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**on**

**DEVELOPMENT OPTIONS AND  
CONSTRAINTS INCLUDING TRAINING  
NEEDS AND INFRASTRUCTURE  
REQUIREMENTS WITHIN THE TUNA  
FISHING INDUSTRY AND SUPPORT  
SERVICES IN TUVALU**

**16 to 27 November 2000**

**by**

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This field report forms part of a series compiled by the Fisheries Development Section of the Secretariat of the Pacific Community's Coastal Fisheries Programme. These reports have been produced as a record of individual project activities and country assignments, from materials held within the Section, with the aim of making this valuable information readily accessible. Each report in this series has been compiled within the Fisheries Development Section to a technical standard acceptable for release into the public arena.

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## SUMMARY

The Government of Tuvalu is in the process of formulating a National Tuna Development and Management Plan for the country, with assistance from the Forum Fisheries Agency, and input from other regional organisations, such as SPC. The input provided in this report was compiled during fieldwork in November 2000, and focuses on the development of Tuvalu's tuna fishing aspirations.

The general prospect for developing a domestic tuna fishery in Tuvalu is limited at present. The best initial approach will be for the government, through the Fisheries Department and the National Fishing Corporation of Tuvalu (NAFICOT), to compile a specific development plan for the domestic tuna fishery. However, the plan needs to be developed with the input of the different stakeholders in Tuvalu, so that they feel some ownership of the plan and support it.

There are major infrastructure needs to be addressed to provide a climate for the private sector to develop. These infrastructure needs include a safe anchorage for vessels, a longer runway so that larger aircraft with greater freight carrying capacity can land in Tuvalu, and the ready availability of electricity and fresh water in reasonable quantities. Land availability is also an issue, which will limit the possibility of processing facilities being constructed for exporting fish or fish products.

The single most important issue that will assist development in the tuna fishery is the establishment of export markets for fish in a whole or processed form. However, the markets have to pay a price that will make it viable for NAFICOT, the outer island Community Fishing Centres (CFCs), and the fishermen themselves. This will be very difficult, as the freight costs from Tuvalu to potential markets are very high. This is mainly due to there being irregular shipping, and the limited amount and high price of airfreight. Addressing the infrastructure issue regarding the runway should greatly assist this.

An alternative approach could be to focus on value-adding to the tuna catch, especially in the outer island CFCs. This would result in a higher valued product being produced with reduced weight compared to whole fish. Value-adding processes could include salting and drying and the production of tuna jerky. With products like these where they have a longer shelf-life and do not necessarily need refrigeration, sea freight can be used, provided the product can reach the market in a reasonable timeframe.

If viable markets can be established and a reasonable price paid to the fishermen for their tuna catch, then the Fisheries Department can look at ways to promote the catching side. This could be in several forms. First, a FAD programme could be established to provide specific fishing locations for tuna fishing. The Fisheries Department could then provide training for local fishermen, including the introduction of mid-water fishing techniques used in association with FADs, and better handling practices for the catch including the correct use of ice. Training could also be provided to fishermen in medium-scale fishing techniques, especially tuna longlining, as a means to encourage local fishermen to invest in larger vessels.

The government's policy is to remove itself from commercial activities and to promote private sector development. This is especially needed in fisheries, with both the Fisheries Department and NAFICOT needing to cease certain commercial activities as soon as possible. However, there is a longer-term role for NAFICOT to play, as the wholesaler of fish in Tuvalu, as there is no way this will be taken up by the private sector in the short-term. The government should continue with their aim of privatising NAFICOT, although it will need to be a money-making venture before the private sector will invest in it.

## RÉSUMÉ

Le gouvernement de Tuvalu est en train d'établir un plan national de développement et de gestion de la pêche thonière, avec l'assistance de l'Agence des pêches du Forum et le concours d'autres organisations régionales telles que la CPS. Les informations reprises dans le présent rapport, recueillies sur le terrain en novembre 2000, portent sur l'évolution des aspirations de Tuvalu en matière de pêche thonière.

Dans l'ensemble, les perspectives d'expansion de la pêche thonière nationale à Tuvalu sont limitées pour l'instant. Dans un premier temps, les pouvoirs publics, par le truchement du ministère des Pêches et de la National Fishing Corporation of Tuvalu (NAFICOT), établiront un plan de développement de la pêche thonière nationale. Ce plan devra toutefois être élaboré en collaboration avec les différentes parties prenantes de Tuvalu, de manière à ce qu'elles s'en sentent propriétaires et s'y rallient.

Des infrastructures devront être créées pour créer un climat propice au développement du secteur privé, notamment un mouillage abrité, une piste d'atterrissage plus longue permettant à de plus gros porteurs d'atterrir à Tuvalu, et la fourniture d'électricité et d'eau douce en quantité raisonnable. L'exiguïté des terres pose également un problème car elle entrave la construction d'usines de transformation du poisson ou de produits de la mer destinés à l'exportation.

Le principal facteur d'expansion de la pêche thonière sera l'ouverture de débouchés à l'exportation pour le poisson entier ou transformé. Or, sur ces marchés, le poisson devra atteindre un prix rentable pour la NAFICOT, les centres de pêche communautaire des îles périphériques et les pêcheurs. Cela sera très difficile car les frais de transport entre Tuvalu et les marchés potentiels sont très élevés, du fait de l'irrégularité de la desserte maritime et du volume limité et des tarifs élevés du fret aérien. L'aménagement de la piste d'atterrissage pourrait remédier à ce problème d'infrastructure.

Une autre approche pourrait consister à se tourner vers la valorisation de la pêche thonière, notamment dans les centres de pêche communautaire des îles périphériques. Après transformation par salage et séchage ou préparation de charques, les produits obtenus auraient une plus grande valeur marchande, pour un poids inférieur à celui du poisson entier. Ces produits se conservant plus longtemps et ne nécessitant pas obligatoirement de réfrigération, ils peuvent être transportés par bateau, à condition de parvenir à destination dans un délai raisonnable.

Si des marchés rentables peuvent être créés et un prix raisonnable consenti aux pêcheurs thoniers, le ministère des Pêches pourra envisager de promouvoir des techniques de pêche adaptées, par plusieurs moyens. Un programme de mouillage de DCP pourrait être mis en œuvre de manière à limiter la pêche thonière à des sites précis. Le ministère des Pêches pourrait dispenser une formation aux pêcheurs locaux, notamment une initiation aux techniques de pêche à mi-eau autour de DCP et aux meilleures pratiques de manipulation de la prise, y compris l'utilisation correcte de la glace. Des pêcheurs pourraient également être formés aux techniques de pêche semi-artisanale, en particulier la pêche de thon à la palangre pour inciter les pêcheurs locaux à investir dans de plus gros bateaux.

Le gouvernement a pour politique de se désengager des activités commerciales pour promouvoir l'expansion du secteur privé. C'est une démarche particulièrement nécessaire dans le secteur de la pêche, où le ministère des Pêches et la NAFICOT devraient cesser dès que possible certaines activités commerciales. La NAFICOT devrait en revanche jouer un rôle à plus long terme comme grossiste de poisson à Tuvalu, le secteur privé n'étant pas en mesure d'assumer cette tâche à court terme. Les pouvoirs publics devraient persister dans leur objectif, soit la privatisation de la NAFICOT. Cette société devra toutefois devenir rentable avant que le secteur privé ne veuille investir.

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## **1. INTRODUCTION**

The information contained in this report forms a specific component to develop a 'National Tuna Development and Management Plan' (NTDMP) for Tuvalu. The NTDMP will be drafted by the Forum Fisheries agency, in consultation with the Tuvalu Fisheries Department. This report forms the basis of the development component of the NTDMP, with a focus on small-scale development in the tuna fishery.

SPC was requested to undertake a study as input to the development of NTDMP for Tuvalu. The study was to include the areas identified and questions raised in the outline for a 'Tuna Development and Management Plan', provided by the Secretary for Natural Resources and Environment in Tuvalu.

This component of the overall programme has the following specific Terms of Reference:

1. Travel to Tuvalu to:
  - Review and summarise Tuvalu's involvement in tuna fishing activities;
  - Develop possible objectives and strategies for future development of the tuna fishery in Tuvalu;
  - Assess the infrastructure, support services and training available in Tuvalu at present, and make suggestions on future needs and directions;
  - Identify constraints to development of the tuna fishery in Tuvalu, and make suggestions on development options, including the assessment of development options presented in other documents, such as ADB, CFTC, and other reports; and
  - Assess the roles of government and the private sector in future development of the tuna fishery in Tuvalu.
2. Produce a written report addressing the above issues; and
3. Discuss the suggestions in the report with staff of FFA, the Tuvalu Fisheries Department and the Ministry of Natural Resources and Environment in Tuvalu, to extract specific components or ideas to be included in the National Tuna Development and Management Plan for Tuvalu.

The Fisheries Development Adviser of the Secretariat of the Pacific Community, Lindsay Chapman, travelled to Tuvalu to undertake this work from 16 to 27 November 2000. The suggestions contained in this report are based on information collected during fieldwork in Tuvalu. The suggestions do not account for any changes that may have occurred to legislation or other circumstances, since the time of this work. The report also focuses on Funafuti, with reference to the outer islands when information was available. Therefore, some of the information and suggestions may not now be relevant based on changes that may have occurred since that time.

## **2. BACKGROUND**

The history of tuna fishing in Tuvalu goes back several centuries, although the early days were purely at a subsistence level. Over the years this has changed, with some part-time fishermen modernising their boats and equipment and fishing to sell their catch. The Tuvalu government also became involved in the tuna fishery, with a tuna pole-and-line vessel donated to them by the Government of Japan. Running in parallel to domestic tuna fishing activity was the government's declaration of the Tuvalu fishing zone, which allowed the government to negotiate fishing access agreements with distant water fishing nations. This allowed the government to raise revenue from the tuna resource in the region, although this is only a fraction of the value of the actual catch taken.



## 2.1 Domestic fishing operations

Tuvalu has a long history in tuna fishing at a subsistence level, chasing surface schools of tunas using larger outrigger canoes that were paddled or sailed. Fishermen traditionally used a local poling method, using a wooden pole with coconut fibre twine to attach a pearlshell lure. The lures were constructed by cutting mother-of-pearl shell into strips about 15–20 mm wide, with a hook carved from turtle shell, sea shell or bone bound to the lure. The shell was polished, to reflect the rainbow of colours in the shell when it was in the water being fished. Over the years, the coconut fibre was replaced with nylon monofilament and the hooks made of metal, although the pole and pearlshell part of the lure remained.

In the 1960s and 1970s, fishermen started to move away from using the traditional sailing outrigger canoes to fish outside the reef for tunas. Some fishermen put small outboard motors on their outrigger canoes, while others fishermen chose to use small outboard-powered open monohull boats. To start, the traditional pearlshell lure and pole was used, although this changed to fishermen using monofilament line trolling artificial lures, or sometimes natural baits. The trolling mainly targets skipjack tuna (*Katsuwonus pelamis*), yellowfin tuna (*Thunnus albacares*) and wahoo (*Acanthocybium solandri*), although a range of other species are also taken. Most fishermen only fish part-time, leaving before dawn to be on the fishing grounds at first light. In 1978, it was estimated that several hundred tonnes of tuna were landed in Funafuti, with most tuna around 2–3 kg in weight and average catches fluctuating from 25 to 250 kg/trip.

In 1970, the United Nations Development Programme/Food and Agricultural Organisation conducted research into the potential for development of a skipjack fishery in Tuvalu. Their South Pacific Tuna Mission noted the absence of information on bait availability. The Van Camp Seafood Company conducted a bait fish survey in Tuvalu in 1972, with limited catches recorded. A later study in 1976 suggested the potential for a pole-and-line fishery was limited, because of low live bait abundance. The South Pacific Commission conducted pole-and-line fishing and bait fishing trials in Tuvalu in June/July 1978 and July 1980, as part of their Skipjack Assessment Project. The 1978 trials produced good catches of skipjack and yellowfin tuna, with 2,739 fish tagged and released over a 10 day period. In addition, two nights baiting yielded 708 buckets (around 1,060 kg) of live bait, although over half of this was released due to insufficient space in the vessel's live bait tanks. The fishing in 1980 was not as productive as in 1978, with only 318 fish tagged and released over a nine day period. The catch of live bait was also much less with around 444 kg taken in seven nights fishing. The Ika Corporation in Fiji also conducted fishing and baiting trials in Tuvaluan waters in 1980, using two of their pole-and-line vessels. During these trials catch rates varied greatly from 0.12 t/day/vessel to a high of 5.98 t/day. However, overall it was concluded that there was a sizeable surface tuna fishery in Tuvaluan waters. Catches of live bait were low, especially in July, and consisted of one main species, the blue sprat (*Sprattelloides delicatulus*). The availability of sufficient quantities of live bait would be a limiting factor to development of a pole-and-line fishery in Tuvalu.

The Fisheries Division was established under the Ministry of Commerce and Natural Resources in 1976, to be responsible for fisheries development and management. The original aim of the Fisheries Division at the time was to catch fish to develop fisheries as well as meeting its recurrent costs. Over time the main functions of the division became the upgrading of the country's small-scale fisheries to meet local demand, and hopefully generate quality fish for export once local demand was met; to licence foreign fishing vessels to operate in Tuvalu's EEZ, and monitor their activities; and to develop commercial fishing, which included marketing of the catch. The government of the day placed much hope on the development of fisheries resources in its vast fishing zone that was declared in 1979 (900,000 km<sup>2</sup>).

Tuvalu gained independence in 1978, and at that time implemented its first development plan for the country. Development plans have fisheries featuring, especially with the goal of expanding fish production for local and export markets. In support of this, the government established the National Fishing Corporation of Tuvalu (NAFICOT) in 1981. NAFICOT's initial role was to operate the vessel

F/V *Te Tautai*, a 173 GRT pole-and-line vessel donated to Tuvalu by the Government of Japan. This vessel arrived in Funafuti in March 1982. The government wanted NAFICOT to be the agency responsible for developing the country's industrial fisheries.

This approach had two government entities involved in fisheries development and catching fish for local sale and export, both under the same department. NAFICOT focused on the industrial fishing with their pole-and-line vessel, and the Fisheries Department looked at small-scale development. In 1978, 1981 and 1983, the SPC introduced deep-water snapper fishing techniques, with trial fishing activities and the training of local fishermen in Funafuti, Vaitupu, Nukulaelae and Nukufetau. The catch rates recorded ranged from a high of 15.0 kg/reel-hour at Nukulaelae (large size of deep-water snapper) to a low of 4.8 kg/reel-hour at Nukufetau.

In 1983, several new development projects commenced in Tuvalu. The first was a boat yard funded and initially operated by the US Save the Children Federation, which was later operated on a revolving fund from the money earned from boat sales. This project constructed several diesel launches for the Fisheries Division under Canadian funding. They also designed and constructed several catamarans for lagoon transport, which were sold in Funafuti, Nanumea, Nukulaelae and Nukufetau. Other designs included a two-man fibregrass-sheathed plywood sailing canoe, of which 60 were constructed.

The second project was a fish aggregating device (FAD) programme, with materials supplied through funding by UNDP for two devices. These FADs were deployed in 1983, one off Funafuti and the other off Vaitupu. UNDP also funded the purchase of additional FAD materials for four devices in 1984. This was supplemented with funding from the United Kingdom and Canada. The aim of the FAD programme was to increase the availability of tunas in specific locations for local fishermen to harvest, as well as providing alternative fishing locations for the pole-and-line vessel F/V *Te Tautai*. In 1985, the Government of Tuvalu requested assistance from the SPC, to conduct fishing trials around FADs, and conduct training in the use of mid-water fishing techniques associated with FADs. The vertical longlining method was introduced to Funafuti as part of an SPC project in Tuvalu, which ran from October 1985 to June 1986. Catches were low on the mid-water gears, although good catch rates were recorded from trolling activities.

The final project that was commenced at this time was the construction of a fisheries jetty and slipway, which was funded under New Zealand aid. A New Zealand reef blasting team completed work on the jetty in early 1984. The Tuvalu Public Works Department commencing the construction of the slipway in late 1984, having the work completed in mid-1985 following many delays. With these facilities operational, additional funding was necessary to complete some minor work that was not completed at the time.

NAFICOT with their pole-and-line vessel, which they received in 1982, and operational funding of AUD 160,000 from the United Kingdom, conducted fishing and baiting activities out of Funafuti, with limited success, with bait availability being the main problem as well as the distance from unloading and fuelling ports. To look at alternative bait catching methods, a joint SPC/FAO project was undertaken in 1983 and 1984. The results of the alternative baiting methods were encouraging, although the bait resource was still considered limited. With the limitations in Tuvalu, NAFICOT had F/V *Te Tautai* fish in Fiji with the Ika Corporation for two seasons. Unfortunately, the short skipjack fishing season in Fiji limited the vessel's performance, and the vessel returned to Tuvalu.

Japan approved a fisheries resources survey for Fiji and Tuvalu, with AUD 1.2 million allocated to the Tuvalu component of the project. The F/V *Te Tautai* was chartered under this project to conduct the survey work, which commenced in October 1984. The main aim of this project was to locate offshore seamounts, new fishing grounds, and test alternative fishing methods. The survey found good fishing grounds between Nanumanga and Nanumea, although no new seamounts were located. The field work was completed in 1986.

At the completion of the charter to Japan for the seamount fishing survey work in Tuvalu, NAFICOT moved F/V *Te Tautai* to the Solomon Islands in 1986 to operate. The vessel operated successfully, although its operation costs were high compared to the smaller vessels used by local pole-and-line operations. In 1988, F/V *Te Tautai* had a record catch of 1090 mt. In late 1989, the vessel was chartered for three years by the SPC, to undertake a regional tagging programme. This was a highly successful tagging programme and the charter fee paid for the vessel (around AUD 4.0 million) allowed NAFICOT to put some of these funds into reserve, for the future operation of the company. At the completion of the charter, F/V *Te Tautai* sat idle until it was transferred to the Marine Department (Ministry of Works and Communication) in September 1993. The vessel was then used for inter-island transport cruises for several years until it sank at its mooring in the Funafuti lagoon in 1996.

In 1987, United Kingdom funding was provided for the construction of a new fish market, which was constructed beside the slipway. As part of this project, Australian aid was provided in the form of equipment for the market. This included an ice machine, freezers and chillers, processing equipment and display units. After completion, the control of the fish market was transferred from the Fisheries Department to NAFICOT. This set NAFICOT up for the marketing of fish in Tuvalu, although the control of the corporation was transferred to the Finance Department in 1990.

In support of fisheries development, the Government of Japan donated six, 9.0 m diesel-powered fishing boats to the Government of Tuvalu in 1989. The Fisheries Department operated these vessels under a share fishing arrangement, where around 30 local fishermen used the vessels and were paid one-half the value of the their catch. These vessels were encouraged to fish outside the reef, exploiting the deep-water snapper resource. Unfortunately several of these vessels were damaged beyond repair in separate accidents between 1989 and 1991. In 1991, two of these fishing vessels were transferred to NAFICOT to operate, with the final two transferred to NAFICOT's control in 1992. NAFICOT operates the four vessels under the same share fishing arrangement. One vessel was lost on the reef in an accident, which left three vessels working to NAFICOT, with these vessels producing around two tonnes of fish per month.

