certification of an extremely large purse seine fishery is likely to have a major negative impact on pole-and-line promotion efforts that are based on premiums.
- New vessel designs: FFA sponsored the design of a small-scale pole and line vessel. There is a reasonable chance that such a vessel will be more economical to operate than the Japanese-style vessel used in former times in the region. On the other hand, if such a vessel is part of a rural small-scale pole-and-line scheme, there are numerous factors working against success, as detailed above.
- New baiting scheme: Section 6.5 above discusses positives/negatives of community involvement in baitfishing and the use of the Indonesian *bagan* technique. In summary, these schemes could circumvent some baitfishing problems experienced in the past, but success is by no means assured due to several factors, including reliance on subsistence communities to reliably produce baitfish at times specified by pole-and-line vessels.

The analysis above facilitates speculation on how significant the current opportunity actually is for the development of pole-and-line fisheries in the Pacific Islands. There is a great amount of uncertainty associated with this subject, as evidenced by the wildly differing opinions on pole-and-line potential held by the large number of people interviewed in the present study. Nevertheless, some thoughts on potential may be useful – if for no other reason than encouraging a rigorous debate on the subject.

The opportunity for large-scale pole-and-line development in the region is highly dependent on a significant rise in the current premium for pole-and-line tuna. Although the future of the premium is far from clear, a rise unlikely to occur if the FAD-free purse seine fishery in the region is certified and remains certified. The opportunity for small-scale pole-and-line development is, in the opinion of the consultant, highly dependent on a significant amount of long-term support through government or donor funding. This contention is based on the time required in the region in the past to commence and bring to fruition development projects of at least moderate complexity (e.g.

bottomfish development in Tonga) and current efforts by NGOs to establish marine protected areas in some of the countries where pole-and-line developments are being considered.

Following from this and using information presented in earlier sections of this report (e.g. trends in the fleet, success of pole-and-line promotion anywhere, recent investment, baitfishing potential), the opportunity for pole-and-line development in the Pacific Islands region could be described as “modest at best”, with considerable differences between countries.

During the present study, of those individuals interviewed who are at least moderately familiar with pole-and-line fishing and the realities of tuna fisheries in the Pacific Islands, few held opinions on the opportunities afforded by pole-and-line in the region that are remarkably different than the above statement.

10.0 Lessons Learned and Emerging Issues in the Promotion of Pole-and-Line Fisheries

10.1 Lessons

The history of pole-and-line promotion in the Pacific Islands region could provide some important lessons for the future of the activity. “Lessons” are taken to mean results that have occurred often enough so there is a reasonable possibility that, in similar circumstances, there will be similar outcomes. It is recognized that there is a fair amount of subjectivity in this exercise and the same situation could be interpreted differently. Nevertheless, there may be value in attempting to identify what are believed to be especially evident lessons.

The staff of the FFA Fisheries Development Division in general feel that the FFA/DevFish involvement in pole-and-line promotion has been too short to derive major lessons. From an outside perspective (that of the consultant) it appears that a lesson of the FFA involvement is that this type of development takes longer than originally anticipated and that industry players move slower than planned.

Recent investment in pole-and-line fishing in the region has been meagre: “talk is cheap” when it comes to making substantial investments. Historically, it has not been possible to identify cases of successful pole-and-line promotion in the Pacific Islands in the past three decades (Section 4.3 of this report). The lesson here appears to be that the pole-and-line development or revitalization in the region is a very difficult task and certainly not as easy as stated in some of the NGO promotional literature.

Similarly, in the numerous attempts of pole-and-line promotion in the southwest Indian Ocean spanning 25 years (Section 4.2 of this report), none have been successful. This seems to indicate that the Pacific Islands is not the only region struggling to succeed in pole-and-line promotion.

There has been considerable attention focussed on the development of small-scale pole-and-line fisheries. A major lesson derived over many decades of general fisheries development experience in the Pacific Islands was articulated in 1983 and remains valid today: “the basic structure of the subsistence sector is not conducive to the regular supply of fish in sufficient quantities to meet consumer demand”.⁷⁴ This lesson was expressed in a slightly different way by a recent FFA paper: “Artisanal vessels are usually associated with a plethora of social and economic activities as well as weather associated factors that dictate the day to day activity of the vessel owner and crew.”⁷⁵ The lesson here is that reliance on small-scale fishers in commercial pole-and-line operations is fraught with difficulties. This is not to argue against the merits of small-scale and rural fisheries

⁷⁴ Carleton, C. (1983). Guidelines for the Establishment and Management of Collection, Handling, and Marketing Facilities in the South Pacific Commission Area. SPC, Noumea.