By 1990, the machinery in the fish market started to break down and fall into disrepair. The same was true for the fishing vessels, first under the control of fisheries, and then under the control of NAFICOT. To assist Tuvalu, the Japanese set up a new 'Fisheries Development Assistance for Pacific Island Nations' programme. The aim of the programme was to repair equipment previously provided under aid and provide on-the-job and off-the-job training. From 1991 to 1993, several Japanese teams came to Tuvalu and rebuilt the engines on the fishing vessels, as well as fixing the vessel electronics and some outboard engines. Under a separate aid grant, the Fisheries Department received a new 19.0 m research and extension vessel from the Government of Japan in 1991.

September 1991 saw the commencement of a new USAID-funded survey project for deep-water snappers. The aim of this project in Tuvalu was to explore the offshore seamounts to find new fishing grounds; test the fishing on these grounds, and conduct trial shipments of deep-water snappers to assess their acceptance on export markets. There was also a small FAD component to this project, with one FAD deployed of each island in Tuvalu in 1993. The results of the survey work were very successful, with new seamounts being located and plotted in Tuvalu's southern waters. The catches were encouraging and the trial shipments produced prices of AUD 9.00—10.00/kg, although the high marketing costs (airfreight and packing materials etc) would only allow a modest return to fishermen in Tuvalu.

The FAD component of the USAID project was to try to increase the catch of small tunas, and provide a bait source for bottomfishing trials. Local fishermen started using the FADs to increase their catch, although limited markets dictated that the catches also had to be limited. With the loss of many FADs soon after the completion of the USAID project in 1994, the Government of Tuvalu requested technical assistance from SPC to conduct site surveys and deploy one or two FADs around Funafuti, while training up local counterparts in all aspects of the work. Limited materials on hand at the time of the project only allowed one FAD to be constructed and deployed.

The NAFICOT fish market was in poor shape from 1990 to 1994, when Japan established a project to get this facility operational. From 1994 to 1997, A Japanese engineer and a Japanese adviser were stationed in Funafuti, and they ordered parts to get the freezers operational and installed a new two tonne per day plate ice maker. As part of this project, Japan also donated a small 5 m inboard-outboard diesel-powered vessel, which was added to the fishing fleet. By the end of 1996, NAFICOT was fully operational. Japan also supplies a large amount of fishing gear, which NAFICOT sold to local fishermen through a retail outlet they established.

Also during the late 1980 and early 1990s, there was interest in developing fisheries in the outer islands. In this regard, the Japanese were looking at establishing a Community Fishing Centre (CFC) in Vaitupu, and Australia was looking at setting CFCs at Nanumea and Nukufetau. The CFC was established at Vaitupu in 1992, although the wharf was destroyed in December of that year due to bad weather, and had to be replaced (completed in 1996). The CFCs, at Nukufetau and Nanumea, had work commence in 1992 and completed in 1995. The 19 m diesel-powered extension vessel donated by Japan in 1991, was used to transporting the catch from the CFCs in the outer islands to Funafuti.

The focus of the Australian funded CFCs was on the production of salted and dried product, and as a result of this, no ice or freezing facilities were provided in these locations. The product from these locations was transported to Funafuti for marketing, and was well received. Unfortunately, once the Australian staff pulled out of these CFCs, the production slowed and ceased. In order to revive these two CFCs, the government provided a block ice machine and small freezer, to they could produce fresh fish of a high quality. The Government of Tuvalu has now funded CFCs at the four remaining islands, with work commenced in 1998 and completed in 2000, although Nui is waiting for replacement equipment to get their facility operational. The cost of each of these centres is in the order of AUD 100,000, for the machinery (12 mould block ice maker producing 500 kg of ice/12 hours, one tonne freezer, 18 KVA diesel-powered generator, and an ice crusher) and the building (includes processing area).

At the end of 2000, the main focus of the Fisheries Department continued to be the operation of the CFC at all outer islands. The government was providing AUD 20,000 in operational funding to each centre each year, although it was not clear how long this arrangement would continue. The fisheries extension vessel was mainly used for charter work to move people and goods around the islands, and transporting fish in from the CFCs when this was necessary. Some fishing was conducted, with the catch sold to NAFICOT. There were plans to continue training fishermen in the outer islands in deep-water snapper fishing techniques. There were no plans to promote tuna fishing or introduce alternative fishing methods for tuna until there was a way to use the catch, either by processing in Tuvalu or exporting fresh to export markets. There was the possibility they would get more FADs to assist the local troll fishermen, of which there were around 10 full-time and many part-time operators in Funafuti.

In November 2000, NAFICOT had two fishing vessels operational and two on the fisheries slipway waiting for parts ordered from Japan. They also had 68 local fishermen under a contract fishing arrangement where the fishermen get cheap ice, 20 per cent discount on fishing gear they purchase from NAFICOT, reduced maintenance costs on repairing outboards, fuel at a cheaper rate, and cheaper hire on ice boxed, with their catch all sold to NAFICOT and set prices. The throughput of fish at NAFICOT was around 7–8 t/month, with around 2.5–3.0 t/month caught from their vessels, around 3 t/month from the contract fishermen, and 1–2 t/month from fisheries and the CFCs. They did some processing of smaller fish, especially those that were not popular with the general public. Their recovery rates were very low for reef fish (purchased whole at AUD 1.90/kg), although they sold the fillets at AUD 12.00/kg (heads and backbones were sold for \$0.30/kg for pig food). Tuna fillets sold at AUD 8.00/kg. Salted and dried fish was sold at AUD 12.00/kg, although the actual cost of producing this was higher, although the market would not pay a higher price for this product.

NAFICOT's facility consisted of a 2 t blast freezer, 3 t holding freezer, 2 t chiller, 1 x 2 t/day and 1 x 1 t/day flake ice machines, 2 bandsaws, filleting tables in the processing area, and 6 domestic

freezers. They also had two retail outlets besides the NAFICOT premises (Teone Market Facilities). The first was at the main Fusi Coop Store, where they had a display cabinet and sold fish with the rental for the space being 1.5 per cent of the value of fish sales. The second retail outlet was beside the small Fusi Coop Store in Vaiaku. This was their own shop, which was quite small. Their other approach to marketing was to have a truck with ice chests of fish travel to the northern end of the island twice/day. Overall NAFICOT was not buying much tuna, as there were several local fishermen fishing tuna and selling them direct to the public.

## 2.2 Foreign fishing access

During the 1970s, foreign fishing vessels operated in the vicinity of Tuvalu. Naturally, the catches taken by these fleets, mainly Japan, Korea and Taiwan, were much higher than the catches taken by the Tuvaluan subsistence tuna fishery. Longline catches by these three fleets for tuna and billfish averaged around 2000 t in 1975 and 1976. Japanese long-range pole-and-line vessels also ventured south to the vicinity of Tuvalu, with an average catch of around 1000 t between 1972 and 1978, excluding the 1976 catch of 7,500 t.

Tuvalu declared its 200 nautical mile fishing zone on 1 January 1979, which allowed the government to negotiate fishing access agreements with the distant water fishing nations. Agreements were negotiated with Korea in 1980 for up to 137 longliners and a fee up to USD 84,000, in 1981 for up to 115 longliners for a fee up to USD 92,000, and with Taiwan in 1981 for up to 100 longline licences for a fee up to USD 84,000. However, not all licences were taken up, with Table 1 summarises the actual revenue received from distant water fishing nations over the years since 1980, excluding the USA.

**Table 1: Actual revenue received from distant water fishing nations for fishing access (licences) in the Tuvalu's EEZ since 1980, excluding USA Multilateral Treaty fees.**

Year	Revenue (USD)	Year	Revenue (USD)
1980	40,847	1991	482,266
1981	53,105	1992	930,968
1982	149,354	1993	
1983	182,465	1994	
1984	138,890	1995	The remaining figures were not available at the time this report was completed.
1985	362,045	1996	
1986	267,018	1997	
1987	148,784	1998	
1988	298,694	1999	
1989	378,930	2000	
1990	302,750		

In 1988 the members of the Forum Fisheries Agency finalised a Multilateral Treaty Fishing Agreement with the US. Under this agreement US purse seiners could fish in the zones of FFA member countries. The agreed fee was shared amongst the member countries, with 15 per cent shared equally and the remaining 85 per cent allocated based on the location of the catch taken. Table 2 summarises the fees that Tuvalu has received under this agreement since it commenced in 1988.

**Table 2: US Multilateral Treaty Fishing Agreement cash benefit to Tuvalu since 1988 based on the 15 per cent and 85 per cent shares.**

<b>Year</b>	<b>15% share (USD)</b>	<b>85% share (USD)</b>	<b>PDF (USD)</b>	<b>Total (USD)</b>
1988 – 1989	12,222	808	66,667	79,697
1989 – 1990	108,226	35,399	66,667	210,293
1990 – 1991	119,077	258,643	66,667	444,387
1991 – 1992	112,812	1,675,877	66,667	1,855,356
1992 – 1993	107,070	180,005	66,667	353,742
1993 – 1994	148,867	399,715	118,533	667,115
1994 – 1995	147,630	1,294,391	118,533	1,560,554
1995 – 1996	149,825	514,334	111,125	775,284
1996 – 1997	149,723	2,234,975	111,125	2,495,823
1997 – 1998	148,653	3,568,565	111,125	3,828,343
1998 – 1999	148,447	4,825,905	111,125	5,085,477
1999 – 2000	148,661	2,899,387 (est)	111,125	
2000 – 2001	148,131		111,125	

The fees Tuvalu has collected from foreign fishing access in its EEZ (Tables 1 & 2) are a very important source of income for the country. It is uncertain how this will continue in the future with the establishment of a new regional body to manage the region's tuna resource. It is expected that the new body will take several years to be established, so Tuvalu should continue to collect access fees at around the same level in the next few years at least.

### **3. INFRASTRUCTURE REQUIREMENTS**

There is a need for basic infrastructure within a country to allow development in the marine sector. This infrastructure includes shore facilities such as: wharves, access to fuel, water and ice for operators; support services including slipways, maintenance facilities, trades people to work on vessels; suitable vessels to harvest the resource; processing facilities; and airport facilities and cargo space availability. In Tuvalu's case, the availability of land also needs to be considered.

#### **3.1 Availability of land**

The land in Tuvalu is owned by clans, and there appears to be no free-hold title. This means that there is no sale or transfer of land. Therefore, all land is leases from the clans for construction of buildings and other facilities. The government also leases land from the clans for all of their offices and facilities, such as the airport runway, electricity power plant and public works area.

In the case of Funafuti, the growing population is using the available land for housing, and it is hard to know if and where there is any land that may be available for leasing for commercial development. This factor alone is a major constraint to any future development in the fisheries sector. One way around this may be for the government to look at reclaiming land from the sea. The Government of Tuvalu could look at the construction of wharves parallel to the coast in the lagoon and dredging the areas in front of the wharves to back-fill and create additional land with waterfront access. This would be a costly exercise, which needs to be studied fully, including environmental impact studies, to assess potential damage to the marine environment. There is also the question of ownership of the reclaimed land, would it belong to the clan or the government? If waterfront land becomes available

through reclaiming, the government should reserve some of this land for private sector development of facilities for the fishing sector.

**Suggestion 1:** That the Government of Tuvalu conduct a study on the feasibility of constructing parallel wharves and back-filling behind them through dredging, to reclaim land on the coast.

**Suggestion 2:** That the Government of Tuvalu have environmental impact studies undertaken for each site where the reclaiming of land is being considered.

**Suggestion 3:** That the Government of Tuvalu consider the issue of ownership of reclaimed land, so that this land can be used through leasing from the appropriate owners.

**Suggestion 4:** That if waterfront land becomes available through reclaiming, the Government of Tuvalu reserve some of this land for private sector development of facilities for the fishing sector.

The current study did not allow time to visit any of the outer islands, so it is not known what the situation is regarding the availability of land. Anecdotal information would indicate there is land available, as small community fishing centres (CFCs) have been established by the Fisheries Department on all outer islands.

### **3.2 Shore facilities**

There are only a couple of wharves in Funafuti, and these are all exposed to the west, as there is no protection and no safe anchorage. There are two small finger wharves in the main town area, although they are both needing repair. The longer of the two only has shallow water access at low tide of around 0.5 m, so larger vessels would only be able to come alongside at high tide unless the area around the wharf was dredged to increase the depth. The second wharf, which is beside the hotel, is quite small, with limited access. No one appears to be claiming ownership for these wharves, including the Ports and Marine Department.

The main Funafuti wharf is located out of town to the north, and is an 'L' shape with deep-water access for cargo ships. It is also used by the fuelling ships, as the BP fuel depot is close by. Unfortunately the wharf is in disrepair, and a recent report of the status of Tuvalu's assets states that almost 90 per cent of the concrete members supporting the wharf have been extensively damaged by spalling and cracking. The wharf now has a safe working load of 18 tonnes, which means only one container can be on the wharf at any one time. The report also states that the cost of reinstatement or refurbishment would be almost the same as constructing a new structure. The replacement structure recommended is a shore parallel wharf built by reclaiming seabed. Possibly an in-depth study needs to be undertaken on the best way to proceed with the Funafuti wharf, as the wharf in its current state has a limited life.

**Suggestion 5:** That the Government of Tuvalu as a matter of urgency, have a study undertaken to assess their options on whether to reinstate or replace the existing Funafuti wharf.

**Suggestion 6:** That the study also include options on the best structure to replace the current wharf, that is, whether a pier wharf similar to the current wharf or a parallel wharf would be the best option.

In the event that the Funafuti wharf is replaced by a parallel wharf, the government could consider extending the wharf length to allow for future development in the fishing sector. This would allow one environmental impact study to be done. The reclaimed land could have one section reserved for fisheries development infrastructure, as suggested in Section 3.1.

**Suggestion 7:** That if the Funafuti wharf is to be replaced by a parallel wharf, the government consider extending the wharf length to allow for future development in the fishing sector.

The Fisheries Department also has a wharf as part of their complex, which is a few hundred metres from the Funafuti wharf. Unfortunately this wharf is also in disrepair and has a limited lifespan. The NAFICOT and fisheries vessels use this wharf, although they only come alongside to load and unload, and do not tie up overnight. The wharf itself needs replacing, and the best option may be to approach the Japanese Government to replace or refurbish this wharf structure under grant aid in the short term, while long-term options are explored.

**Suggestion 8:** That the Government of Tuvalu approach the Government of Japan to have the fisheries wharf refurbished or replaced in the short term, while long-term options are explored.

A long-term option that would solve many development constraints in the fisheries sector for Tuvalu is to seek the construction of a small-boat harbour in Funafuti, although a study on the feasibility and cost of such a structure, and a separate environmental impact study should be conducted first. This would be a major undertaking, although the idea has been raised in the past. A small-boat harbour would not only provide a place for commercial vessels to tie up, but also provide a safe anchorage, which is a major constraint to development of a commercial fishing fleet of small-scale and medium-scale vessels. A suitable small-boat harbour would need to be large enough to accommodate at low tide, around 10 medium-scale vessels up to 20–25 m in length with a draft of 3.0 m, plus a minimum of 30 small-scale vessel from 5 to 10 m in length, and possibly with a 1.0 m draft. The best construction would be through stone breakwalls with road access on top, although stone would need to be imported for the construction.

**Suggestion 9:** That the Government of Tuvalu have a study undertaken on the feasibility and cost of constructing a small-boat harbour, with a separate environmental impact study undertaken at the same time.

**Suggestion 10:** That the specifications for the small-boat harbour in Funafuti include stone breakwalls with road access on top, reclaiming land, and be of a sufficient size to accommodate at low tide, 10 vessels of 20–25 m length and 3.0 m draft, and at least 30 vessels, 5–10 m long and a draft to 1.0 m.

In the construction of a small-boat harbour in Funafuti, the reclaiming of land should be included, as this land can be used for the construction of support facilities needed to support a commercial fishing fleet. In addition, the exterior wall of the small-boat harbour could be turned into a deep-water wharf to replace the existing Funafuti wharf. This would then negate the need for a wharf and land as suggested earlier in this section in regard to replacing or extending the Funafuti wharf should it be replaced with a parallel wharf. In reality, the concept of a small-boat harbour will do a lot to encourage private sector development, as the constraint of a safe anchorage, land availability, and hopefully support services, will all be addressed in one project. This concept should be developed into a full project proposal, with the proposal put to a donor such as Japan, for consideration and the studies undertaken as previously suggested.

**Suggestion 11:** That the Government of Tuvalu develop the concept of a small-boat harbour into a full project proposal and submit this to a donor like Japan for consideration, and the studies should be undertaken.

**Suggestion 12:** That the study include the construction of a deep-water wharf on the outside of the harbour, to replace the existing Funafuti wharf.

The obvious place for the construction of a small-boat harbour, especially if it includes a new main wharf, would be the area from the existing main wharf to around 50–100 m past the fisheries jetty (to the south), so that this jetty and the slipping facility are protected within the harbour. This is a large area, although it would allow the existing facilities (BP fuel depot, container and shed storage, fisheries and NAFICOT premises) to remain where they are and become part of the new complex. The reclaimed land would therefore be for additional structures or possibly expansion of some of the older ones. This does not mean that other sites may be preferable to the government. In fact, it would



make sense that if studies are going to be conducted, that several sites be included in case there are problems identified in some areas.

**Suggestion 13:** That if studies are to be undertaken, the area between the main wharf and around 50–100 m past the fisheries jetty (to the south), be included as one of the study sites, given the current facilities that are located in this area.

It appears there are no safe anchorages in any of the outer islands of Tuvalu, so they face the same constraints as Funafuti in developing commercial fishing activity, although they have the additional constraint of limited markets to sell the catch. It is therefore difficult to suggest any development of shore facilities at this time, although at the islands of Nukufetau and Nanumea, which have large lagoons and abandoned airstrips (discussed under section 3.6), there is the possibility that a similar project to construct a small-boat harbour could be feasible in the future.

### **3.3 Support services**

A range of support services are required by any fishing industry to keep it operational. In Tuvalu's case, there is very little domestic development occurring in the tuna fishery, although for development to occur, support services need to be in place. The types of support services required include slipways, trades people in the areas of carpentry, welding (steel and aluminium) fibreglassing, engineering (diesel, hydraulic, refrigeration and general), electrics, and access to fishing gear, safety equipment, vessel electronics and bait. For Tuvaluans wishing to enter the tuna fishery with their own vessel, these services are essential.

#### **3.3.1 Slipways**

There is currently one slipway in Funafuti, and none in the outer islands. The current slipway is small and has three sets of rails with carriages that are rated to 40 t capacity. There is only one set of winch gear, and this is several years old although in reasonable condition. The cable from the winch is directed through blocks and pulleys to operate each of the three carriages.

The current system is adequate to haul out the current vessels being operated by the Fisheries Department and NAFICOT, although the largest vessel is getting to the limit of the existing gear. It would be worth upgrading the winch gear in the near future to increase the capacity so it is not working at its upper limit. This approach would also allow slightly larger and heavier vessels to be pulled out in the future, which provides an opportunity for larger vessels to enter the fishery, especially tuna longline vessels, which will be discussed under Section 5.9.6.

**Suggestion 14:** That the Fisheries Department look at upgrading the winch gear on the current slipping facility, increasing the capacity of the winch gear so that larger vessels can be pulled out if needed in the future.

A longer-term approach would be to include the construction of a new, larger slip facility, as part of a small-boat harbour project. Part of the reclaimed land could be used to construct the slip as well as a launching ramp for smaller trailer vessels. The slip could be included in the initial design of the complex to be constructed on reclaimed land, or be added as a separate project later. The important point is that land be allocated to this purpose in the design stage so that adequate land is reclaimed for this and other associated structures, like workshops, and fish processing and storage facilities. Alternately, if the proposed small-boat harbour had the existing facilities at fisheries and NAFICOT included within the harbour so they were protected, then the slipway could be expanded rather than a new slipway being built.