⁷⁵ Stone, R. (undated, “working document”). Implementation of a pilot project to develop artisanal tuna supplies for processing. Forum Fisheries Agency, Honiara.

development, but to point out the extra difficulties this poses for small-scale pole-and-line development.

Several lessons learned on pole-and-line baitfishing in the region are given in Section 6.0 of this report. The overall main lesson learned appears to be that, despite decades of attempts, no baitfishing innovation has resulted in a remarkable improvement in productivity over the bouki-ami, nor a reversal of the demise of pole-and-line fishing. In addition, an important message is that the limited baitfish resources of atolls add yet another major element working against the viability of pole-and-line fishing.

Another important lesson is recognized in the FFA Regional Tuna Management and Development Strategy: “there is a record of general failure of investments in the region by governments in fishing and processing ventures, and a recognition that successful domestic development depends on national and foreign private investment. An FFA/ADB report⁷⁶ examined many cases and concluded: “Unfortunately, with very few exceptions, government tuna ventures that have operated for more than two years have been unprofitable and have required additional heavy injections of public funds to maintain operations.”

10.2 Emerging Issues

In the present study several important issues emerged that deserve at least some mention. Although some of these are somewhat beyond the scope of this report, they are highlighted for possible attention in the future.

The relation between pole-and-line tuna and FAD-free tuna is an interesting issue. It appears that there is a reasonable possibility that the region’s FAD-free purse seine fishery will receive MSC certification. If so – and bearing in mind that some retail chains have committed to ONLY pole-and-line and some to pole-and-line OR FAD-free – encouraging the broader commitment would have advantages for the PNA countries. Expressed in a different way, if the levels of pole-and-line production in the Pacific Islands remain the same (i.e. a tiny amount), commitments by retail chains to ONLY pole-and-line tuna work against the current interests of the region. If the FAD-free fishery in the region does not get (or does not maintain) MSC certification, another form of verifying FAD-free tuna would be very valuable – judging from the comments of EU tuna traders.

In the quest for successful promotion of pole-and-line fishing, at least some attention should be focused on an important aspect of the development models used. Many regional and international development agencies provide assistance “on request of a government”. On the other hand, opportunities for development are not evenly distributed. The reality is that fisheries rarely get developed “on request”, but rather by having appropriate interventions working with the right combination of opportunities, entrepreneurial skills, government policies, and capital. An important issue for a development agency is the trade-off between focusing development resources on places thought to have the required elements for success, and the need to respond to country requests.

There is currently some sentiment in several tropical regions that hand-line fishing for tuna is more profitable than small-scale pole-and-line fishing. In many cases the capital requirements are smaller and the hand-line fishery is not constrained by the availability of live baitfish. The fact that many Indonesian and Maldivian pole-and-line fishers have switched to hand-line fishing adds support to this contention, but recent experience with Philippine-style “pump boats” in PNG and the Solomons shows that “all that glitters is not gold”. The issue of giving more support to tuna-handlining deserves some attention.

⁷⁶ Pollard, S. (1995). Tuna Industry Development Study – Regional Report. Report 95/66, Forum Fisheries Agency, Honiara.

11.0 Suggestions for Future Pole-and-Line Promotion Efforts

11.1 Opinions of Stakeholders

Many of the people interviewed during the present study had opinions on future pole-and-line promotion efforts. Because considerable thought has gone into some of these ideas, there is some degree of obligation to present those opinions. These are not all the ideas received, but an effort is made here to portray the spectrum of opinions.