**Suggestion 15:** That if the proposal to construct a small-boat harbour goes ahead, that adequate land is reclaimed to allow for the construction of a new slipway and a separate launching ramp for small trailer vessels.

**Suggestion 16:** That if the fisheries and NAFICOT facilities are included within the harbour so they are protected, then the slipway could be expanded rather than a new slipway being built.

It should be noted that vessels being hauled out of the water will need work done to them by trades people, and these people will need workshops to carry out the work. Therefore, land should also be set aside as part of the slipway or small-boat harbour, to allow the private sector to construct workshops to conduct carpentry, welding and engineering work.

**Suggestion 17:** That land be set aside as part of the slipway or small-boat harbour, to allow the private sector to construct workshops to conduct carpentry, welding and engineering work for fishing vessels.

Given the limited size and number of fishing vessels in Tuvalu at the present time, there would not appear to be any need to construct a slipping facility at any of the outer islands. However, if the development of fisheries does increase dramatically, then there may be the need for a slipway some time in the future. This would especially be true if there was development of the abandoned airstrips in Nukufetau or Nanumea (discussed in Section 3.6), and commercial fishing activity were developed in these areas.

### *3.3.2 Carpenters, welders (steel and aluminium) and fibreglassers*

It is difficult to assess the number of skilled or qualified carpenters, welders and fibreglassers in Funafuti at present, as there is such a small private sector. In the government, people with these skills and qualifications are employed at the Public Works Department, Electricity Commission, Fisheries Department and NAFICOT, to name a few. As several of these government departments also take on work for the private sector, there is reluctance by people with these skills to leave government and set up their own business. To encourage this to occur, and increase the demand for skilled people in the private sector, the government should stop doing paid work that could be done by the private sector. The Public Works Department has started doing this, contracting out repairs to government buildings to the private sector. The new Tuvalu Telecommunication Corporation's facility has just been completed using local contractors for the construction of the new building. This approach should be encouraged in other government departments.

**Suggestion 18:** That the Government of Tuvalu stop their departments from conducting paid work that can be done by the private sector in the areas of carpentry, welding and fibreglassing.

**Suggestion 19:** That the Government of Tuvalu support the private sector to develop in these areas through contracting government work out like the Public Works Department has started doing.

Some construction work is being done around Funafuti, and several small boats are being constructed or repaired in people's backyards. People were also observed welding steel to fix up motorbike frames. There did not appear to be any aluminium welding facilities available in Funafuti, although this was not confirmed and the Public Works Department may have the necessary equipment. The number of people doing this type of work is encouraging to see, as it shows the skills are available, and the private sector is starting to grow.

It is not known what skilled staff there are in the outer islands, so it is assumed that some people have skills in carpentry, welding (steel) and fibreglassing, although many of these may be government employees at present. As development occurs in the outer islands, this area may need to be reassessed in the future.

### *3.3.3 Engineers (diesel, hydraulic, refrigeration and general) and electricians*

The same situation (as for carpenters, welders and fibreglassers) exists for engineers and electricians in Tuvalu. That is, there are skilled people in Tuvalu, although most of them work for different government departments. Some of the government departments also conduct paid repair work for the private sector, charging an hourly rate for the work plus the cost of parts. The private sector is starting

to expand in these areas, especially in auto repairs and outboard repairs. Several small workshops exist on Funafuti, and they appear to be well patronised. Any expansion in the fishing industry will add to the potential work opportunities for the private sector.

It is understandable that the Public Works Department, Fisheries Department, Electricity Commission and NAFICOT all have skilled trades people working for them in these trade areas, to maintain the machinery they have. For the smaller operations, it may be a more cost effective solution to not have an engineer or electrician on staff, but contract or hire someone on an as-needs basis. This would encourage private sector growth. However, the government departments need to stop conducting paid work for the general public, allowing this work to be done by the private sector, which will encourage future growth.

**Suggestion 20:** That like the two previous suggestions, the Government of Tuvalu stop their departments from conducting paid work in the areas of engineering and electrical, and where possible contract or hire private sector trades people to undertake work for them.

When looking at developing a larger fishing fleet with vessels that can fish offshore for days or weeks at a time, there will be a growing need for engineers to work on these vessels, as there are very few people with the skills and inclination to undertake this type of work. There is a need to train people up in this area, and this will be discussed more under Section 4.1.2.

It is not known what skilled engineers and electricians there are in the outer islands, so it is assumed that some people have these skills, although they may be government employees at present. As development occurs in the outer islands, this area may need to be reassessed in the future.

### *3.3.4 Suppliers of fishing gear, safety equipment and vessel electronics*

At present the main suppliers of fishing gear in Funafuti are the Fisheries Department and NAFICOT, who both have fishing tackle stores. Small amounts of basic fishing gear (hooks and line) can also be bought at some local stores on the island. At present there is no one selling sea safety equipment or vessel electronics.

The number of small craft, and in the future, medium-scale vessels, heading to sea is expected to increase with the development of offshore resources. The safety of these vessels will be critical to ensure no vessels or crew are lost at sea. Therefore, there is a need to ensure that all vessels carry appropriate sea safety equipment for the crew on board, based on the size of vessel and area of operation. Currently there are no specific Regulations that cover fishing vessels, although the Ports and Marine Department are working on Regulations for non-Convention (STCW) vessels over 15 m in length, and it is not clear at this stage if commercial fishing vessels will be included in this mainly merchant-focused requirements.

The Fisheries Department should take the initiative here and approach the Ports and Marine Department to develop some small-boat Regulations, for vessels from 5 to 25 m in length, which would include commercial fishing vessels. This would allow the Fisheries Department and others involved in the fishing industry to have input to the development of the Regulations, so they are realistic to a developing fishery. Possibly the best approach would be to set up a working group with representatives of different relevant government agencies and the fishing industry. The working group could then develop the Regulations, especially the carrying of appropriate sea safety equipment based on size of vessel and area of operation, to satisfy everyone's needs. Once these Regulations are developed, they need to be made law and enforced.

**Suggestion 21:** That the Fisheries Department set up a working group with Ports and Marine and other relevant government departments and representatives from the fishing sector, to develop small-boat Regulations, especially the carrying of appropriate sea safety equipment based on size of vessel and area of operation.

**Suggestion 22:** That once the small-boat Regulations are developed, they be made law and enforced.

There is scope for a local business to take on the selling of fishing gear sea safety equipment and possibly a select range of vessel electronics, such as two-way radios, echo sounders and GPS units (possibly with plotter). However, it would require both the Fisheries Department and NAFICOT to close down their fishing gear retail outlets, to allow the private sector to take over this task. The Fisheries Department should look into this closely, and encourage a local business to take on this task.

**Suggestion 23:** That the Fisheries Department encourage a local business to take on the supply of fishing gear, sea safety equipment and a select range of vessel electronics, and once established, both the department and NAFICOT close their fishing gear retail outlets and support the private sector.

If a business were to set up to cater to this prospective market, they should focus on good brand name electronics and sea safety equipment and try to standardise through bringing in specific models rather than a large range. This will assist the fishing industry and themselves when it comes to spare parts and repairs. Also, the government should support the sale and use of these pieces of equipment as it could save lives and cut down on the number of search and rescue missions that the government is involved in. Basic sea safety equipment and radio equipment should be a requirement on all vessels venturing to sea, and this could be a requirement under the National Tuna Development and Management Plan, if not in small-boat Regulations.

**Suggestion 24:** That the Fisheries Department look at vessels being licensed under the National Tuna Development and Management Plan being requirement to carry a radio (and possibly a GPS for offshore work) as well as the required sea safety equipment to specific levels, based on the size of vessel, area of operation and number of people on board.

Getting repairs done on electronic equipment in Tuvalu could be very difficult. There were a couple of electronic equipment repair shops in Funafuti, however, it appeared that none of them were skilled in repairing fishing vessel electronics. There would appear to be a need for skilled personnel in the area of repairing vessel electronics. Identifying who should pay for this type of training is difficult as there is no guarantee that a person once trained would stay with those that sponsored the training.

### *3.3.5 Suppliers of ice, bait and export packing materials*

Currently the only commercial supplier of ice in Funafuti is NAFICOT, although some local fishermen freeze down plastic bottles of water in their home freezers, and take these with them when they go fishing. NAFICOT's ice producing capacity is 3 t/day (1 x 2 t/day and 1 x 1 t/day plate ice machines), and the ice is sold for AUD 2.50/bucket (roughly 10 kg), or AUD 1.00/bucket to fishermen working under contract to them. This price is reasonable, although not all fishermen use it. The troll fishermen who head to sea early in the morning, returning mid to late morning, land their catch without ice as they feel it is too difficult to deal with and the fish are only a matter of hours old when landed for sale. Only consumer acceptance will change this practice, as the fishermen seem to be able to sell all that they land (some fishermen stop fishing when they feel they have caught what they can actually sell).

It is doubtful that anyone in the private sector will set up in opposition to NAFICOT at present in producing ice, especially with the current small demand. However, if a new company wishes to establish itself, like a tuna longline company, they would need to provide their own ice making facilities for on board chilling of the catch and/or on-shore processing. The capacity of the equipment will depend on the ice requirements of the fishing and processing venture, plus any that the new operation may want to sell to other fishermen or the general public.

**Suggestion 25:** That any new fishing enterprise to be established in Tuvalu for tuna fishing will have to have their own ice making facility for both their fishing and processing operation to meet their needs.

Alternately, refrigerated sea water (RSW) can be used on tuna fishing vessels as the chilling medium for the catch and still maintain the quality needed for fresh export to high-priced markets. This is a good option for new ventures where limited shore facilities may be available during the start-up stage.

**Suggestion 26:** That any new tuna fishing ventures look at RSW as an alternative chilling medium to ice for their fishing vessels.

No one handles export packing materials or bait in Tuvalu at present, as these are not required at present based on the current state of the fishery and the methods employed. If exporting of fish commences or tuna longlining is trialled and successful, then there would be a need for these items at that time. Any company getting into this line or fishing or processing, which would probably be NAFICOT in the first instance, would need to access these items for their operation, and make allowance for their purchase in operational budgets, including the freight of getting these items to Tuvalu. Regarding bait, there could be a local market for this to other fishermen, although this has not been tested as yet. If there is a local demand, then additional bait could be bought in and sold to those requiring it.

**Suggestion 27:** That any company entering into tuna longlining activities and/or processing for export, include the purchase of bait and/or export packing materials into the operational budget, including the freight of getting these items to Tuvalu.

**Suggestion 28:** That if a company starts to import bait for their fishing operation, they bring in extra to supply local fishermen that require it.

Community fishing centres (CFCs) have been established on all outer islands in Tuvalu. Part of their operation is to produce ice and sell it to local fishermen to ensure quality of product. The ice produced is block ice, which is then put through a crusher. The capacity of these units is 500 kg/12 hours in 12 moulds. The price that ice is sold is up to each CFC, but expected to be in the range of AUD 2.00–3.00/bucket. It is doubtful that any private sector interest will try to establish ice making facilities in the outer islands to compete with the CFCs, although if they stop operating for whatever reason, the private sector could step in if there is an ongoing need and it is profitable to do so.

There is also the possibility that in the future, a fishing company may establish itself in one of the outer islands, especially Nukufetau or Nanumea, where the abandoned airstrips are (refer section 3.6). In this event, the company concerned would need to bring in all of the necessary equipment and supplies, like ice plants, bait and export packing materials, for their operation, and the suggestions made earlier in this section would apply.

### *3.3.6 Availability of fresh water*

There is no public fresh water supply in Funafuti. Each house or building has its own water catchment from the roof to a storage tank. Therefore, there is a real shortage of fresh water availability on the island, especially when rain is not forthcoming on a regular basis to keep the tanks full. To assist this situation, the Public Works Department has storage tanks of their own, plus they operate a desalination plant. The water is sold to whomever on an as-needs basis. The rate for purchasing fresh water is AUD 15.90/tanker truck load (4,500 litres) for domestic houses, and AUD 44.00/tanker load for commercial businesses and vessels.

The current situation with fresh water availability means that it will preclude the establishment of any processing operations that needs any volume of fresh water. The only way around this would be to either use salt water for processing, or have a desalination plant of a size large enough to provide the water needs of the facility. This will need to be a consideration of anyone wishing to set up any facility in Tuvalu, as the water problem is not going to be solved in the near future.

**Suggestion 29:** That any company wishing to set up in Funafuti that has a need for any volume of water either consider using salt water or have a desalination plant of a size large enough to provide the water needs of the facility.

The state of water supply in the outer islands is not known, however, it is expected to be the same as Funafuti. Therefore the same situation is likely to exist with the same solution.

### *3.3.7 Reliability of electricity supply*

The electricity supply in Funafuti is running at capacity, which causes stoppages from time to time. This is due to the age of the current generating equipment, equipment failure, availability of spare parts, and the increase in usage as the population increases on the island. The Electricity Commission is in the process of ordering a new 1000 kW diesel-powered generator, which will greatly relieve the situation, although a second unit is needed as backup as the older, smaller units are becoming less reliable and costly to run and maintain.

**Suggestion 30:** That the Government of Tuvalu order a second 1000 kW diesel-powered generator the same as the first, so there is a backup unit that is capable of handling the current requirements on Funafuti.

The problem with the current system is that the new generator will only be sufficient for providing slightly more than what is required at peak load now. That is, there is no real allowance for growth in electricity usage, which will be essential for any private sector development in the fisheries sector. The Government of Tuvalu can not afford to have electricity being a constraining factor to private sector development. To overcome this potential problem, the Electricity Commission should be looking at either larger generators than the 1000 kW units, or possibly a better solution, purchasing two smaller units in addition, with these units being either 300 or 500 kW units to account for development, that could occur quickly if the climate is right.

**Suggestion 31:** That the Government of Tuvalu consider the purchase of larger units to those in mind at present, or in addition, purchase two 300 to 500 kW units to address potential future needs to allow development to occur, especially in the private sector.

Even with new generators, there is always the possibility of blackouts due to unforeseen circumstances. This will especially be true under the current system of only having one new unit with the older, much smaller units as backup. As a safeguard, it would be best if any new venture has its own backup generator to meet the needs of the facility. This would ensure power, although there may be a few minutes lost between the power going out and the start-up of the company back-up unit.

**Suggestion 32:** That any company starting up in Funafuti that requires constant power for their operation ensure they have their own backup generator to meet the needs of the facility.

The other point to consider is that the price of electricity in Funafuti is AUD 0.34/kW-hour. The problem is that the cost of generating the power far exceeds the charge being applied, so the government is heavily subsidising the provision of electricity to all users. The Electricity Commission is trying to increase the charge for power to AUD 0.43/kW-hour, and if this comes in, the operating cost for private sector development will also increase. It should be noted that the cost of generating the power is still much higher than the proposed new charge of AUD 0.43/kW-hour, so the cost of power could increase further in the future. In this regard, for large power users, they should assess if it is cheaper to generate their own power or to pay the price and use town power, realising that the cost to the consumer has to increase, or the government will need to increase their subsidy for providing power to the community.

**Suggestion 33:** That any company that is a high power user look closely at the cost of generating their own power in comparison to the cost of obtaining power from the Electricity Commission, and choose accordingly.

The Electricity Commission is currently implementing a project of outer island electrification. Each outer island will receive three diesel-powered generators of different sizes to meet the current calculated needs with some reserve for development. This being said, any company wishing to establish itself in any of the outer islands will need to look closely at the power available on the island, and the ability of the island to maintain the service, especially in times of diesel shortage, or if the power is only going to be provided between certain hours, and plan accordingly with the provision of their own power or back-up unit.

**Suggestion 34:** That any company wishing to establish itself in any of the outer islands look closely at the power available on the island, and plan accordingly with the provision of their own power or back-up unit if deemed necessary.

### **3.4 Local tuna fishing fleet and suitable vessels**

In the past, Tuvalu had a commercial pole-and-line vessel which was not economically viable to operate in Tuvaluan waters because of the limited live bait resource, the distance needed to travel to sell the catch and get fuel, and the vessel being government owned and operated. There is always the possibility, although unlikely in the current economic climate of the industrial tuna fishery, that private sector interests may wish to conduct pole-and-line fishing operations in Tuvaluan waters in the future. The government should ensure that there are no restrictions put in the way of this type of fishing activity being conducted in Tuvaluan waters, especially access to live bait.

**Suggestion 35:** That the Government of Tuvalu ensure that there are no restrictions put in the way of domestic pole-and-line fishing activity being conducted in Tuvaluan waters, especially access to live bait.

The other main industrial fishing method for surface-schooling tunas, purse seining, is used seasonally in Tuvaluan waters by foreign fishing interests through the payment of access and/or licensing fees. This is a proven method, although the current world price for tuna is low and is making many of these fishing operations marginal. The possibility of Tuvalu becoming involved in purse seining activities is discussed more in Section 5.7.1.

The only tuna fishing activity currently employed by local fishermen is trolling, and possibly some traditional polling using pearlshell lures, and mid-water handlining, which are all small-scale methods. The vessels used are small, generally 4.5–7.0 m in length, and powered by outboards from 15 to 60 horsepower. Most of these vessels are constructed locally from plywood, some with a sheathing of fibreglass. There are also a few imported aluminium and fibreglass skiff used in this fishery. The use of traditional outrigger canoes for tuna fishing has stopped in Funafuti, although these could be still used in some outer island locations. As stated in Section 3.3.5, local tuna fishermen do not take ice with them when they fish. Fish quality and encouraging small-scale vessels to use ice chests and ice is an area where the Fisheries Department (extension) could focus.

**Suggestion 36:** That the Fisheries Department (extension) focus on encouraging small-scale operators fishing for tunas to carry ice chests of a size large enough for the fish being targeted, and ice to chill their catch.

There are other small-scale and medium-scale fishing techniques that need to be considered when looking at domestic participation in the tuna fishery in Tuvalu. First would be the use of mid-water fishing techniques, especially in association with FADs. FADs have been used in Tuvalu in the past, including all outer islands, with mid-water fishing methods being introduced to Tuvalu in the mid-1980s. The used of FADs will be covered under Section 5.9.4, while the possibility of promoting small-scale tuna fishing methods is covered under Section 5.9.5.

It should be noted that many local fishermen swap from one fishing method to another, such as from tuna trolling to handlining in the lagoon for shallow-water snappers, to fishing for deep-water

snappers outside the reef. In this regard, most vessels will need to be multipurpose, so that fishermen can continue to move between the fisheries, especially if there are seasonal changes that effect catch.

Small-scale and medium-scale tuna longlining is the main method of tuna fishing with promise for domestic participation by Tuvaluans, once infrastructure and transportation problems are overcome. Of the fishing vessels in Tuvalu at present, there is probably one, the fisheries research and extension vessel, that could be converted from their current fishing and extension activities to tuna longlining. The smaller NAFICOT vessels would be too small and not appropriate for this style of fishing.

Looking outside Tuvalu, there are many styles of tuna longline vessels being used domestically in the Pacific. Small-scale tuna longlining is conducted successfully in Samoa, and this is discussed more in Section 5.9.4. Medium-scale longlining though (refer Section 5.9.6) is more widespread in the Pacific, using vessels of 18–25 m in length, although vessels from 15–20 m are often used. The vessel parameters in Table 3 are for several size ranges of medium-scale vessels that could be used in Tuvalu as dedicated tuna longliners, with the capability to fish for deep-water snappers on a season basis if desired. The actual design of the vessel and the positioning of the wheelhouse (forward or aft) is up to the individual as both work successfully. The main features, outside the parameters outlined in Table 3, for a suitable vessel are:

- to have an open deck area for ease of working;
- to have a steering and control system mounted in a position to allow safe navigation of the vessel and operation of the gear during line hauling (usually have a steering position on the starboard side of the vessel where the gear comes out of the water);
- to have a block or pulley mounted over the area where the outside steering position is located so the operator can steer, control the hauling of the gear, and unclip the branchlines as they come up;
- to have an area on the side where fish can be landed easily (possibly have a cut-out area on the starboard side from the gunwale to the deck);
- to have the line setter/shooter mounted off-centre on the transom towards the starboard side (to make setting easier);
- to have block or pulley arrangements to guide the line from the reel squarely to the line shooter/setter during setting and squarely onto the reel during hauling;
- to have the area where fish processing is done shaded;
- to have a carpet or padded area for landing and cleaning the catch to stop damage occurring; and
- to have easy access to the fish hold so fish can be chilled as soon as they are bled and processed.

The specifics on the fishing gear components and construction are not covered here as many operators have their own personal preference. However, a monofilament system using a hydraulically-powered mainline reel is recommended over the traditional basket gear, as it is much easier to operate and maintain. In addition, RSW is recommended over ice as it cuts costs and reduces time spent in loading ice and chilling the catch.

**Suggestion 37:** That any Tuvaluan entrepreneur considering entering the tuna longline fishery closely look at the vessel parameters suggested above when they look at purchasing a tuna longline vessel, even if they have to purchase a vessel and make alterations, especially in regard to chilling (use of RSW) and fishing gear (use of hydraulically-powered mainline reel).



**Table 3: Suggested parameters for several sizes or classes of tuna longline vessels for Tuvalu**

Vessel parameter	Smaller vessel	Larger vessel
Hull construction	Steel or fibreglass	Steel or fibreglass
Superstructure construction	Aluminium or fibreglass	Aluminium or fibreglass
Length overall	19–21 m	23–25 m
Waterline length	18–20 m	21–24 m
Beam	5.5–6.5 m	6.5–7.2 m
Draught	1.5–2.0 m	1.7–2.2 m
Main engine (common brand)	200–300 hp	300–400 hp
Gearbox	Reduction	Reduction
Auxiliary engine(s)	2 x 30–40 KVA unit	2 x 50–60 KVA units
Hydraulic system	To suit equipment	To suit equipment
Cruising speed	Around 10 knots	Around 10 knots
Fish hold capacity	35–40 m <sup>3</sup> total	40–60 m <sup>3</sup> total
Chilling system	RSW (4–6 tanks)	RSW (4–6 tanks)
Freezing system	Dry freezer	Dry freezer
Freezer capacity	8–10 m <sup>3</sup> total	10 m <sup>3</sup> total
Fuel capacity	20,000–25,000 litres	25,000–30,000 litres
Fresh-water capacity	4,000–5,000 litres	6,000–8,000 litres
Crew compliment	6–8	8–12
Longline reel capacity	100 km x 3.5 mm mono	150 km x 3.5 mm mono
Line setter/shooter	Yes	Yes
Setting timer	Yes	Yes
Radio buoys	4–6	6–8
Radio direction finder	Yes	Yes
Radar	36 nm range	48 nm range
GPS with plotter	At least one unit	Preferably 2 units
Echo-sounder	Single frequency to 1,000 m	Single frequency to 1,000 m
Auto-pilot	Yes	Yes
Two-way radios	SSB and VHF	SSB and VHF
Weather fax	Yes	Yes
Temperature gauge	Yes	Yes
Inmarsat C	Yes	Yes
Satellite phone	Yes, if available	Yes, if available
Safety equipment	To country requirements	To country requirements

### 3.5 Processing facilities

The only processing facility in Funafuti is NAFICOT, and it is very small and not really up to export standards. There is no HACCP (hazard analysis and critical control point) plan in place for the facility, so it would not be able to export product to US markets, including Hawaii. This will be a major problem for NAFICOT, especially when they are wanting to develop and export industry for deep-water snappers, with Hawaii the target market.

It is planned that NAFICOT will be upgraded in the near future, with a new processing area and possibly new machinery. The building may also be enlarged, although this was not clear at the time this study was undertaken. If these planned changes go ahead, it is essential that the modifications and extensions are done in such a way that they meet all health standards and requirements, plus they are implemented with the development of a HACCP plan in mind to meet the US requirements. NAFICOT, through the Government of Tuvalu, could request technical assistance from SPC in the design and layout of modifications to their premises.

**Suggestion 38:** That NAFICOT through the Government of Tuvalu request technical assistance from SPC in the design and layout of modifications to their premises.

The issue of availability of land has been covered under Section 3.1, with some options to overcome this covered in Section 3.2. To encourage new entrants to the commercial fishery, whether it is for tuna or for deep-water snappers, they will need land to be able to construct processing facilities. Therefore, land needs to be identified, probably through reclamation if this is environmentally sound, and set aside to encourage future development of private sector processing and storage facilities. Reclaimed land associated with the suggested small-boat harbour would be ideal for this purpose, as the vessels would be tying up in this location as well. Without land, there is little scope for private sector development of processing facilities in Funafuti.

**Suggestion 39:** That the Government of Tuvalu set aside land, possibly through reclamation if this is environmentally sound, to allow future private sector development to occur with the establishment of processing facilities.

Each of the CFCs in the outer islands have a processing area incorporated. It is unknown if any of these are to appropriate health standards, or whether they would be appropriate to develop a HACCP plan. As part of the rationale behind the CFCs is to promote export, then careful consideration needs to be given to where product can be exported to, outside of Funafuti, from each of these facilities. Even if the fish is transported from these centres to NAFICOT for processing, or further processing, the CFCs form part of the handling and processing chain, which needs to be incorporated in any HACCP plan if the product is destined for US markets.

**Suggestion 40:** That NAFICOT look closely at how they can incorporate CFCs into their HACCP plan, when they develop one, to ensure the product they receive from the CFCs can be processed, or further processed, for export to US markets.

Land may not be such a problem in the outer islands for the development of processing facilities by the private sector. This would need to be clarified at each location by anyone wishing to enter into such a venture in the future.

### **3.6 Airport facilities and cargo space availability**

Currently there is one international airstrip in Funafuti, and two abandoned airstrips, one in Nukufetau and the other at Nanumea, which were left from WWII and have not been used since that time. Tuvalu does not have any airline, international or domestic, so it relies on an international carrier, Air Fiji at present, to provide a twice weekly service between Suva, Fiji and Funafuti in Tuvalu, although additional flights are scheduled when the need arises. The plane currently servicing this run is a small 30 seater, with limited cargo space only if the plane is around one half full with passengers. The current freight rate for product from Funafuti to Suva is AUD 6.00/kg, although NAFICOT has negotiated a rate of AUD 2.50/kg for fish being exported.

The current air service is inadequate for the development of an export industry flying fresh fish out to overseas destinations. There is basically no airfreight space available, and the freight rate is too high to export most products at a profit, as the Funafuti to Suva leg would be the first stage of getting the product to markets such as Hawaii, the US Mainland and Japan. The runway is considered too short for larger B737-type aircraft, hence the smaller plane used at present. The obvious solution to this

problem is to upgrade the runway to take larger aircraft, which would increase the airfreight capacity through larger planes coming to Tuvalu.

**Suggestion 41:** That the Government of Tuvalu consider upgrading the current airstrip on Funafuti to accommodate B737-type aircraft.

There have been discussions on upgrading the airstrip to a B737 standard over many years, and the government in 1992 and 1993 had studies done with costing to do this. The 1993 costing was for AUD 5,770,000, to extend the runway by 465 m (from 1535 m to 2000 m), including re-construction of around 1,000 m of the existing airstrip, a new terminal area, and visual aids and electrical works, including lighting control building and relocated control tower. If the new terminal area is excluded, the cost was estimated at AUD 4,345,000. These figures are out of date, although the plans should still be valid. It would therefore seem that only a new costing needs to be called for, possibly through tender if the government intends to proceed with this venture.

**Suggestion 42:** That if the Government of Tuvalu decides to go ahead with extending and upgrading the airstrip on Funafuti, they use the diagrams from the 1992 and 1993 studies, and call for tenders for doing the work.

A possible alternative to upgrading and extending the airstrip in Funafuti, is to look at the abandoned airstrips in Nukufetau and Nanumea, and have a study conducted to see what would need to be done to get either one upgraded to appropriate standards to accommodate B737 aircraft. In taking this path though, there is the need to develop additional infrastructure at either of these locations to accommodate passengers, as well as the need for an internal airline to move international passengers from either of these locations to Funafuti (could establish a local airline with foreign investment from the private sector). This in itself could be a worthwhile step, as it would allow ready access between either (or both) of these locations and Funafuti, without the need for sea transport. From this perspective, it would be a worthwhile exercise to have the study done at both locations as part of future development and possible decentralisation.

**Suggestion 43:** That the Government of Tuvalu have a study undertaken at both Nukufetau and Nanumea, on the requirements and costs of upgrading or reconstructing the abandoned airstrips on these two outer islands to accommodate B737-type aircraft.

The fact is that if there was an international airstrip at one or both of these locations, it may attract foreign investment through a joint venture with a local partner to develop an export-based tuna fishing facility. This would work well towards the government's decentralisation policy, promoting private sector development, and creating local employment. Again, there may be the need for basic infrastructure, although this could in the most part be negated for the fishing company, provided there was suitable land available for the construction of shore facilities and housing for any expatriates. In constructing shore facilities, electricity generation, and water supply would need to be incorporated.

**Suggestion 44:** That the Government of Tuvalu consider the upgrading of one or both of the outer island airstrips, as a first step in promoting decentralisation, private sector development, and local employment in these areas.

**Suggestion 45:** That if the government does go ahead with upgrading either or both of the outer island airstrips, they also consider the establishment of a local airlines, possibly through a joint venture arrangement with a private sector investor.

#### **4. TRAINING NEEDS AND REQUIREMENTS**

There is a range of training needed in Tuvalu to meet the future needs of the fishing industry, the support sector, and within the Fisheries Department and NAFICOT.

## 4.1 Fishing industry

There is no Fisheries Training College in Tuvalu at present, although there is a Maritime Training College. The Maritime College only provides maritime training at present, although would like to get involved in fisheries training in the future, if a need is identified. To do this, the college would need to get suitably trained staff in identified areas and specialised training equipment, such as a radar simulator. The college does have an engine room simulator, which can be used for training up engineers for both the merchant and fishing industries.

In the event that the Maritime College does develop some fisheries related courses, especially for skippers and engineers, these should be developed under STCW guidelines, so that the courses feed into the STCW system, even though fisheries is not covered under STCW at this stage. Such an approach will allow those with a fisheries qualification to undertake bridging courses to have their qualifications recognised under the merchant structure. This would be important in a place like Tuvalu, where limited jobs are available.

**Suggestion 46:** That if the Maritime College develops any courses for the fishing industry, they be developed to STCW standards.

The Marine and Ports Service (MPS) are responsible for all shipping, working under the Merchant Shipping Act 1997 and Merchant Shipping (STCW Convention) Regulations 1998. The focus of this legislation is merchant shipping in Tuvalu, although it does cover fishing vessels as well. The problem is that MPS does not have the capacity to monitor and enforce the Regulations, so they are not worried about fishing vessels at all at present. However, MPS is in the process of developing a new document called ‘Development of Non-Convention Regulations’ to cover vessels 15 to 24 metres in length. This still left vessels under 15 m in length outside of any Regulations, and there were no plans at this stage to develop or implement any small-boat provisions.

Under the Shipping Act 1997, the Schedules cover the manning levels and qualifications for crew on fishing vessels. The Act covers vessels down to 7 m in length, with vessels of 7–15 m engaged in Near Coastal Voyages (within 200 nm) requiring a Class 5/6 Master/Engineer; vessels from 15–25 m require two Class 5 Masters; and for vessels 25 to 60 m, one Class 4 and two Class 5 Masters are required. On the engineering side, vessels with engines <250 kW required a Class 5/6 Engineer; and vessels with engines 250 to 500 kW requiring one Class 4 and one Class 5 Engineer.

Given this situation, MPS should look at including vessels of 7–15 m in their ‘Development of Non-Convention Regulations’, to keep this consistent with the Shipping Act 1997. The Fisheries Department should work with MPS in the development of these Regulations, so that they are developed to assist the fishing industry, and not just be the merchant requirements being applied to the fishing industry. In doing this, the Fisheries Department and NAFICOT could have input to the proposed manning requirements on fishing vessel greater than 7 m as well, to ensure that this is not unrealistic and work against the development of fisheries in Tuvalu.

**Suggestion 47:** That the MPS look at including vessels of 7–15 m in their ‘Development of Non-Convention Regulations’, to keep this consistent with the Shipping Act 1997.

**Suggestion 48:** That the Fisheries Department and NAFICOT work with MPS in the development of the Regulations and manning levels for fishing vessel, to ensure they do not hinder fisheries development aspirations through being too stringent.

In Tuvalu’s situation, a Class 6 Master/Engineer should be sufficient for a 7–15 m vessel doing Near Coastal Voyages, while a Class 5 Master/Engineer should be adequate for vessels 15–25 m. Once the Regulations are developed and implemented, both the Fisheries Department and NAFICOT should follow these Regulations, ensuring that all skippers, engineers and crew are suitably qualified and the manning levels are adhered to at all times. The Regulations should also require that all people working offshore on vessels over 7 m in length, hold a current sea safety certificate.

**Suggestion 49:** That MPS through Regulations, implement a manning requirement for fishing vessels of a Class 6 Master/Engineer for a 7–15 m vessel, and a Class 5 Master/Engineer for vessels 15–25 m, doing Near Coastal Voyages.

**Suggestion 50:** That MPS include in the Regulations the requirement that all skippers, engineers and crew on vessels over 7 m in length hold a current sea safety certificate.

**Suggestion 51:** That the Fisheries Department and NAFICOT support MPS in the implementation of the Regulations, through ensuring that all of their employees are trained to meet the requirements of the Regulations.

#### *4.1.1 Skippers and crew*

There are very few fishing vessels over 7 m in length in Tuvalu. The larger fishing vessels are all owned and operated by either the Fisheries Department or by NAFICOT. Fisheries had a 19 m fibreglass extension vessel, which is used to: fish around Funafuti to supply fish to NAFICOT; transport fish from the outer island CFC to NAFICOT; and for general charter to transport people and goods within the islands of Tuvalu. This vessel had a qualified skipper, who gained his qualification through overseas training. None of the NAFICOT 9 m vessels had qualified skippers or crew. It also appeared that none of the local fishermen, who worked their own vessel of up to 7 m in length, had any form of training or qualification.

There is an urgent need for qualified skippers on all of the NAFICOT vessels, as they work outside the reef up to 15 nm off the coast. NAFICOT is also keen to get some larger vessels to fish the seamounts in the southern waters of the Tuvalu EEZ. Qualified and experienced skippers will be needed for these vessels. In addition, the fisheries vessel should have a qualified mate, and/or a replacement skipper, in the event that the current skipper decides to leave or is not available when needed. The main problem is how to get the skippers and crew trained up.

The one area where the Maritime College could provide immediate training for fisheries and NAFICOT skippers and crew (could include engineers and local fishermen as well) was in sea safety. All people who head to sea (offshore) should be trained and hold a current sea safety certificate, especially on vessels over 7 m in length, which is not the case in Tuvalu at present. The course proposed by the college would run for two weeks and include four days of fire fighting, four days of survival at sea, two days of personal safety, plus some time to do elementary first aid. The Fisheries Department and NAFICOT should look into the cost of having this training for all of their skippers, crew and engineers. Possibly the Maritime College could run a specific course, or several courses, to provide this training. Once the fisheries and NAFICOT staff were trained, they should encourage local fishermen who work outside the reef to undergo the same training for their own good.

**Suggestion 52:** That the Fisheries Department and NAFICOT ask the Maritime College to provide a costing for providing sea safety training to their staff, and seek the necessary funds to have the training undertaken.

**Suggestion 53:** That the Fisheries Department and NAFICOT put all of their skippers, crew and engineers through training to attain a sea safety certificate through the Maritime College.

**Suggestion 54:** That once the fisheries and NAFICOT staff are trained and hold sea safety certificates, they encourage other local fishermen who work outside the reef to undertake the same sea safety training.

Training up skippers so they become qualified will be a more difficult task given the current situation in Tuvalu, with three options available. These are to have the Maritime College develop the course for a Master Class 6 and 5 skipper, bring in suitable tutors or trainers to hold courses in Tuvalu, possibly through the Maritime College, or to send selected people overseas for training. Each option has a cost

and time factor involved. Given the immediate need for the current skippers of the NAFICOT vessels to gain a qualification, it would be best in the first instance to bring in a qualified trainer or tutor to hold the necessary training in Tuvalu, at least for the Master Class 6 level. If this approach is taken, then others from fisheries or local fishermen could be invited to attend as well, so there is a total of around 10 or 12 people being trained at the same time. Fisheries and NAFICOT may need to seek donor funding to cover the cost of running such a course. The best venue for this training to occur would be the Maritime College, if their facilities were available.

**Suggestion 55:** That the Fisheries Department and NAFICOT look at bringing a qualified tutor or trainer to Tuvalu to run a Master Class 6 skippers course for selected staff, plus some local fishermen if space is available.

**Suggestion 56:** That the Fisheries Department and NAFICOT seek donor funding to fund the running of a Master Class 6 skippers course in Tuvalu.

**Suggestion 57:** That the Fisheries Department and NAFICOT approach the Maritime College to use their facilities to run a Master Class 6 course, or seek another suitable venue if necessary.

If this approach is not undertaken, then the best short-term approach would be to send selected people from NAFICOT and fisheries overseas for training, probably to Fiji. The best long-term approach would be for the Maritime College to develop the course materials and employ a suitable tutor to provide the necessary training, and conduct one or two courses per year.

**Suggestion 58:** That if the Fisheries Department and NAFICOT do not bring a tutor to Tuvalu to provide Master Class 6 skipper training, in the short-term they send selected staff for overseas training, or in the long-term, they encourage the Maritime College to develop the appropriate course work and employ an suitably qualified lecturer.

#### *4.1.2 Engineers*

There is a shortage of qualified engineers available for the fishing industry in Tuvalu. The Fisheries Department has a qualified engineer on their vessel, however, NAFICOT has one engineer on shore, but none on their vessels. NAFICOT also has an engineer from Japan coming to assist them on a regular basis, especially for major repair work to the company vessels.

The Maritime College does provide some basic engineering training for their merchant trainees. However, it was unclear if this training was to a level where a recognised qualification could be granted. This would need to be clarified, and if necessary, additional course materials prepared, so that the college could grant a Class 5 engineers qualification under the STCW structure. This may need to be taught in modules in specific subject areas, to allow staff from fisheries and NAFICOT, as well as local fishermen, to continue working between the running of different modules.

**Suggestion 59:** That the Maritime College develop a course for Class 5 engineers, using a modular format in specific subject areas, and offer this for training up engineers for the fishing industry.