- Refrain from any more involvement in promoting large-scale pole-and-line fishing: “you can lead a horse to water, but you can’t make it drink”.
- There is a need to put pole-and-line promotion on hold in order to see how the MSC certification of FAD-free purse seine plays out.
- Keep on doing what FFA is doing now in pole-and-line development - until sufficient time has elapsed to determine the impact of a few years of effort.
- How in this present day can FFA be pushing an unviable fishery?
- FFA has done all the general work in pole-and-line promotion, now they should only respond to country requests.
- FFA should not irreversibly hitch its tuna development wagon to pole-and-line fishing. They have put a significant amount of effort into pole-and-line promotion and there should be a review of priorities in fisheries development – surely there must be other areas that deserve at least the amount of attention that pole-and-line has received.
- Because there are unlikely to be marvellous technological improvements on the catching side, the demand side should be closely monitored for market developments and any opportunities created by WCPFC fisheries management measures.
- Small-scale pole-and-line development projects are what the region needs, but likely to be beyond what most developing country governments can afford and what donors prefer to fund.
- Large tuna fishing/processing companies have a corporate social responsibility to nurture small-scale pole-and-line development.
- In some cases local markets for skipjack could be bigger than what we think – what is needed are projections for future demand (i.e. like that in the “Future of Fisheries” report) and an economic analysis of the feasibility of pole-and-line to supplying those future markets.

11.2 Some Conceptual Considerations

The above ideas (and others received during the study) as applied to future pole-and-line promotion activities can be crudely classified into three categories: (a) more of the same, (b) ceasing involvement in pole-and-line promotion, and (c) a change in emphasis in current pole-and-line activities. The results of the present study seem to suggest something between (b) and (c).

Any changes to the present type of pole-and-line promotion should consider current weaknesses. At the risk of over-simplifying a complex situation, the present Pacific Islands pole-and-line work trajectory appears to suffer from two major problems: (a) highly dependent on the improvements provided by small pole-and-line vessels and by Indonesian bagans for baitfishing, both of unknown productivity when operating in the social/economic conditions prevailing in the Pacific Islands region, and (b) a deficit of private sector interest.

Arguments are presented in previous sections of this report that indicate there are few technical interventions that could or should be undertaken in the future to catalyse large-scale pole-and-line fishing. To a certain extent, the larger companies know their businesses well and the future for those corporations in pole-and-line will be determined by market forces and other factors that FFA is not in a position to influence. Some strategic and analytical action related to large-scale pole-and-line is suggested in the sections below.

Another issue that should be carefully considered in future pole-and-line promotion efforts is the social dimension. It is well-known that pole-and-line fishing has many positive social attributes, of which the relatively large employment of this fishing method (both ashore and on-board) is often considered the most important. As mentioned in Section 3 above, the lack of employment opportunities is arguably one of the most serious long-term problems faced by many Pacific Island Countries. It is quite reasonable that countries of the region look to pole-and-line fishing to contribute to employment opportunities. It is an irrefutable fact that in the past significant employment was generated by the fishery.

There are very different ideas on generating employment from pole-and-line fishing in the future. One perspective is that because obtaining social and economic benefits at the community level within the Pacific Islands is a priority, the option of pursuing pole-and-line development should be evaluated on terms broader than just the commercial viability of the fishing entity. A very different perspective is that such fishing is unlikely to be profitable in the short or medium term, so it must be supported for a lengthy period – which has social opportunity costs (i.e. donors/governments have other ways and other sectors to support social causes). Alternatively, some individuals are not convinced that the development of pole-and-line fisheries necessarily requires support for a long period.

In considering these various opinions on the desirability of promoting pole-and-line fishing for social purposes, there is likely to be considerable variation across countries of the region. The decision to develop pole-and-line fishing for social purposes is a value judgement that involves weighing commercial feasibility, availability of government and/or donor resources, and alternatives for supporting social causes - something that can only be done by the concerned government.

11.3 What to Avoid

With the benefit of hindsight, some areas of pole-and-line promotion that should be avoided can be suggested:

- Refrain from investing a significant amount of resources in encouraging big tuna corporations to move into pole-and-line. They will do it themselves - if and when conditions are right for them.
- Avoid formulation of comprehensive bait-fishing/tuna-fishing schemes (“pilot projects”) in countries where the opportunities are very limited, even though requested by a government. Such action on schemes may convey the perception of the desirability/feasibility of the project and/or endorsement.
- Abstain from backing government involvement in commercial pole-and-line fishing. Lack of private sector interest in a commercial venture is likely to be a sign of non-sustainability, not justification for government involvement.

11.5 Suggestions for the Future

The following are suggestions for priorities in future pole-and-line promotion work. Rather than a prescriptive list of what should be done, the following is largely a list of items that should receive more attention than in the past.

Economic analysis

There appears to be strong justification for more economic analysis of pole-and-line activities:

- The report of the September 2009 workshop on establishing pole-and-line fisheries in the region⁷⁷ recommended additional economic feasibility studies, including an analysis of economies of scale, cost of marketing, accessibility, and competition.