Larger fishing vessels in Tuvalu, of which there is only one at present with fisheries, will require engineers with a higher qualification based on the power rating of the main engine(s) and machinery on board. If NAFICOT goes down the path of getting larger vessels to fish the southern seamounts, they may need engineers with higher qualifications. To develop a course in Tuvalu at this stage for higher engineering qualifications would seem unrealistic, as the demand is small. Therefore it would be best to send suitable people from fisheries or NAFICOT, overseas for the necessary training.

**Suggestion 60:** That the Fisheries Department and NAFICOT select suitable staff who will require a Class 4 engineering certificate, and send them overseas for the necessary training.

Given the lack of vessels over 7 m in the commercial fishery in Tuvalu at present (including the outer islands), with these all being outboard-powered, there does not appear to be a need at present for engineering training in the private sector. This could quickly change if local fishermen start to upgrade their vessels to diesel-powered craft, especially if a safe anchorage is developed through a small-boat harbour, and if the Maritime College does offer a Class 5 engineers qualification, this should satisfy the need at that time.

#### 4.1.3 General

There is only a small private sector in the fishing industry in Tuvalu at present. Local fishermen use small outboard-powered craft for their fishing operation, with trolling, shallow-water handlining, and to a lesser extent deep-water snapper fishing, being the main commercial activities. Few of these vessels use ice, so the quality of the landed catch is highly variable. This is an area where both the Fisheries Department and NAFICOT can assist fishermen through training and raising awareness.

NAFICOT is in the process of upgrading its facilities to meet export sanitation standards and requirements, as well as developing a HACCP plan for their facility, so they can export to the US. Part of the chain in exporting high quality product is to start off with high quality product that has been properly handled from the time it was caught. Therefore, fishermen wishing to sell their catch to NAFICOT in the future will need to ice their fish as soon as it is caught. NAFICOT should start an awareness campaign regarding the need for using ice, and look at ways to train people to ensure they are providing a quality product. Possibly a couple of one-day workshops would be the best approach, with these conducted in the outer islands as well, so the CFCs are purchasing high quality fish and sending it to Funafuti.

**Suggestion 61:** That NAFICOT and the Fisheries Department organise a couple of one-day workshops to promote the use of ice, explain the importance of using ice, and showing the correct method of handling fish and icing them.

**Suggestion 62:** That these one-day workshops be conducted in the outer islands as well as Funafuti.

Another area where the Fisheries Department and NAFICOT could assist local fishermen is with training in alternative fishing methods, like mid-water handlining for larger tunas, possibly in association with FADs. These methods are discussed in more detail under Section 5.9.5 with FADs discussed under Section 5.9.4.

As more people become involved in commercial fishing, especially if export markets are established, small fishing companies may be established. These will more than likely be family businesses that may expand over time. To assist local fishermen develop their businesses, there will be a need for specific training in running a small fishing business. The Business Advisory Bureau of the Department of Tourism, Trade and Commerce does run training in management of a small business. However, the materials they used were old and may be slightly outdates. The Fisheries Department could either support this existing training in managing a small business, or seek assistance, possibly from SPC, in establishing a more specific course for training in managing a small fishing business.

**Suggestion 63:** That the Fisheries Department either support this existing training in managing a small business provided by the Business Advisory Bureau, or seek assistance, possibly from SPC, in establishing a more specific course for training in managing a small fishing business.

SPC has specific training materials available for the financial management of a small fishing business. SPC can also assist in the running of the first workshop, which would normally run for one week. Fisheries staff can run such a workshop using the SPC materials, possible with assistance from staff of the Maritime College, or local school teachers. Future courses can then be run by the staff of the Fisheries Department as required. This training could also be conducted in the outer islands to assist those wishing to set up fishing businesses in these locations.

**Suggestion 64:** That if the Fisheries Department needs to develop training in small business management, they use the SPC materials and seek assistance from SPC in the running of the first workshop.

People or companies in Tuvalu wishing to run a larger fishing operation, could find the two-week regional SPC and New Zealand School of Fisheries (NZSOF), 'Enterprise Managers Course' useful. This course covers business management on a larger scale including vessel management, joint ventures and charter arrangements, an introduction to HACCP requirements for marketing seafood in the US, and a range of other topics specific to operating or managing a larger-scale fishing operation. As this is a regional course run each year, Tuvaluans will need to apply to attend; normally, one or possibly two positions are available.

**Suggestion 65:** That the Fisheries Department support Tuvaluans entering or expanding their fishing business to a larger-scale, including NAFICOT staff, by nominating them to attend the annual SPC/NZSOF Enterprise Management Course, to develop better business management skills.

## **4.2 Support sector**

The support sector is very small in Tuvalu, with most trades people working for different government departments. The government in some areas is trying to move away from their departments doing work for local people in opposition to the private sector. Fisheries is one area where this approach has not been taken at this stage, and this is discussed more under Section 5.3.

Overall, the government could provide the training of trades people in areas that would benefit fisheries development, such as engineering (diesel, outboard, hydraulic), electrical, carpentry, and welding, with these people encouraged to leave the government and set up in the private sector over time. This is a very difficult position to be in as the private sector is so small, and without major developments to the infrastructure as a whole, there is not enough work around to support growth in the support services area.

**Suggestion 66:** That the Government of Tuvalu continue to train up people in the support sector trades, encouraging them to leave government and set up their own businesses in the private sector.

## **4.3 Fisheries Department and NAFICOT**

The staff of the Fisheries Department, and to a lesser extent NAFICOT, will need a range of training to gain the necessary skills to develop and manage different fisheries in Tuvalu. The Fisheries Department and NAFICOT also have vessels that could be used for training.

### *4.3.1 Training needed for staff of the Fisheries Department*

Under the current education and training system in Tuvalu, it would appear there is a limited focus on the marine sector. This is not unusual as there is limited employment opportunities in Tuvalu in the marine sector. Therefore, Tuvaluans interested in a degree course in the marine sciences go overseas to get this training. As a result, there are only a few Tuvaluans with a degree in marine sciences.

The University of the South Pacific offered several courses through its Tuvalu campus. These courses included a Diploma in Tropical Fisheries, a Diploma in Ocean Resource Management and Policy, and a Diploma in Fisheries Economics and Management. These are all provided as distance learning courses that take a minimum of three years to complete. At the time of this report being written, there were no Tuvaluans enrolled in any of these courses.

The Fisheries Department needs to raise the profile of marine science in Tuvalu, as there is an ongoing need for fisheries and environmental scientists. The latter is an area the Fisheries Department needs to focus on, as conservation issues and interactions of gears on non-target species may become an increasing component of the department's work. The Fisheries Department should inform the



Office of the Prime Minister of this need, so that school-leavers can be offered scholarships in these fields.

**Suggestion 67:** That the Fisheries Department identify environmental science and fisheries science as areas requiring qualified staff, and request the Office of the Prime Minister to offer scholarships in these fields.

No staff at the Fisheries Department hold qualifications in fisheries management. Those that are becoming involved in management come from a more scientific background or have worked their way into this with no formal qualification. The problem is that fisheries management is becoming much more complex, and there is a need for specific training in this area. A good example of this is the implementation of the National Tuna Development and Management Plan — is anyone at the Fisheries Department qualified or able to implement it effectively?

The people involved in the implementation of the Plan need specific training in the areas of fisheries management, developing and implementing management plans, and developing and implementing small-scale tuna fisheries projects. Such training is not available in Tuvalu at present, so the choices are to send staff overseas for training or to bring someone into Tuvalu with the necessary skills and experience to provide on-the-job training. These approaches could also be combined through a job exchange programme with a recognised agency involved in fisheries management. This approach would allow staff to be trained while they are working, both in Tuvalu and in the agency involved in fisheries management or fisheries development.

**Suggestion 68:** That the Fisheries Department arrange for staff involved in the implementation of the National Tuna Development and Management Plan to receive training, either by sending them overseas on recognised courses, bringing a person to Tuvalu with the necessary skills to provide on-the-job training, or enter into a job exchange programme with a recognised agency involved in fisheries management and/or fisheries development.

Surveillance and compliance will be required with the implementation of any management plan. However, it is particularly relevant with the National Tuna Development and Management Plan as there are international implications for Tuvalu when they allow foreign fishing vessels to work within its EEZ under agreements with specific terms and conditions.

Currently there is considerable foreign fishing access to Tuvalu, and there is limited surveillance undertaken. The Forum Fisheries Agency (FFA) has completed a vessel monitoring system (VMS), which is being implemented regionally, and countries should require this under fishing access agreements. Tuvalu should work towards the implementation of VMS in any future access agreement, as well as the re-negotiation of current agreements, as part of the terms and conditions. VMS should also be looked at as a future requirement for domestic vessels, as there are flag-state control issues that Tuvalu will need to address if Tuvaluan vessels happen to fish in the zone of a neighbouring country by mistake. VMS is also an additional piece of safety equipment for all vessels fishing offshore.

**Suggestion 69:** That the Fisheries Department fully implement the requirements of VMS in any future or re-negotiated fishing access agreement under the terms and conditions of access.

**Suggestion 70:** That the Fisheries Department look at VMS as a future requirement for domestic vessels, as there are flag-state control issues that Tuvalu will need to address if Tuvaluan vessels happen to fish in the EEZ of a neighbouring country by mistake.

Tuvaluan surveillance officers receive training in Australia, and there are three Australian Naval Officers stationed in Tuvalu. It was unclear exactly what training the Tuvaluan Officers received in Australia. There appeared to be a need for on-the-job training in some fields, including prosecution workshops, evidence collecting, and verification of catch records. This type of training is necessary to ensure that officers know how to conduct their surveillance activities accurately, as some of this work

may lead to prosecution, with appeals from the defence side. On-the-job training is suggested for these officers as they need to know how to work in their own environment with the equipment available to them. The Fisheries Department and the Australian Navy Officers could identify specific areas of training in surveillance and compliance, and approach Australia for assistance with the provision of a suitable trainer in the areas identified.

**Suggestion 71:** That the Fisheries Department and Australian Navy Officers identify specific areas of training for surveillance officers, and approach Australia for assistance with the provision of a suitable trainer in the areas identified.

Another way of conducting surveillance on fishing vessels, especially foreign fishing vessels, is to have observers on board to monitor and verify catch (including bycatch and discards) and fishing location. Several Tuvaluans have been trained as observers, although very little observing work is undertaken. There is a need to increase the number of trained observers, to meet any requirements and ensure accurate data is provided under the National Tuna Development and Management Plan. For maximum efficiency and to minimise long-term costs, it would be best if the people to be trained as observers were not government employees. This would allow observers to be employed on a casual basis when there was work available, and increases the skills in the private sector workforce.

Both SPC and FFA have been involved in training national observers in the region for observing on tuna fishing vessels. It is timely for a workshop to be held in Tuvalu to equip people with the skills required for observing on tuna fishing vessels. Both SPC and FFA are in a position to assist in the running of an observer workshop. This would create a pool of qualified observers to assist in the monitoring of catch and fishing location of tuna fishing vessels working in Tuvalu under the National Tuna Development and Management Plan, or to work through FFA to observe on US purse seiners under the Multilateral agreement.

**Suggestion 72:** That the Fisheries Department request both FFA and SPC to assist in the setting up and running of a workshop to train up Tuvaluan observers to monitor tuna fishing vessels licensed under the National Tuna Development and Management Plan, or to work through FFA to observe on US purse seiners under the Multilateral agreement.

**Suggestion 73:** That the Fisheries Department select non-government employees for training as observers, to increase the skills of Tuvaluans in the private sector workforce, with the Fisheries Department employing these people on an as-needs basis.

As domestic tuna fishing activities develop in Tuvalu, it is hoped that increased catches will be landed for export and domestic sale. There is no port sampling in Tuvalu at present. With the landed catch expected to increase, a port sampling project should be started, so that data can be collected from a representative sample of the landed catch. Several port samplers need to be trained to measure the catch of domestic tuna landings (and bycatch) as well as any fish that may be transshipped by foreign vessels in future. SPC can assistance in training port samplers.

**Suggestion 74:** That the Fisheries Department request SPC to provide assistance in training Tuvaluans as port samplers, and a port sampling project established.

#### *4.3.2 Training needs for staff of NAFICOT and the outer island CFCs*

The management of NAFICOT is in the process of upgrading the company's processing facility. SPC has provided a consultant to assess the current structure in Funafuti, and suggest the necessary changes to this facility to meet export hygiene standards, as well as producing a list of necessary equipment and developing a HACCP plan. It is expected the new facility will be completed by the end of 2001.

Once the facility is upgraded, there will be a need for all staff to receive HACCP training, to ensure that export standards are maintained. NAFICOT should make this a top priority as part of their move

towards exporting marine products from Tuvalu. This training should also flow through to the CFCs, as product received by each CFC will need to be to a high standard, so it can be shipped to Funafuti for marketing locally or exported. NAFICOT, through the Government of Tuvalu, should request assistance with the HACCP training of their staff, ensuring that staff from each CFC are brought into Funafuti for the training as well.

**Suggestion 75:** That NAFICOT make HACCP training a high priority for all staff once the upgrading of the processing facility is completed.

**Suggestion 76:** That NAFICOT ensure that some staff from each of the outer island CFCs are included in the HACCP training, so that the upgraded facility in Funafuti receives high quality product from them.

**Suggestion 77:** That NAFICOT, through the Government of Tuvalu, request assistance from SPC in providing HACCP training for their staff.

#### *4.3.3 Using the Fisheries Department vessel for training*

The Fisheries Department has a 19 m vessel that could be used for training of interested fishermen in different fishing techniques. However, the vessel does not have the necessary equipment to undertake tuna longlining activities, or conduct mid-water tuna fishing activities. The Fisheries Department should purchase the necessary equipment, a hydraulically powered mainline reel and line shooter, and make sure the current hydraulic system is adequate to operate this machinery. If the hydraulic system is inadequate, a replacement hydraulic system should be purchased as well. This would then allow the vessel to operate as a training vessel, to demonstrate these fishing techniques to local fishermen, thus encouraging private sector development in this area.

Before the Fisheries Department embarks on purchasing equipment to fit out their vessel, they should seek guidance for the type and size of gear to be installed. This advice could be sought from SPC or from other sources, such as Japan. Once the advice has been received and the gear is purchased, the Fisheries Department could request assistance from the supplier on the installation of the equipment. SPC could also provide advice on the best location for mounting the different components of equipment, and making up the gear itself. The Fisheries Department should then request technical assistance from SPC, so that the skipper and crew can be trained up in the different fishing techniques prior to the commencement of training with local fishermen.

**Suggestion 78:** That the Fisheries Department look at purchasing a hydraulically-powered mainline reel and line shooter, making sure the current hydraulic system is adequate to operate this machinery, and purchase a replacement hydraulic system if needed.

**Suggestion 79:** That the Fisheries Department seek advice from either SPC or another source as to the appropriate equipment to purchase to equip the vessel for tuna longlining, as well as advice on installation.

**Suggestion 80:** That the Fisheries Department seek technical assistance from SPC when their vessel is equipped, so that the skipper and crew of the vessel can be trained up in the different fishing techniques prior to the commencement of training with local fishermen.

## **5. CONSTRAINTS AND OPTIONS FOR DEVELOPMENT**

There is a range of constraints facing domestic development of the tuna fishery in Tuvalu. Some of these are related to financing, government policy, and the cost of fuel and other items needed to operate. If some or all of these constraints can be overcome, there is a greater chance of domestic development and involvement of Tuvaluans in the tuna fishery. However, the major constraints to development in Tuvalu at present are in the area of basic infrastructure, such as a safe harbour for

vessels and transporting fish to export markets in reasonable volumes, and prices that are economically viable. These constraints have been discussed under various headings in Section 3. Therefore, the options for development presented in this section really hinge on some or all of the infrastructure constraints being addressed.

Development or Tuvaluan involvement in the tuna fishery can be in several areas, and previous sections have looked at the training needs and infrastructure requirements. The other area that development can occur is in post-harvest activities, once the fish have been initially caught, including employment opportunities. However, the initial stage of any development will require a government structure to foster this, with the government pulling back from its current commercial activities to support private sector development.

### **5.1 Possible objectives and strategies for future development of the tuna fishery in Tuvalu**

The unique situation that Tuvalu faces in regard to constraints to development and basic infrastructure requirements makes it very difficult to come up with realistic and achievable objectives and strategies for development of a domestic export tuna fishery. This coupled with the government's commercial fishing activities make private sector development a challenge.

The Manager of NAFICOT, Mr Satalaka Petaia, has recently completed his Master of Applied Science (Living Marine Resources) thesis on 'Building a Sustainable Tuna Fishery in Tuvalu'. In his thesis, he looks at possible objectives and strategies for developing, managing and regulating the subsistence, artisanal, commercial, and industrial tuna fishing sectors in Tuvalu. Taking into account the problems that Tuvalu faces, the development objectives and strategies proposed in Mr Petaia's thesis, and the input of others, the following objectives and strategies are provided for discussion and modification, and inclusion in the National Tuna Development and Management Plan for Tuvalu.

*Draft objectives for comment:*

- Increase local employment and involvement of the private sector in a domestic tuna fishery, maximising the economic returns to the people and communities of Tuvalu;
- Insure that domestic participation in harvesting the tuna resource is conducted in a sustainable, responsible, and environmentally friendly way, to provide both food for local consumption, and export-oriented income; and
- Promote and encourage establishment of tuna fishing facilities and capabilities in Tuvalu, to further domesticate the tuna fishery, while contributing to national development goals.

*The draft strategies (for comment) that would lead into achieving of above objectives are:*

- Increase the participation of private sector interests in tuna fishing through the provision of infrastructure needed to foster development, such as a safe anchorage for fishing vessels, and land availability for constructing support services, like processing and/or storage facilities;
- Work with other government departments in overcoming the logistical problems of transporting products, especially fresh fish, at a cost effective price both internally, and to export markets from Tuvalu;
- Ensure that environmentally friendly and non destructive fishing methods are employed and accurate data is collected from all participants in the fishery, with independent validation through a domestic observer programme;
- Establish an effective extension service to introduce alternative small-scale and medium-scale tuna harvesting techniques to Tuvalu when the main infrastructure constraints are overcome and fish can be exported easily;

- Encourage the private sector to enter into joint ventures with foreign investors to establish viable fishing operations with shore facilities for processing and exporting fresh or processed tunas based in Tuvalu; and
- Promote value-adding to tuna catches in Tuvalu, to maximise local employment, and produce a low weight, high value product to minimise freight costs to export markets.

The above objectives and strategies are merely a starting point for the government to consider. The best initial approach will be for the government, through the Fisheries Department and NAFICOT, to compile a specific development plan or strategy for the domestic tuna fishery, which would have specific objectives and strategies. However, the plan/strategy needs to be developed with the input of the different stakeholders in Tuvalu, so that they feel some ownership of the plan/strategy and support it. The stakeholder groups could include local fishermen, local business people, different government departments (fisheries, NAFICOT, tourism, Marine and Ports etc) and conservation/environmental groups. Outside assistance could also be called on from SPC to assist with the compilation of a specific domestic tuna fishery development plan/strategy.

**Suggestion 81:** That the Government of Tuvalu, through the Fisheries Department and NAFICOT, compile a specific domestic tuna fishery development plan/strategy using representatives from all stakeholder groups in its development, calling on SPC for assistance if needed.

## **5.2 Encouraging private sector development**

The Government of Tuvalu has tried developing fisheries within the country for several decades with little success. These development attempts have all been made through the Fisheries Department, and later NAFICOT, which are discussed in Section 5.3. The focus now needs to be on encouraging private sector development, which is very difficult given the current situation in Tuvalu. This report in general, tries to point out the areas that need to be addressed to create an environment to allow private sector development to occur.

For any development in the fisheries sector to occur in Tuvalu, there needs to be basic infrastructure to support the catching side of the fishing operation, plus there needs to be an available market where the catch can be sold at a profit. Currently in Tuvalu, the infrastructure needed is major, the domestic markets small and limited, and little possibility of cost effective exporting at the current time. This latter point is probably the most important, as without a market to sell fish at a profit, there is no point in catching more than is needed for domestic consumption.

The only way forward for Tuvalu is to develop export markets for fish, as the domestic market is limited both in the volume that can be sold and the price people will pay. To export fish, there needs to be infrastructure in place to get the product out of the country at a price that will make it competitive on overseas markets, and return a profit to the exporter and fishermen. The two ways to export from Tuvalu are by air freight and sea freight. Current limitations with the runway, size of aircraft, availability of air freight space have been discussed in Section 3.6, and these greatly hinder export. Sea freight is only an option for frozen product, or processed product that has a long shelf-life, with or without refrigeration.

The best way forward for the Government of Tuvalu is for them to fund developments in infrastructure needs. This should include upgrading the runway so that fish can be exported fresh by air. Once an avenue has been created to export fish, other infrastructure requirements can be addressed, such as developing a safe anchorage or small-boat harbour (refer Section 3.2), which will allow fishermen to purchase larger vessels and keep them safe. When larger vessels are bought in by the private sector, support services will be needed to maintain the vessels, as well as employment being generated on the vessels themselves. If land is available in Funafuti (refer Section 3.1) fishermen with larger vessel will be inclined to develop shore facilities to process catch for export,

plus purchase fish from smaller operators to increase the throughput. Finally, the government needs to remove itself from commercial activity in the fishing sector, as local fishermen cannot compete.

**Suggestion 82:** That the Government of Tuvalu focus on providing basic infrastructure needs that will create a climate for private sector development in the fishing sector.

### 5.3 Government's commercial involvement in the fishing sector

The Government of Tuvalu is heavily involved in commercial fishing and marketing activities within the country, as a means of encouraging development. However, this is not working and the government recognises this. In fact, they have publicised this in the *Kakeega o Tuvalu 1995–1998* with the following quote:

*'This Government acknowledges the failure of the existing strategy, based largely on aid financed injections of capital to Government owned and operated ventures, for commercial fishing development. This approach has not only failed in Tuvalu, but throughout the region. Moreover, it has been pursued in Tuvalu for almost two decades which suggests that the problems with it are not temporary. Rather, they are embedded within the strategy, which needs to be changed. The major reasons are:*

- 1. The institutional arrangements under aid based financing of Government owned and operated ventures are geared to failure. Governments are not adequately equipped to own and operate commercial ventures generally, let alone high risk and high capital cost fishing ventures. In addition, few of Tuvalu's ODA based development partners have programmes that are sufficiently large to accommodate the capital injections required for development of export oriented commercial fisheries. Moreover, the bureaucracy of aid is not sufficiently flexible to accommodate commercial needs.*
- 2. Foreign Direct Investment (FDI) is the most effective mechanism for transferring the relatively large scale finance, investment, technology, skills, and marketing networks required for a successful commercial fishing venture. The advantages held by FDI investors are almost a perfect offset to the pervasive operational constraints to developing successful commercial fisheries in Tuvalu.*
- 3. Using FDI to finance relatively large scale commercial operations frees up ODA resources to be used in areas where they are better suited to make a strong contribution to a successful industry, such as infrastructure support, and education and training. These are areas where ODA financing has a strong record of success, and they are also critical for successful industrial development.*
- 4. Domestic investors in commercial fisheries have better incentives to increase production and much higher levels of productivity than do government employees. They would also have more immediate access to a wider workforce and the range of skills required to run a successful operation. Moreover, the involvement of private investors is consistent with the Governments desire to see the benefits of development diffused more widely in the community.'*

The Government of Tuvalu recognises their problem, however, continues to dabble with commercial activities in the fisheries sector. Some of this is provided as a service, such as the chartering of the fisheries vessel to do runs to outer islands, as there are few options for travel within Tuvalu. However, the Government needs to pull back from commercial activity in line with the above philosophy, allowing the private sector to development while the government focuses on the infrastructure needs that will assist development.

**Suggestion 83:** That the Government of Tuvalu pull back from commercial activity in line with the philosophy presented in the *Kakeega o Tuvalu 1995–1998*, allowing the private sector to development while the government focuses on the infrastructure needed to assist development.

There are three areas where the government is involved in commercial activity in the fisheries sector at present, NAFICOT in commercial fishing and marketing, the Fisheries Department in fishing and vessel charter, and the CFCs in the outer islands, which are involved in marketing.

### 5.3.1 NAFICOT

NAFICOT was established as part of the Fisheries Department in 1982, to manage the operations of F/V *Te Tautai*, a pole-and-line vessel donated to Tuvalu by the Government of Japan. In 1986, NAFICOT became a semi-government organisation under the Ministry of Natural Resources, with a Board of Directors and its own accounting system. Aid funding from Japan, United Kingdom and Australia over the years has provided a processing facility, the machinery for the facility (ice plants, freezers etc) and several fishing vessels.

At the time this study was undertaken, NAFICOT was to receive an injection of government funding to upgrade the processing plant and machinery, to export standards. NAFICOT also had four 9 m fishing vessels, two operational and two on the slips waiting for spare parts. These vessels were fished by NAFICOT with the crew paid a retaining wage, plus a wet allowance when the catch was over 100 kg for a day trip. NAFICOT also had 68 local fishermen contracted to fish for them using their own vessels, with NAFICOT providing cheaper ice (AUD 1.00/bucket as opposed to AUD 2.50/bucket), discounts on fishing gear purchased through them, reduced maintenance costs on repairing outboards, cheaper outboard fuel (around AUD 0.10 cheaper per litre than retail price), and cheap hire of ice boxes.

There is nothing wrong with encouraging local fishermen to supply fish to NAFICOT through cheaper fuel, ice etc. However, this needs to be kept to a minimum so that fishermen do not become reliant on this to make their fishing operation viable. Also, NAFICOT needs to ensure that they too are making a profit from their subsidising of local fishing operations and purchasing the catch. In this regard, NAFICOT needs to do a full costing of their involvement with these local fishing operations to ensure they are at least breaking even or making a small profit.

**Suggestion 84:** That NAFICOT do a full costing of their involvement with local fishing operations they subsidise, to ensure they are at least breaking even or making a small profit.

The use of the four larger vessels owned and operated by NAFICOT is more difficult to address. These vessels operate outside the reef, so are not necessarily fishing in direct opposition to local fishermen. However, while these vessels are being fished by NAFICOT, there is no incentive for other local fishermen to invest in larger vessels. Possibly NAFICOT could look at leasing these vessels out to the private sector to operate on a more commercial basis. Under the lease, NAFICOT could purchase all fish and maintain the vessels. The only problem here could be that local fishermen would want to target inshore species to cut running costs, which would increase fishing pressure on these resources. This too could be addressed under the lease agreement, although it would potentially restrict the fishing operations and their chances of being run at a profit.

**Suggestion 85:** That NAFICOT consider leasing out their fishing vessels to the private sector to operate under a lease agreement which could require the fish to be sold to NAFICOT, regular maintenance to be undertaken by NAFICOT and charged to the operator, and that fishing should be conducted outside the reef.

If NAFICOT goes down this path, they will need to have the vessels in good working order and the vessels will need to be provided with all necessary in-date sea safety equipment. This should be included in the lease agreement to ensure that NAFICOT is not liable in the event that there is an accident. NAFICOT would also need to assess whether they insure the vessels through an insurance broker, or whether they take this responsibility on themselves. The ultimate aim of this approach would be for NAFICOT to sell these vessels to the private sector operators once they have gained the skills and are running the vessels at a profit. This would then remove NAFICOT from the catching sector.

**Suggestion 86:** That if NAFICOT takes the approach of leasing out their vessels to the private sector, they provide the vessel in good working order with all necessary in-date sea safety equipment.

**Suggestion 87:** That NAFICOT assess whether they insure their vessels through an insurance broker, or whether they take this responsibility on themselves.

**Suggestion 88:** That NAFICOT looks at selling their vessels to the private sector operators once they have gained the skills and are running the vessels at a profit, and remove themselves totally from the catching sector.

NAFICOT imports fishing gear and sells this to the private sector with minimal mark-up in opposition to the local shops. Therefore the local shops do not bring in and sell much fishing gear, as they can not compete with NAFICOT. This is one area that NAFICOT should leave to the private sector, so they could start to sell off their stocks and not order any new gear. Possibly they could sell all of their stock to one of the local shops or cooperative, and work with them to assist with the first couple of orders so that the appropriate gear is purchased from the best suppliers.

**Suggestion 89:** That NAFICOT remove themselves from importing and marketing fishing gear, and sell all of their stock of fishing gear to one of the local shops or cooperative, and work with them to assist with the first couple of orders so that the appropriate gear is purchased from the best suppliers.

NAFICOT is the only wholesale fish buyer in Funafuti. All fishermen who do not sell their catch to NAFICOT, have to sell it individually to local consumers, or to the local hotel, guesthouses, and restaurants. Given that NAFICOT is the only wholesale buyer in Funafuti, and that it is a semi-government body, there appears to be no interest in the private sector to set up a second wholesaler to compete with NAFICOT. The fear of government is that if there was no NAFICOT, there would not be any other wholesaler in the private sector to fill this need.

Given the current situation in Tuvalu, this is one area that NAFICOT will need to continue in the short-term at least. However, they will need to change their current practices in dictating what they will buy and when they will buy it. If NAFICOT wants to encourage development in fisheries and encourage private sector development, then they need to develop markets for all products or fish species that are caught and marketable. This is especially true for tunas, where the current situation is that NAFICOT will only purchase tuna from the private sector when they need it, which is on infrequent occasions.

**Suggestion 90:** That NAFICOT continue with its role in buying and selling fish in Tuvalu, in the short-term at least, with greater emphasis on purchasing and marketing the fish that is available, rather than dictating what they will buy and when they will buy it.

Marketing of the catch and making a profit from this will be the most difficult task for NAFICOT, unless export markets can be established. This is not likely in the short-term, given the limited transport options and the costs involved. Value-adding is a very serious option, and this is discussed more in Section 5.10.

The aim of government appears to be to privatise NAFICOT over time, although the company would have to be running at a profit, which it is not at present, to attract investors from the private sector. The government is currently injecting funds to upgrade NAFICOT's processing facilities to export standards, in anticipation that export markets will be developed. Therefore, NAFICOT needs to focus on marketing a range of products both within Tuvalu and through exports. In doing this, the management of NAFICOT will have to look closely at all the costs involved in the operation of the company to ensure that it is a money-making venture that the private sector would want to invest in.

**Suggestion 91:** That the government continue with its aim to privatise NAFICOT.

**Suggestion 92:** That NAFICOT focus on marketing a range of products both within Tuvalu and through exports, including value-adding, ensuring that all the costs involved in the operation of the company are considered to ensure that it is a money-making venture.



### 5.3.2 Fisheries Department in Funafuti

The Fisheries Department is also involved in a range of commercial activities. These are buying and selling fishing gear, using their vessel for charter and for commercial fishing, and the engineering and slipway facility. Like NAFICOT, the Fisheries Department should not be buying and selling fishing equipment in opposition to the private sector. They too should sell off their stock of fishing equipment to a local store or the cooperative, and refrain from any other commercial dealings in this area.

**Suggestion 93:** That the Fisheries Department sell off their stock of fishing gear to a local store or the cooperative, and refrain from any other commercial dealings in this area.

The Fisheries Department currently has one vessel that is used commercially, and not as a research and/or training vessel. Although there is a need for suitable vessels to undertake charters so that people and/or company staff can move around within the islands that make up the country, this should not be the role of the Fisheries Department. The problem is that the fisheries vessel is the only boat of a size suitable to this work, except for the inter-island cargo vessels that have regular (more often than not irregular) schedules, which can not be broken to meet specific individual needs. Therefore, fisheries should cut back on the number of charters, with the view to stopping this practice altogether, thus providing the opportunity for someone in the private sector to purchase a suitable vessel and provide this service in future.

**Suggestion 94:** That the Fisheries Department cut back on the number of charters, with the view to stopping this practice altogether, thus providing the opportunity for someone in the private sector to purchase a suitable vessel and provide this service in future.

The fisheries vessel is also used for commercial fishing to help supply fish to NAFICOT. In fact, there is a standing arrangement with NAFICOT that the fisheries vessel has to fish for a specified number of days per month for them. This arrangement needs to cease, and the Fisheries Department needs to re-look at their role in fisheries development. The fisheries vessel should be used for research and training, especially training so that new or novel fishing techniques can be introduced to local fishermen. In this regard, the Fisheries Department needs to set up a training programme and purchase the necessary fishing equipment as discussed in Section 4.3.3.

**Suggestion 95:** That the Fisheries Department cease their fishing arrangement with NAFICOT, so that the vessels can be used for research and training as it was originally intended.

**Suggestion 96:** That the Fisheries Department establish a formal training programme for local fishermen and equip the vessel with the appropriate gear for this training.

If the fisheries vessel is equipped with the necessary fishing gear and a formal training programme is undertaken with local fishermen, the catch can be sold to NAFICOT, to assist their marketing endeavours. The money received from the fish sales can be used to either cover the operating costs of the vessel during the training, be split between the local fishermen as an incentive to undertake the training and hopefully adopt these new fishing techniques, or preferably a split of the two. The split arrangement would be the best, especially if the training was on tuna longlining where there could be a good catch of larger tunas.

**Suggestion 97:** That the Fisheries Department split a portion of the money received from fish sales from training trips between the local fishermen as an incentive to undertake the training and hopefully to adopt these new fishing techniques, with the rest used to cover the operational costs of the training.

The Fisheries Department/Marine and Ports are to get a new inter-island cargo vessel in 2002, although it was unclear what the actual arrangement was between the two departments. This new vessel would be tied up with the CFC's in the outer islands as well, bringing their products to

NAFICOT for marketing. If the Fisheries Department is involved in using this vessel for commercial purposes, they should drop out of the arrangement and allow Marine and Ports to operate the vessel.

**Suggestion 98:** That if the Fisheries Department is involved in using the new vessel for commercial purposes, they should drop out of this arrangement and allow Marine and Ports to operate the vessel.

The last area of potential commercial involvement for the Fisheries Department is in the slipway and engineering shop. The only vessels using the slip at present are the fisheries and NAFICOT vessels, as there are no other local vessels that require this service at present. However, the engineering workshop does cater to the repair of outboard engines for the private sector. This practice needs to cease, as there are several small businesses in Funafuti that can cater to the needs of the private sector. Alternately, the Fisheries Department could consider leasing these facilities out to the private sector, with fisheries and NAFICOT being able to use the facilities either on an as needs basis, or supporting the private sector and paying them to work on their vessels. This would remove the requirement for the Fisheries Department to employ their own staff to operate the current facility, as this could all be done by the private sector.

**Suggestion 99:** That the Fisheries Department cease all commercial activities from their engineering shop in support of the developing private sector in this field.

**Suggestion 100:** That the Fisheries Department consider leasing out their engineering shop and slipway to the private sector, and support the private sector through having their staff work on all the fisheries and NAFICOT vessels.

Overall, the future role of the Fisheries Department is not in commercial activities, and they need to stick to encouraging development within the private sector. This can be achieved through training local fishermen in many areas including the introduction of new and novel fishing techniques, proper fish preservation techniques to maintain quality, and value-adding techniques to increase the value of the product. Other areas the Fisheries Department needs to look at include providing basic infrastructure such as an active FAD programme (refer Section 5.9.4) to make it easier for local fishermen to locate tuna and associated species, and data collection so that development can be measured. This data can also be used for scientific purposes and stock assessments for inshore species. Fisheries could also set up an observer programme (refer section 5.9.3) to monitor foreign fishing activity as well as domestic offshore fishing activities when these commence.

**Suggestion 101:** That the Fisheries Department seriously look at their future role, which should be in researching inshore species, providing training to local fishermen, data collection, and providing basic infrastructure like an active FAD programme.

### *5.3.3 Community Fishing Centres (CFCs) in the outer islands*

CFCs have been established on all seven of the outer islands in Tuvalu by government through the Fisheries Department. Each CFC has a block ice machine, ice crusher, freezer, processing area and a generator to provide power for the machinery. There is also an electrification of the outer islands project underway through the Public Works and Electricity Corporation. This may assist the CFCs, depending on the cost of the power. It is estimated that each CFC cost a minimum of AUD 100,000 for the housing and processing area, machinery, and installation. The government is also putting AUD 20,000 per year into each centre to assist with the operation during their start-up years. It was not clear if these funds were to be phased out over time or not.

The centres each have four staff, a manager (earning around AUD 5000/year) and three staff (each earning around AUD 3500/year). This means that just the wages for staff will cost each centre around AUD 15,500/year without any actual operating costs. During the first year of operation, it appears that all CFCs will operate at a loss, and spend all of the government's AUD 20,000 annual contribution plus any funding they have generated through buying and selling fish and ice sales. One way to reduce costs would be to only have a manager at each location, and have several people

employed on a casual basis when there is work to do, such as processing fish, and this work is more than the manager can handle. This would have the manager doing all tasks, and not just managerial tasks. This approach should almost halve the cost of salaries to the CFC, and give them a better change of breaking even, or at least reducing the losses.

**Suggestion 102:** That the Fisheries Department reduce the staffing at all CFCs to a manager and casually employed staff, with the casual staff employed on an as-needs basis when there is more work than the manager can handle.

The aim of the CFCs is to provide a local marketing place in each outer island to develop the cash economy. That is, fishermen buy ice from the centre and use it on their fish to maintain quality, then either sell their catch to the CFC or to the general public. Fish purchased by the CFC can then be either sold to the general public, or transported to NAFICOT in Funafuti in the same or a processed form for marketing. Transporting to NAFICOT is all by sea, using the fisheries vessel or the inter-island cargo vessel. The Fisheries Department is also responsible for maintaining the machinery at each location, and there are already breakdowns being experienced with the machinery.

It is difficult to make suggestions for such a project, as similar projects have been tried in other countries in the region without success. The main problem will be in getting local fishermen to catch fish and sell it to the CFCs at a price where everyone can make a profit. The costs of operating an outboard-powered boat in the outer islands is at least the same if not more than operating the same boat out of Funafuti. However, the CFCs cannot afford to purchase the fish at the same price as NAFICOT purchases fish in Funafuti, as the CFC needs to make a profit and there are freight costs in getting the fish to NAFICOT.

One approach could be to get the local communities involved in the operation of the CFC itself. If each CFC was operated by the local community or a local Fishing Association (cooperative), then they could work together to try and make it work. If the communities had some 'ownership' over the project, rather than the CFC being a 'fisheries project' then attitudes may change and the community pull together. It may be too late for this, as everything has been provided with no commitment, financial or otherwise, by the communities themselves. It would therefore be difficult for communities to have any feeling of 'ownership' over the current CFC project.

That being said, it is worth a try to get the local communities involved more. Possibly a committee could be established, like a local 'Board' to oversee the operation of each centre. Responsible people in the community, local fishermen, local business people, and those with fish processing skills can all come together to form a board, to which the manager works. With this approach, people are more likely to sell their catch to the CFCs, salaries are likely to decrease as people may choose to help out or work for a smaller wage that is currently being paid. The community can then see where the main costs are and try to work around this to minimise them, thus giving the CFC a chance to break even financially. This is not going to be easy, although the community probably has a better chance of achieving this than the government.