⁷⁷ Anon (2009). Workshop on the Establishment of a Sustainable and Equitable Pole-and-Line Skipjack Fisheries in the Pacific, 1st September, Port Moresby, PNG

- This need for more economic and production information was recognized in the 2010 EU-funded analysis of the pole-and-line scheme for Kavieng in PNG⁷⁸ - which called for “further work to confirm the effectiveness and efficiency of the proposed production methods” (i.e. small vessels).
- In earlier sections of this report attention is drawn to the heavy reliance on small pole-and-line vessels for reversal of the poor state of pole-and-line viability. Because the economics of small-scale pole-and-line operations represent “uncharted territory” (i.e. there is considerable speculation involved in *anybody* making annual catch estimates), there is a need for much greater scrutiny of viability.

The FFA’s Fisheries Development Division should be commended on the amount and detail of the financial analysis that has been undertaken in support of pole-and-line promotion. Future work by FFA or other agencies should be somewhat different with respect to purpose, presentation, and scope. Ideally, there would be much emphasis on undertaking objective and detached analysis of the opportunities afforded by pole-and-line operations of various scales and for various markets, clearly laying out what feasible, what is not feasible, and what is unknown. Social benefits should also be considered. The results should be written up concisely and be available for scrutiny by stakeholders.

Emphasis should be placed on the analysis as a tool to decide if pole-and-line development should be promoted, rather than as a tool to promote pole-and-line development. An increased emphasis on economic feasibility studies (and down-playing the preparation of schemes for comprehensive fishing projects) could reduce the possibility of the difficult situation that has arisen in the past: requests from governments to formulate projects predicated on dubious economic foundations (Section 11.3 above).

Other items

A major unknown in current pole-and-line promotion work is the productivity and profitability of small pole-and-line vessels and bagans, upon which so much depend. The operation of that gear in the Pacific Island social/economic environment is likely to be vastly different than in Indonesia where it originates and where all the currently available operational data is from. It appears that at least part of the current approach to determining productivity/profitability is by implementing relatively large pilot schemes (i.e. a need to actually do it, rather than estimate/speculate). On reflection, there is considerable doubt whether an expensive scheme that uses imported skills and management expertise and donor funding can provide useful data on how small vessels and bagans perform in a Pacific Islands commercial situation – the type of information that would be helpful to the private sector in making decisions on pole-and-line. An alternate approach to generating commercially useful information (or at least a contribution) would be to carry out a comprehensive and objective feasibility analysis using Indonesian data, with scaled-back productivity (e.g. using one-half and one-third the Indonesian catch rates). Other cost-effective ways of generating data on the performance in the region of small vessels and bagans that is useful to the private sector should be explored.

Increased attention should be placed on the demand side. Because it is unlikely there will be remarkable technological improvements on the catching side, the demand side should be closely monitored for market developments and any opportunities created by WCPFC fisheries management measures (e.g. time/area exclusion of purse seining). It is especially important to stay abreast of the MSC purse seine certification process and the reaction of the tuna traders.

Following from the above emphasis on the demand side, there should be a consolidation of the existing marketing information – From experience gained in the present study, it can be stated that much of what has been learned by various agencies on the disposal of pole-and-line fish is not readily available. Issues like the ability for pole-and-line fish to compete with purse seine fish (i.e. for domestic canneries or for export) and advantages/limitation of sales to local markets for domestic consumption are crucially important - and likely to be well-known by those directly

⁷⁸ Scott, I. (2010). Feasibility Assessment & Business Planning for Exports to the EU of Tuna Products Based on a Sustainable Pole & Line Fishery in Kavieng. Secretariat of the ACP Group of States or the European Commission.

involved in the work - but currently it would not be easy for other tuna industry stakeholders to access that information. Experience from other fisheries projects in the Pacific Islands suggests that the idea of waiting for some point in the future to document such knowledge often equates to knowledge lost. It has been stated that a consolidation at this point of the existing marketing information could easily be the most valuable contribution that could be made to large-scale pole-and-line fishing.

Although the socio-economic aspects of pole-and-line fishing are often stressed in the promotional literature, good information on the impacts of the types of small-scale pole-and-line projects being promoted is not available. There should be some examination of labour/nutritional impacts of introducing a small-scale pole-and-line fishery for local consumption, bearing in mind that in this case pole-and-line would be relatively large-scale and capital intensive compared to the very small-scale tuna fishing that it would compete with. It would also be important consider the future and the potential for small-scale pole-and-line fishing to satisfy the nutritional requirements of greatly expanded populations in Pacific Island countries.