**Suggestion 103:** That the Fisheries Department encourage the establishment of 'Community Boards' in each outer island, made up of responsible people in the community, local fishermen, local business people, and those with fish processing skills, to oversee the operation of each CFC.

**Suggestion 104:** That the Fisheries Department (government) works toward handing over full control of each CFC to the local communities as they become proficient at operating these facilities.

This approach will work towards the government's goal of getting out of commercial activities, and encouraging private sector development. The Fisheries Department can then play a supporting role, rather than being commercially involved. Support can be provided with the maintenance of the machinery, as it is doubtful if there are skilled people or the necessary equipment in each outer island. Fisheries can also look at implementing a FAD programme (refer Section 5.9.4) to assist local fishermen. Training can also be provided in fish quality and value-adding processes to allow a range

of quality products to be transported to NAFICOT for marketing. Different fishing gears and techniques can also be introduced by the Fisheries Department.

**Suggestion 105:** That if the Fisheries Department follows the community approach, they provide a supporting role through assisting with the maintenance of the machinery at each CFC, establish an FAD programme, provide training in fish quality, value-adding processes, and introduce different fishing techniques.

There is still the issue of getting the fish from the CFCs to NAFICOT for marketing. Wherever possible, the CFCs should be using the regular inter-island cargo vessel. Fisheries should not get involved in a 'collection vessel' operation, as this will only subsidise the whole operation. Given the regular/irregular schedules of the inter-island vessel, it could be worthwhile the CFCs processing a lot of their catch to minimise freight costs, while generating additional income in each location through employment of people to do the processing. Processing could be to a frozen fillet form or even to a smoked or salted and dried form, which needs no or little refrigeration and has a long shelf-life.

**Suggestion 106:** That the Fisheries Department not get involved in a 'collection vessel' operation, but rather encourage the CFCs to use the inter-island vessel to transport product to NAFICOT.

**Suggestion 107:** That the Fisheries Department encourage the CFCs to process a lot of their fish to cut down of freight costs and generating additional income in each location through employment of people to do the processing.

## **5.4 Government policies**

There are a range of government policies that can effect and/or assist the development of a tuna fishing industry, and these include the duty on fuel, bait, fishing equipment and spare parts; licensing and export permits; and data collection and use.

### **5.4.1 Fuel**

The cost of fuel, both diesel and petrol, is quite high in Tuvalu. This, according to the one fuel company in Tuvalu (BP) is mainly due to the relatively small storage tanks (402,000 l of diesel, 80,000 l of petrol (to increase to 120,000 l during 2001), and 80,000 l of avgas), high freight costs and the small usage of the country. A tanker came every 60 days or so to fill up the storage tanks. The company was ready to expand as soon as there was an increased need identified. This need could be from developments in the fishing sector, and the Manager of BP was trying to get the government to make foreign vessels who were fishing under access agreements, come and take fuel in Tuvalu.

The fuel company also bought in around 3,000 drums (200 l each) of fuel (30% diesel, 40% petrol, and 30% kerosene) in containers on cargo vessels from Fiji. A lot of the drums of fuel were shipped to the outer islands. Each drum cost AUD \$60.00, and they were non-returnable, so this added to the overall cost of the fuel. In Funafuti, people could get their drums re-filled, although this was not possible in the outer islands.

The wholesale price in November 2000 for petrol was AUD 0.906/l, and for diesel was AUD 0.858/l. This included all government duties and taxes. There was a duty-free price for diesel, which was AUD 0.7732/l. This is the price that would apply to the fishing industry. It is doubtful that the government or the fuel company could lower the price any further based on the current usage in Tuvalu. This high fuel price will remain a major constraint to development of the domestic tuna fishery. The only way to reduce the cost of fuel in Tuvalu is to increase usage and negotiate a price with the fuel company. If a larger tuna company was to work out of Tuvalu, they would be in a position to do this.

**Suggestion 108:** That if a larger tuna company was to work out of Tuvalu, they negotiate a lower price for their fuel based of the usage per month.

#### 5.4.2 Bait, fishing equipment and spare parts

Most items used by the fishing industry attracted very low duty and tax by government. This is based on the government's philosophy that most of these items were essential to the subsistence lifestyle of the country's inhabitants. Table 4 summarises the main items used by local fishermen, and the duty and tax charged on these items.

**Table 4: Duty and tax charged in Tuvalu on main items used in the fishing industry**

Item	Duty and tax status
Kerosene (household and aviation fuel)	Duty-free and Tax-free
Oils	Duty-free plus 2.5% Tax
Grease	20% Duty plus 2.5% Tax
All fishing gear (small and large)	Duty-free plus 2.5% Tax
All fishing boats	Duty-free plus 2.5% Tax
Outboard engines all sizes	Duty-free plus 2.5% Tax
Diesel engines all sizes	10% Duty plus 2.5% Tax
Ropes and cables	Duty-free plus 2.5% Tax
Spare parts for engines and machinery	Duty-free plus 2.5% Tax
Ice machines	Duty-free plus 2.5% Tax
Bait (this was considered a fish import)	75% Duty plus 2.5% Tax
Tinned fish (as a comparison to bait)	25% Duty plus 2.5% Tax
Tinned meat (as a comparison to tinned fish)	10% Duty plus 2.5% Tax

As can be seen from Table 4, most items are duty-free, and only attract 2.5 per cent tax. There are three items that should be looked at though, as the duty payable is a disincentive to development of a domestic tuna fishery.

The most significant item is bait, which attracts a 75 per cent duty. This is because the government does not differentiate between bait and other forms of fresh and frozen fish when it is imported. The idea of the duty is to stop people from importing cheap fish for eating, when there is plenty of locally-caught fish. Therefore, a distinction needs to be drawn between fish for human consumption and fish that is used as bait to catch other fish. This distinction needs to be made, as a fishing operation like tuna longlining uses large volumes of bait. Tuvalu will be looking at developing a tuna longline fishery as part of the National Tuna Development and Management Plan, so should be looking to eliminate any duty on bait to encourage tuna longlining activities to commence.

**Suggestion 109:** That the Government of Tuvalu differentiate between fish for human consumption and fish that is to be used as bait to catch other fish.

**Suggestion 110:** That the Government of Tuvalu remove all duty from bait, to foster development of tuna longlining activities in Tuvalu.

Grease attracts duty at the rate of 20 per cent at present. Grease is used on fishing vessel to lubricate the propeller shaft and different components of machinery. As this is a necessary component for the operation of fishing vessels, the Government of Tuvalu should consider dropping all duty on this item.

**Suggestion 111:** That the Government of Tuvalu remove all duty from grease.

Most offshore fishing vessel over 7 m in length are powered by diesel engines. Shore processing facilities usually have a diesel-powered back-up generator as well. Diesel engines are therefore an intricate part of fishing and processing operations. Currently diesel engines attract 10 per cent duty, which should be removed in support of developing tuna fishing operations in Tuvalu.

**Suggestion 112:** That the Government of Tuvalu remove the duty from all diesel engines.

#### 5.4.3 Licensing

There is no formal licensing scheme in Tuvalu for domestic fishing vessels at present. There is also a shortage of data from local tuna fishing vessels, as at present they are all small-scale troll vessels. However, Tuvalu needs to look to the future and any international requirements they may have. Under the regional management of the tuna resource, it will be a requirement for the Government of Tuvalu to have jurisdiction over all tuna fishing activities to low water mark. It will be up to the Fisheries Department to decide what the minimum size of vessel to be covered under the National Tuna Development and Management Plan should be.

Having observer coverage on foreign fishing vessels is an important monitoring tool, for validating the actual catch and position as well as providing additional information on species composition and bycatch. The latter information is becoming very important as conservation groups look closely at bycatch species and the interaction of fishing techniques on non-target species. Tuvalu may also have international obligations to validate catches from vessels, which it flags. Therefore, it is essential that the Fisheries Department implement a meaningful observer programme to validate the catch of foreign vessels working in their EEZ, plus domestic vessels. The easiest way to do this is to make this a licensing requirement under the National Tuna Development and Management Plan for all foreign fishing vessels and domestic vessels over a specified length working in Tuvalu's EEZ.

**Suggestion 113:** That the Fisheries Department make it a licensing requirement under the National Tuna Development and Management Plan, for all foreign fishing vessels, and domestic vessels over a specified length working in the Tuvalu EEZ, to carry an observer from time to time.

There will be costs associated with getting observers on and off foreign fishing vessels working in the Tuvalu EEZ, especially when the foreign vessels generally do not enter port in Tuvalu. The only way around this is to include in the licensing condition, that the cost of getting an observer on board is the responsibility of the foreign vessel or company. This requirement should not be a problem for domestic vessels. The choices for the vessel or company would be to have the vessel come to port to pick-up and drop-off an observer, or cover the cost of transport and living allowances to get the observer to a port to embark and disembark the vessel, as well as getting back to Tuvalu.

**Suggestion 114:** That under the licensing requirement for foreign vessels to carry an observer from time to time, the requirement also stipulate that it is the vessel or company's responsibility to cover all costs of getting observers on and off their vessels, and back to Tuvalu.

The idea of having a separate fee to cover the wages and allowances of observer coverage should be considered by government. Such a fee could be included in the licence fee or added to it. The idea would be to have the 'observer fee' placed into a separate account, a 'trust fund', for the Fisheries Department to use primarily to cover the wages and allowances of observers on foreign tuna fishing vessels working in the Tuvalu EEZ. Such a fee could also be used for funding port sampling of tuna catches either landed in, or transhipped through, Tuvalu. The fee could be set at around USD \$1,000 per licence for foreign vessels, with possibly a small percentage of local licence fees (if they are implemented in the future). The Fisheries Department will need to be able to set up such an account with the support of government for this to work. The Fisheries Department will also need to make the workings of such an account fully transparent to ensure there is no misuse of the funds.

**Suggestion 115:** That the Fisheries Department seek government approval to establish a ‘trust fund’ where the ‘observer fee’ charge or portion of a licence is deposited, with these funds used specifically for covering the cost of wages and allowances for observers on tuna fishing vessels in Tuvalu’s waters or port sampling activities.

**Suggestion 116:** That the ‘observer fee’ be set at around USD \$1,000 per licence for foreign vessels, with possibly a small percentage of local licence fees if these are implemented in the future.

**Suggestion 117:** That when the ‘trust fund’ is established, the workings of the account are fully transparent to ensure there is no misuse of the funds.

When looking at the perceived benefits to the fishing sector from having foreign vessels fishing in the Tuvalu EEZ, there are basically none as the entire licence fee goes into the government’s general budget at present. Some groups within the fishing sector would argue that having foreign vessels working in the Tuvalu EEZ is a negative benefit, as the catch from foreign vessels may be perceived as effecting the catch rates of local vessels. Setting up a trust fund to deposit an observer fee to cover the cost of observers is a good first step in increasing the perceived benefits from foreign fishing access by the domestic fishing sector. However, observers are used to monitor and verify the foreign fishing activities occurring in the Tuvalu EEZ, so there is only a small perceived benefit to the fisheries sector from this activity. What would be perceived as a benefit or even a boost to the domestic fishing sector, would be if some of the licence fee was set aside for fisheries development or research work.

A similar approach could be used to the observer fee, except it could be called a ‘development fee’, which is specifically used for development work or possibly some research. The same trust fund could be used with a separate account for development work. The fee could be set at around USD 1,000 per licence for foreign vessel. For local vessels, around 25 per cent of their licence fee (if one is implemented in the future) could be paid into the development fund. As this would be considered part of the overall trust fund, the same workings and reporting to government would apply.

**Suggestion 118:** That the Fisheries Department collect a ‘development fee’ as an additional charge or portion of a licence under the Plan, and deposited these funds in the trust fund for specific work in fisheries development or possibly research.

**Suggestion 119:** That the ‘development fee’ be set at USD 1,000 per licence for foreign vessels, with around 25 per cent of local vessel licence fees (if one is implemented in the future) also going into the account.

In collecting the development fee, it would be wise to use all or at least 75 per cent of the fund on small-scale tuna fishing development projects. Such a project would be the funding of an ongoing FAD programme in locations where they will benefit local fishing communities. Some of the fund could be used for research purposes, although this should be minimised as Tuvalu is not really involved in tuna research.

**Suggestion 120:** That the Fisheries Department use all or at least 75 per cent of the development fund on small-scale tuna fishing development projects, such as an ongoing FAD programme.

#### *5.4.4 Export permits*

Customs is the department that handles export permits. As there are very few exports of marine products at present, it was difficult to get detailed information. It appeared that a ‘Combined Certificate of Value and Origin’ form was completed for each consignment, with the Customs Department checking to ensure the product being exported was true to that being declared. Customs was not charging any fees in November 2000, although they were looking at introducing a AUD 2.00 per consignment fee to cover the cost of the paper work. This seemed like a reasonable fee, given the cost of producing the forms to be completed.

**Suggestion 121:** That the Customs Department implement a fee of AUD 2.00 per consignment for all exports from the country.

It was unclear if companies needed an export permit to be able to actually export product from Tuvalu. If there is no export permit system in place at present, one should be introduced. This will allow the government to monitor who is exporting what. For tuna products, it would be worth the government including export permits under the National Tuna Development and Management Plan. Such a permit should require processing facilities to be maintained to a specified hygiene standard, as well as product needing to be to specified standards. NAFICOT is the only company at present able to export fresh fish, although others may start if improvements to infrastructure allow it in the future.

**Suggestion 122:** That if the Government of Tuvalu does not have an export permit system in place, they develop one, possibly under the National Tuna Development and Management Plan.

**Suggestion 123:** That any export permit system require processing facilities to be maintained to a specified hygiene standard, as well as product needing to be to specified standards.

#### *5.4.5 Data collection and use of data*

There was very little data collected by the Fisheries Department. In the past they used the SPC system, especially when they had their pole-and-line vessel, F/V *Te Tautai*. Unfortunately this system had collapsed internal, and the Fisheries Department moved to a partial system of selected and random collection. Given there was very little tuna fishing activity since the F/V *Te Tautai* stopped fishing in 1993, there was not a lot of domestic tuna data to collect. Currently, only small vessels troll for tunas and other pelagics off the coast.

The Fisheries Department now wants to move back to the SPC system. This is mainly due to international obligations that will fall on Tuvalu through the implementation of both the National Tuna Development and Management Plan, and the establishment of an international Commission in the near future. Data provision should be a requirement under the National Tuna Development and Management Plan, for both domestic and foreign vessel, and implemented as a licence condition. This should include verification of data through the placement of observers. The Fisheries Department will need assistance in setting up the database and data collection system, and they should approach SPC for this assistance.

**Suggestion 124:** That the Fisheries Department require data provision under the National Tuna Development and Management Plan, for both domestic and foreign vessel, and implement this as a licence condition.

**Suggestion 125:** That the Fisheries Department request assistance from SPC in the setting up of a database and data collection system under the National Tuna Development and Management Plan.

The small troll fleet in Tuvalu mainly targets tuna and associated species. It is up to the Fisheries Department as to whether or not they wish to collect data from these vessel under the National Tuna Development and Management Plan. If the Fisheries Department implements an ongoing FAD programme (refer Section 5.9.4) and introduce mid-water fishing techniques for tuna (refer Section 5.9.5), then data could be collected from vessel undertaking these fishing techniques as well. Collecting this data could be costly, depending on how cooperative the local fishermen are.

**Suggestion 126:** That the Fisheries Department consider whether or not they wish to collect data from domestic troll and mid-water fishing vessels on their tuna catch under the National Tuna Development and Management Plan.



## 5.5 Financing for new fishing operations

A major problem in any developing country, especially one in a remote location like Tuvalu, is access to funding for fishing operations at an affordable interest rate, with repayments over a reasonable period of time. One of the concerns is that fisheries is considered a high-risk area, and many lending institutions steer away from this sector. There are several institutions in Tuvalu that fund loans in fisheries, although the interest rates and terms of the loans fluctuate.

### 5.5.1 *Development Bank of Tuvalu*

The Development Bank of Tuvalu (DBT) had not been funding projects during the years 1999 and 2000 due to there being no working capital as a result of past loans not being repaid. At the time of writing this report, management of DBT were turning things around, with their portfolio amounting to AUD 1.5 million. The Government of Tuvalu was also expected to put some money into DBT to assist it in becoming operational again. It was hoped that DBT would be in a position to start assessing loan applications in early 2001.

DBT was reassessing the criteria that loans would be made under in future. The criteria for the loans will be adequate security, ability to repay the loan, and experience in managing or running the operation. Security was a difficult issue, as they would not take land as it was owned by clans (no free hold title). Buildings could be held as security, although only for the duration of the lease. There were also problems with insuring buildings, boats etc, which was also a requirement of the loan.

There was no real limit on the amount that could be borrowed for a specific fishing industry loan, although if the loan was for over AUD 100,000, then DBT would need to lock in with other overseas banks to come up with the funding. Fisheries related loans would cover up to 50 per cent the value of the project, so that if someone wanted to buy a boat worth AUD 200,000, the bank would only cover AUD 100,000. They would also require the bill of sale to be held with the bank as security over the loan, plus the vessel insured. There appeared to be a little flexibility in the repayment of the loan, as long as the cash flow was worked out. There would be a 3 month grace period before the first repayment was due. Then the repayments could follow the cash flow, which could be an annual payment, or one years payment with interest paid over a 6-month period, if this was the main fishing season. The bottom line was that the loans would be over 5 years at 8 per cent interest (as at November 2000), and you needed to pay the loan off.

An 8 per cent interest rate is not bad, although if the Government of Tuvalu is putting in funds to assist DBT, they could stipulate a lower interest rate as an incentive to foster development in the fishing sector. DBT may also want to reconsider the repayment period, especially for larger loans (over AUD 100,000), and make these over a longer period, say 10 year. Again, this would be an incentive for local fishermen to take out loans in the future.

**Suggestion 127:** That the DBT consider issuing loans to the fishing sector at interest rates lower than the current 8 per cent, which could be achieved if the Government of Tuvalu made this a stipulation on funds they provide to the bank.

**Suggestion 128:** That DBT consider a longer repayment period of say 10 years for larger fisheries loans.

### 5.5.2 *National Bank of Tuvalu*

The National Bank of Tuvalu (NBT) made loans to small-scale fishing operators. The process was simple. There was an initial interview of the applicant with the bank, to sort out the preliminary or background information like age, where from, what the loan is for, how much they are after etc. The most important part of the loan application and appraisal was that the full loan had to be guaranteed by the proponent, through superannuation if they were a public servant in the past, or equity holding through a 'Bill of Sale'. If there was no guarantee then there was no loan. Therefore the bank can not

loose. After this, the loan application and the loan agreement are completed, although these were formalities.

It took three days to get the loan approved at NBT. Once approved, the bank made a bank cheque payable to the person providing the goods (boat, outboard, fishing gear etc). There was a maximum of AUD 10,000 on any loan and for fisheries loans the interest rate was 11 per cent. The loan was over 36 months, with the first payment due three months after the loan was taken out, with monthly payment thereafter. The bank in November 2000 had around 20 loans out with fishermen in Funafuti and the outer islands.

It appeared the NBT did not want to get involved in larger loans with the fishing industry. NBT also did not seem interested in considering changes to the interest rate or length of repayment period. The feeling was that larger loans should go through the DBT. NBT's interest rates were higher and seemed to be in line with general market rates, which did not assist the fishing industry.