In this report arguments are advanced suggesting that more pole-and-line promotion work with the large tuna companies would not be very fruitful. The difficulties of small-scale pole-and-line work are also discussed. One possibility that may be worthy of further investigation is supporting medium-scale entrepreneurs – specifically, working with individuals that have some commercial experience and success. Some of the larger tuna companies in the region have indicated they would be willing to help manage smaller pole-and-line vessels as long as it does not involve ownership or financial responsibility. In some respects such an arrangement may circumvent one of the largest problems in promoting non-industrial pole-and-line fishing: the lack of interest by the private sector in the smaller scales of fishing.

12.0 Concluding Remarks

The opportunity for large-scale pole-and-line development in the region depends on a significant rise in the current premium for pole-and-line tuna. The future of the premium is far from clear, but a rise is unlikely to occur if the FAD-free purse seine fishery in the region is certified and remains certified. The opportunity for small-scale pole-and-line development is highly dependent on a significant amount of long-term support through government or donor funding.

Following from this and using information presented in this report (trends in the fleet, success of pole-and-line promotion anywhere, recent investment, bait-fishing potential), the opportunity for pole-and-line development in the Pacific Islands region could be described as “modest at best”, with considerable differences between countries.

A major lesson learned from examining the situation in the Pacific Islands and in other regions is that pole-and-line promotion is a very difficult task and there are few cases of success. A key recommendation of this study is that, in any future work on pole-and-line fishing, development agencies should give higher priority to objective and rigorous analysis of perceived opportunities.

Appendix 1: Individuals Contacted During the Pole-and-Line Study

(chronological order)

Person Contacted	Institutional Affiliation
Dan Sua	Forum Fisheries Agency
Mike Batty	Secretariat of the Pacific Community
Graham Southwick	Fiji Fish Company, former pole/line fisherman
Hugh Walton	Forum Fisheries Agency
Adrian Wickham	Solomon Islands National Fisheries Development
Robbie Stone	Forum Fisheries Agency, former pole/line fisherman
Len Rodwell	Forum Fisheries Agency
William Sokimi	Secretariat of the Pacific Community, former pole/line fisherman
James Movick	Forum Fisheries Agency
Chris Reid	Forum Fisheries Agency
Lagi Toribau	Greenpeace
Duncan Williams	Greenpeace
Mike Savins	Tarawa businessman involved in fisheries
Gert van Santen	Consultant, formerly of World Bank (including the Maldives program)
Tony Lewis	Consultant, formerly of Secretariat of the Pacific Community, and NFA/PNG
Bill Holden	Marine Stewardship Council, former tuna fisherman
Bob Kearney	University of Canberra, formerly of AFMA, Secretariat of the Pacific Community, PNG, WorldFish, and IATTC
Jim Ianelli	NMFS, formerly of Secretariat of the Pacific Community
Lida Pet-Soede	World Wide Fund for Nature
Jos Pet	Consultant
Andrew Bassford	Friends of the Pole and Line Development Group
Frank Chopin	Food and Agriculture Organization of the United Nations
Simon Funge-Smith	Food and Agriculture Organization of the United Nations
Ray Clarke	US National Marine Fisheries Service
Noah Idechong	Palau Congressman, former head of NGO and head of Marine Resources
Jose Ingles	World Wide Fund for Nature
Maurice Brownjohn	Secretariat of the Parties to the Nauru Agreement, former tuna fisherman
Kurt Schaeffer	Inter-American Tuna Commission
Mesei Chin	Palau Bureau of Marine Resources
Hisae Kuniyoshi	Kuniyoshi Fishing Company
Genaro Torres	Kuniyoshi Fishing Company
Joe, Amos, April	F/V vessel "Marine Star" (crew)
Peter Wilson	Consultant, formerly of Trust Territory Government, formerly of Maldives
David Itano	University of Hawaii
Chris Boggs	US National Marine Fisheries Service
Capt. Shigeru	F/V Nisei
David	F/V Nisei (engineer)
Charlie Pires	Owner F/V Nisei
Nick Rawlinson	Australian Maritime College (baitfish specialist)
Mike McCoy	Gillett, Preston and Associates
Les Clarke	Consultant to FFA and PNA
Miguel Herrera	Indian Ocean Tuna Commission
Steve Akester	MEP, and part owner of Maldivian pole-and-line vessel
Phil Roberts	TriMarine
David Ardill	Formerly of IOTC

Andrew Wright	Formerly of WCPFC
Phil Roberts	TriMarine
Shiham Adam	Maldives Marine Research Centre
Du Xue Jun	Golden Ocean, Suva and Tarawa
Jean Pierre Hallier	Institut de Recherche pour le Développement, formerly of SPC
Blane Olson	Anova Seafood
Aketa Taanga	Kiribati Fisheries Division
Gus Natividad	Frabelle Fishing Corporation
Helga Josupeit	Food and Agriculture Organization of the United Nations
Robert Lee	Food and Agriculture Organization of the United Nations
Pete Celso	RD Tuna Canners Ltd
Crick Carleton	Nautilus Consultants
Henk Brus	Atuna
Ian Bagshaw	Buying Director Fish, Princes Ltd.
Sari Tolvanen	Greenpeace
Liam Campling	Tuna trade consultant
Tom Parker	Sainsburys UK Ltd.
Michael Crispino	International Seafood Sustainability Foundation
Robin Pelc	Monterey Bay Aquarium Seafood Watch Program
Ian Cartwright	Consultant, formerly of FFA
Nigel Edwards	Seachill
John Briggs	Sancroft International
Seremaia Tuqiri	WWF
Dale Squires	US NMFS
Gerry Scott	US NMFS
JosuSantiago	AZTI

Appendix 2: The Three Remaining Pole-and-Line Operations in the Pacific Islands

Palau

The Kuniyoshi fishing company has operated a pole-and-line fishing vessel in Palau for several years. According to the company's operation's manager, the fiberglass pole-and-line vessel "Marine Star" is 24 GRT and 15 metres in length. Kuniyoshi has been operating the vessel since the 1990s. Prior to that period the company operated another pole-and-line vessel, the "Renjaber", which was chartered from the government. The "Marine Star" is the last of a fleet of Palau-based pole-and-line vessels that was at a maximum of 36 vessels in the early 1980s.

Live bait is obtained at night by using bouki-ami gear in the area of the Rock Islands. The vessel generally attempts to fish for tuna 5 days per week. Currently, the crew consists of seven Palauans and three Filipinos. A few years ago, the percentage of foreign crew was greater.

The vessel's managers indicate that tuna catches have averaged 20,000 pounds per month (i.e. 108 metric tonnes per year) in the last few years. The SPC yearbook estimates that catches by the Palau vessel were 100 mt per year in the period 1992-2000. An average of 1,300 gallons (4,921 litres) of diesel is used per month and the current price paid is US\$4.06 per gallon.

The catch is disposed of in the company's retail store adjacent to the office and residence of the owners. Some catch is sold on the roadside. Purchases at the retail shop are mostly for home consumption, but some are for restaurants and institutions. Current prices are US\$1 per pound for both skipjack and yellowfin, regardless of quantity. In early 2010 prices were \$1.25 to \$1.50, but were reduced due to poor economic conditions in Palau.

The vessel's management indicates that after the surge in fuel costs a few years ago the operation of the vessel is no longer profitable. They are not likely to continue operating a pole-and-line vessel after the present vessel is retired, unless they can charter a vessel from the government on concessionary terms, as was the case for the company's first vessel. Knowledgeable Palauans from outside the company indicate that current operations are unlikely to be profitable, but continue because the vessel supplies the company's retail store with fish and provides employment associated with social obligations. Vessel operations will probably cease when the elderly owner passes away.

Source: H.Kuniyoshi, G.Torres, N.Idechong



Hawaii

The Honolulu-based pole-and-line vessel “Nisei” is 79 ft (24 m) in length, 98 GRT, and was built in 1997. The vessel is owned by a company that also operates a shipyard, tugboats, and passenger vessels. The “Nisei” currently operates with six deck crew plus captain and engineer. It is the last remaining vessel in a fleet that numbered 35 boats in the late 1940s and six boats in 1991.

Live bait (mostly the anchovy *Encrasicholina purpureas*) is captured during the day. Formerly, most bait was captured in Pearl Harbor but military security concerns have closed that favoured baiting area.

Fuel currently costs US\$4 per gallon and fuel consumption is about 25 gallons per hour, or about 175 gallons during an average tuna fishing day. [175 gallons for 1.85 tonnes]

The lack of several other pole-and-line vessels operating out of Honolulu (“many eyes and ears”) means that scouting for schools is more time consuming. The high cost of fuel causes the searching strategy to be more conservative and more dependent on FADs.

The average catch is about 3,000 to 5,000 pounds (1.4 to 2.3 metric tonnes) per day in recent years, but is affected by the need to stop fishing during periods of good catches to prevent flooding of the limited local market. Currently all fish is sold through the Honolulu fish auction. In the 1990s a considerable portion of the catch was sent by airfreight to Japan, but that practice ceased about ten years ago.

According to the owner, the vessel is not profitable at present. The vessel ceased being profitable about two years ago when fuel costs surged. In 2010 the “Nisei” had less than 20 tuna fishing days. Ten year ago the price paid for the vessel’s catch averaged \$1.75 to \$2.00 per pound, and the price is currently about the same, but costs, especially for fuel, have greatly risen during that period. The closure of the cannery in 1984 resulted in dependence on a very limited local market – and market flooding during periods of high catches. The increased availability of longline fish on the local market in recent decades has resulted in downward pressure on prices. The vessel’s captain has a different view on profitability: the main factors detracting from profitability are the reduced number of schools in the past decade and the non-availability of good crew (many of the current crew are over 60 years old) may prevent future operations. Currently, the crew is eligible for unemployment benefits due to the low number of actual fishing days.

The future? The owner states that “this may be the last season”. He does not want to sell the vessel, for historical and emotional reasons – but concedes that fishing operations may soon cease, unless there is some remarkably positive change in the fishery. He feels that product development and minimum prices at the auction are key to future profitability.

Source: C.Pires, Capt Sigeru, D.Itano, Boggs/Kikkawa (1993)⁷⁹



Photo: D.Itano

⁷⁹ Boggs, C. and B. Kikkawa (1993), Development and Decline of Hawaii’s Skipjack Tuna Fishery. Marine Fisheries Review 55 (2).

Solomon Islands

National Fisheries Developments Ltd. acquired ten pole-and-line vessels in 1977 through a loan from the Asian Development Bank. The vessels were operated by the company until 1998. In 1998 the Solomon Islands Government introduced new higher taxes and duties on inputs including fishing vessels, fuel and spare parts, when NFD was contemplating bringing in a new pole-and-line vessel. As a result, pole-and-line fishing became non-viable, NFD terminated its pole-and-line fishing activities and began relying exclusively on purse seining.

Until 2000 Solomon Taiyo Ltd had the last large pole-and-line fleet based in a Pacific Island country, of around 21 vessels, with annual catches as high as 30 000 mt. Solomon Taiyo came to an end in 2000 when external factors caused the Japanese partner to pull out of the joint venture. In 2001 with Taiwanese aid money the Solomon Islands government reopened the company as a wholly state-owned enterprise called Soltai Fishing and Processing. The 21 pole-and-line fishing vessels left by Solomon Taiyo in 2000 were over twenty years old and were in a poor state of repair. Only 12 of the fleet of 21 were resurrected in 2001.

In 2006 two brand new pole-and-line vessels, provided through Japanese aid arrived in the Solomon Islands. At the end of 2007 the two new vessels plus one of the old vessels were still active, but in 2008 all pole-and-line fishing by Soltai ceased.

In 2010 a re-structuring of Soltai occurred in which NFD's parent company, TriMarine, became a shareholder. NFD purchased one Soltai pole-and-line vessel ("Solomon Endeavor", ex-Soltai 6) and has an agreement for operational responsibilities for the two remaining Soltai vessels: the Soltai 101 and Soltai 105 (the newer vessels that arrived in 2006). The refurbished "Solomon Endeavor" was operated by NFD for a few months in late 2010, along with the company's purse seiners, and is still operating.

According to TriMarine Management, a purse seine vessel can operate with very little shore support, whereas even a few pole-and-line vessels need a significant amount of such support. When the cost of this shore support is factored in, TriMarine's preliminary conclusion is that tuna production costs are at least 40% greater per tonne from a Japanese-style pole-and-line vessel than from the type of seiner that TriMarine operates in the Solomon Islands.

(Source: P.Roberts, A.Wickham, Barclay (2008))