### *5.5.3 Joint ventures*

Time did not permit the researching of government policy on foreign investment in Tuvalu, although this is a possible way forward for developing fisheries in the country. If foreign investment is used, then Tuvaluan interests should retain 51 per cent of the venture to hold ownership. The best approach would be to set up a joint venture, to set up shore facilities where land is available and to bring in suitable vessels for the planned fishing operation. Given the limited infrastructure in Tuvalu, any such joint venture company should have a marketing strategy to move the product, in whatever form, from Tuvalu to overseas markets.

**Suggestion 129:** That the Government of Tuvalu support joint ventures in the private sector where the companies remain 51 per cent Tuvaluan owned and a marketing strategy is provided for the sale of product overseas.

Caution should be taken by the Government of Tuvalu, when assessing joint venture proposals put forward by the private sector, to assess what the actual benefits are to Tuvalu. Preference should be shown to joint ventures that set up infrastructure in Tuvalu, and creating local employment. This would probably be in the processing sector, or the catching sector on fishing vessels. Joint ventures where everything remains offshore, with no product landed in Tuvalu should be avoided, unless there is good employment opportunities on the fishing vessels involved in the venture.

**Suggestion 130:** That the Government of Tuvalu assess the benefits to Tuvalu from all joint ventures put forward by the private sector, and show preference to those that set up infrastructure in Tuvalu, creating local employment, or those where good employment opportunities exist on the fishing vessels in the venture.

### *5.5.4 Other options*

There are several other options that the private sector in Tuvalu can explore when looking to finance fishing operations in the country. These include accessing funds from the South Pacific Project Facility, the United Nations Capital Development Fund, and the Government of Tuvalu establishing its own revolving fund, possibly through the DBT.

#### *South Pacific Project Facility (SPPF)*

Tuvalu has just become a signatory to the Cotonou Convention and is now considered an ACP (African, Caribbean and Pacific) Country. This status allows private sector investors to access investment support through agencies like the South Pacific Project Facility (SPPF) and possibly the Centre for the Development of Enterprises (CDE). SPPF is located in Sydney, Australia, and can assist likely investors in three main areas: formulating, evaluating and promoting project ideas and providing consultancy services to develop and implement business plans; obtaining equity and loan

financing on commercial terms from financial institutions; and providing additional equity from the Pacific Island Investment Fund.

In previous discussions with SPPF staff, they have suggested a three-way split on funding, which is an approach that is to be used in ACP countries in the Pacific. This approach would have one-third of the funding put up by the proponent (can be a grant), one-third put up by SPPF as an unsecured loan, and one-third put up by a funding institution as a secured loan at normal interest rates. The support of the Fisheries Department in any assistance that SPPF can provide to private sector development of tuna fishing activities is encouraged.

**Suggestion 131:** That the Government of Tuvalu check with organisations like the SPPF, and see what sort of assistance can be provided to private sector fisheries development under their ACP status.

#### *United Nations Capital Development Fund (UNCDF)*

The UNCDF fund has assisted countries in the past with fisheries development projects. It is not known if or how much funding is available, although the Government of Tuvalu should make enquiries. The government should also request the guidelines under which funding can be sought. If funding is available, this could be used by the government to set up a 'revolving fund', which local fishermen could borrow against to purchase a fishing vessel or gear for their fishing operation. As people pay off their loans, others can borrow against the revolving fund.

Such a fund is best administered by the DBT, although the government should set up the terms and conditions of loans, interest rates and repayment schedules, so they are of benefit to the government's goal of developing fisheries. Therefore, interest rates should be as low as possible, as the main aim of this would be development and not income-earning for the DBT. Of course, DBT would need to recover their costs in administering the loans, however, this should be on an 'actual' basis without overheads if possible.

**Suggestion 132:** That the Government of Tuvalu approach UNCDF to see if there is any funding available for fisheries development project, and if so, request the guidelines for securing these funds and apply for them.

**Suggestion 133:** That if UNCDF funds are secured, they be administered through the DBT as a revolving fund, with minimal interest rates charged, and the government involved in setting all terms and conditions for using these funds, including the charges of DBT to administer the fund.

#### *Government of Tuvalu funded revolving fund*

The Government of Tuvalu could set up a special fund for encouraging domestic development in the tuna fishery in Tuvalu. This fund could be administered by the DBT, under the same terms and conditions as suggested for UNCDF funding. The fund could be established on a revolving basis, also as suggested for UNCDF funding. The only difference would be that it would be money provided by the Government of Tuvalu that would be used for the loans.

**Suggestion 134:** That the Government of Tuvalu consider setting up a revolving fund fully funded by them to fund domestic development projects in the tuna fishery, with the DBT used to administer the fund under the same terms and conditions as suggested for any UNCDF funding.

## 5.6 Charter fishing operations

There is currently no charter fishing operations in Tuvalu. This is mainly due to there being very few tourists travelling to the country requiring such a service. This may change in the future if there is a safe anchorage for a charter vessel, the air service is improved, and there is more accommodation available. However, this would more likely be a longer-term development option, although if someone in the private sector wants to invest in getting a small trailer boat for doing charter fishing work in the Funafuti lagoon, then this should be encouraged. Possibly a person could mix charter fishing with other charter options, such as taking tourists to the reef for snorkelling or for SCUBA diving, or to the different islets for picnics. If all of these charter operations are offered, then there is scope for one or possibly two operators to set up in Funafuti.

**Suggestion 135:** That the Fisheries Department support and encourage the concept of someone in the private sector setting up a small charter operation covering fishing, SCUBA diving, snorkelling and transport to islets in the lagoon for picnics.

## 5.7 Assessment of tuna-related development options presented in the 1994 ADB study

The Asian Development Bank (ADB) funded a study of the Tuvalu fisheries sector in 1994. The principal focus of the study was to evaluate existing constraints to, and opportunities for, further development of fisheries activities, especially commercial, export-oriented enterprises. The report of the project team provided information on a number of possible development projects that could be implemented in the marine sector. These included projects looking at developing offshore resources, such as tuna and deep-water snappers (including marketing and value-adding), and inshore resources, such as aquarium fish, giant clam mariculture and pearl oyster culture. This section of this report will look closely at, and make an assessment of, the development options including marketing and value-adding, presented for the offshore resources, using the headings used in the 1994 ADB Report.

### 5.7.1 *Proposed purse seine fleet project*

The ADB team proposed that Tuvalu establish a small, two-vessel commercial purse seine fleet, with a dedicated refrigerated carrier vessel. This approach would require no shore facilities in Tuvalu. They suggested the enterprise be set up as a separate corporation under NAFICOT, with an experienced person in all aspects of commercial fisheries hired under a long-term contract to undertake the initial management of this enterprise. The operation would have the carrier vessel transporting the frozen skipjack from the two purse seiners to canneries in the region, such as Pago Pago in American Samoa. It was also strongly suggested that a feasibility study be undertaken of the whole operation, and a sound business plan be developed.

Two scenarios are presented to fund such an operation, which was estimated at around USD 10–11 million. The first option was to approach an appropriate funding service, such as the Commonwealth Development Corporation (CDC) for a loan and some equity participation. The CDC would require equity funding of at least 30 per cent by the Government of Tuvalu. They would be requested to take an additional 10 per cent equity position and syndicate a loan for the balance of the financing requirements. The second option was to enter into a joint venture arrangement, which would reduce the capital requirement for the Government of Tuvalu, assuming they did not want to take on the total financial burden of the project on their own.

The report details some criteria or qualifications to look for in a joint venture partner for the Government of Tuvalu, as well as stating the joint venture partner should be the major share holder (51% at start) and manage the operation. Suggestions are also made to increasing Tuvaluan ownership of the company by having the foreign joint venture partner gradually divest its shares over a specified period, say seven years. It is further suggested that a likely joint venture partner could be one of the distant water fishing nations currently working in the region. A detailed costing of the proposed operation is provided in Annex G to the ADB Report.

### *Discussion and assessment*

In looking at the proposed purse seining project presented in the 1994 ADB Report, the basic idea is sound and well thought through. The suggestions presented for operation of the two purse seine vessels and carrier seem realistic, although the costings may not be a true reflection of the actual costs that could have occurred at that time.

In 1986, Marco Seattle Incorporated conducted a similar study on the Government of Tuvalu entering the tuna purse seine fishery in the Pacific. Their suggestion was for the Government of Tuvalu to buy a used vessel in the 1100 to 1200 tonne class (US style vessel) and have it refitted. Their costing was based on a catch of 4200 st (short tonne) per year being sold at USD 650/st. When comparing this to the ADB proposal, they are assuming much smaller vessels (300 t capacity each), which will each have a catch of 4000 t/year. The catch is also divided up by species and size to try and maximise the value of the catch. The dollars per tonne quoted for each category also seem very high, although could have reflected the prices being paid in 1994, as the world price for tuna fluctuates greatly from month to month and year to year. Now in 2000, these costings are not relevant and would not reflect the costs incurred in the purse seine fishery at present.

Current trends in the Pacific tuna purse seine fishery, with very low prices being paid for skipjack world-wide (USD 400–450/st in November 2000), would indicate that this is not the best time to be buying into this fishery. The cost of operating purse seiners continues to increase, while the price paid for the catch fluctuates considerably. This does not mean that in a year or two the economics of the Pacific tuna purse seine fishery may not change for the better. Therefore, it is best that the Government of Tuvalu keep this option open to them, and possibly have a new feasibility study undertaken when the price paid for skipjack increases. Such a study could be requested through FFA or another independent source, and should include an economic assessment of the fishery (including operating cost and value of catch) over the last 10–15 years, to highlight the volatility of the fishery. It would also be best if the Government of Tuvalu looked at a single larger vessel, rather than smaller vessels and a carrier. This will reduce the cost of the overall operation and allow the purse seiner to be self sufficient and be able to follow the fish across the region in areas they have access to fish in.

***Suggestion 136:*** That the Government of Tuvalu not consider entering the Pacific tuna purse seine fishery at this point in time, although they should not discard this option totally for the future.

***Suggestion 137:*** That the Government of Tuvalu approach FFA or another independent source in several years time, or when the economic climate in the Pacific tuna purse seine fishery improves, to have a new feasibility study on entering this fishery undertaken.

***Suggestion 138:*** That any future study on the Government of Tuvalu entering the Pacific tuna purse seine fishery include an economic assessment of the fishery (including operating costs and value of catch) over the last 10–15 years, and be based on a single larger US-style vessel.

Regarding the funding of such a venture in the future, if the economics of such an operation are favourable and the Government of Tuvalu wishes to proceed, then an assessment should be made by the government of the day on funding options. These could include the purchasing of a second-hand vessel and having it refitted, either under a joint venture arrangement with another party or solely by the government. A new vessel could be purchased under either of these arrangements, although this would probably be the most expensive option. Whichever approach is taken, the Government of Tuvalu will need to hire qualified and experienced officers (skippers and engineers) in the first instance, until Tuvaluans can be trained to take over these positions. Also, a detailed business plan will need to be developed and followed, including a maintenance and slipping schedule to ensure the vessel is kept in good condition.

***Suggestion 139:*** That if the Government of Tuvalu proceeds with entering the Pacific tuna purse seine fishery in the future, the government of the day should assess their funding options at that time.

**Suggestion 140:** That if a tuna purse seiner is purchased in the future, the government employ qualified and experienced officers (skippers and engineers) in the first instance, until Tuvaluans can be trained to take over these positions.

**Suggestion 141:** That if a tuna purse seiner is purchased in the future, a detailed business plan be developed and followed, including a maintenance and slipping schedule to ensure the vessel is kept in good condition.

#### *5.7.2 Proposed commercial seamount fishery project*

The ADB team proposed the establishment of a small three-vessel bottom fishing fleet based in Fiji, although fishing the seamounts in Tuvaluan waters. Under this proposal, the vessels would carry their fish back to Fiji for processing and export to Hawaii. This would eliminate the cost and uncertainties of getting the fish from Funafuti to Nadi in Fiji. The estimated cost of purchasing the three vessels was around USD 1.125 million, although it does not specify if these are new vessels or second-hand. CDC was the funding source identified for this project, under the same terms as the purse seine project.

It is suggested that NAFICOT should retain ownership of the seamount fishing fleet, with a manager for this specific project. The ADB team also suggests the privatisation of NAFICOT over a 5–10 year period, through a transfer of shares system.

The ADB team also expect the catch rates to be good on the seamounts, and there to be a good stock for annual harvest. This is based on data gathered as part of a USAID project that was underway at the time of the study. Costings are also provided for the expected fishing operation based out of Fiji. In the calculations a price of USD 13.50/kg is estimated for 65 per cent of the catch.

#### *Discussion and assessment*

In reviewing the proposed seamount fishing project, there appears to be many questions to answer. Firstly, the description of the vessels and gear are very vague, and there is no rationale behind the 15.2 m vessels suggested or where they would come from. There is some merit in having the vessels working out of Fiji, although this restricts the fishing areas, or the vessels will need to steam farther (longer time) to get to the more northern grounds. If the operation is based on mainly fishing the southern seamounts, then there could be rapid stock depletion in these areas. In the Tongan situation, initial catch rates on the seamounts (and there are many seamounts in the Tongan EEZ) were high, although over a short time as they were fished the catch rates dropped and the number of higher valued species also dropped. It is anticipated that a similar scenario is likely to occur in Tuvalu.

There was a USAID funded deep-water snapper project in Tuvalu from September 1991 to September 1994. The project was successful and showed that small-scale commercial exploitation of the bottomfish resource in Tuvalu is economically viable and sustainable on a modest scale if appropriately managed. The project estimated the maximum sustainable yield of deep-water bottomfish at 84 t annually. Catch rates for the project were around 4–5 kg/line-hour, and the exporting trials showed that the Hawaii market would pay around AUD 9.00–10.00/kg for the higher value species. The actual return to Tuvaluan fishermen though would be modest, as the marketing costs are high, especially airfreight costs. This study looked at future development of the fishery occurring from a Tuvalu base.

To operate these vessels out of Fiji will require working through a local processing plant and this appears to be covered in the costing. There could be a high turnover of crew on the vessel, and this is covered to some degree, although the actual costs could be much higher. There is also the down time of waiting for replacement crew to arrive from Tuvalu, not to mention trying to manage such an operation from NAFICOT, unless the manager is also stationed in Fiji. If this is the case, then there would be additional costs associated with basing a manager in Fiji. The main problem though is in the estimated price being paid for bottomfish in Hawaii and the percentage of the catch that could attract

such a high price. The anticipated returns from fish sales based on the figure contained in the report seem too high. It is estimated that for the high value species, the percentage would be much less, and the actual price per kilo would be less, based on current prices paid in Hawaii and the prices reported in the USAID study. This would greatly change the economic projection and it is expected that the operation would be marginal at best given the costs of basing the operation in another country.

The main question to be answered is what is the real return to Tuvalu from harvesting the deep-water snapper resource, which is not pelagic and moving around, in this manner. The returns would be the employment on the vessels, although there may be the need for expatriate skippers and engineers in the early stage, and the possible profit, if there is any, to NAFICOT. With the vessels based in Fiji, the benefits to Fiji are the purchasing of all materials, processing and packing the catch, equipment purchase, food, ice, bait, repairs to the vessel, slipping, airfares to move staff around etc. It would appear that most benefits from the proposed fishing operation would accrue to Fiji and not Tuvalu. This being said, unless seafood products can be airfreighted out of Tuvalu at a reasonable cost and in reasonable quantities, then this may be the only option, or Tuvalu waits until airfreight is sorted out and the vessels can be based locally. The latter approach would also allow local people with smaller vessels to participate in the fishery (private sector development), further sharing the benefits from the deep-water snapper resource amongst Tuvaluans. To start development though, while infrastructure problems are sorted out in Tuvalu, one vessel in the 15–19 m range could be based out of Fiji with the intention to move the vessel to Tuvalu at a future time.

**Suggestion 142:** That the Government of Tuvalu establish one deep-water snapper vessel in Fiji, to start to harvest the resources on the southern seamounts in the Tuvalu EEZ.

**Suggestion 143:** That the Government of Tuvalu limits the Fiji operation until there is a suitable airfreight service out of Tuvalu, to export the country's deep-water snapper resource through establishing locally-based fishing operations, mainly in the private sector.

**Suggestion 144:** That when the exporting/airfreighted of marine products out of Tuvalu can be done on a regular basis in reasonable quantities, the vessel in Fiji be relocated to Tuvalu and a second vessel added to this fishery, plus the encouragement of small, local operations.

Regarding the privatisation of NAFICOT, the proposed approach has some merit, and the government needs to find ways to promote private sector development. Whether this is through the privatisation of NAFICOT, or possibly the long-term dismantlement of NAFICOT as the private sector develops, the end result is that the government is best placed to manage the resource, not harvest it. Therefore, the government should be looking at ways to encourage development in the private sector, while reducing their presence so they are not competing with the private sector. Possibly a specific study could be undertaken to look closely at ways to reduce NAFICOT's presence in the commercial fishing sector, while promoting private sector development.

**Suggestion 145:** That the Government of Tuvalu has a specific study undertaken to look closely at ways to reduce NAFICOT's presence in the commercial fishing sector, while promoting private sector development.

### *5.7.3 Funafuti fishing base*

The ADB project team propose to establish a fish base in Funafuti to service the small-scale and small commercial fishing fleets including fuel, ice, processing and export marketing. It is proposed that the base would occupy a 40 m x 65 m area in the vicinity of the commercial wharf at Funafuti. Site preparation would require filling an area level to a sea wall 60 m in length and one metre above high water level, as well as a 10 m x 20 m pier jetty being constructed. The construction of this area would require dredging and filling to provide an area sufficient for the project. It is proposed that the Government of Tuvalu would fund this part of the project, which under the costings provided would amount to around USD 595,000. The proponents did raise the possibility of environmental impact,

although thought there would not be a problem, and the government could have an environmental impact study conducted if they wanted, but this was an additional cost.

Once the site was available, the proposed project would construct a large processing and cold storage area as well as a two level office block. The main building would house 3 x 15 t brine freezers, a 10 t/day flake ice plant, 2 x 250 t freezers at  $-25^{\circ}\text{C}$ , and a large processing area maintained at  $10^{\circ}\text{C}$ . The cost of the buildings was estimated at USD 860,000, and the machinery and equipment at USD 735,000. Fitting out the office and providing other equipment, design costs, the materials for 10 FADs and the materials for the construction of 15 small-scale vessels adds up to an additional USD 840,000.

The proposal has a diagram of the new area, showing the approximate layout of the buildings and machinery. No information is provided on the possible financing of the project, except that the Government of Tuvalu should fund the construction of the wharf and reclaiming the land for the site. This proposal is closely linked to the small-scale fishing fleet project, which would provide the fish to the fish base, and to the purse seining proposal, as the carrier vessel would be used to transport the stored catch to overseas markets for sale.

#### *Discussion and assessment*

The proposal to build a wharf and dredge the area to fill behind the wharf and make a level site around one metre above sea level is sound, and given the shortage of land on Funafuti, may be the only way to provide land for development of any future fisheries complex. However, an environmental impact study should be undertaken to assess any negative impacts that may result from such a project, such as the change in current flows, damage to corals around the proposed construction site, and any effects this may have of the adjacent marine life.

**Suggestion 146:** That before the Government of Tuvalu considers the construction of a wharf and dredging to reclaim land, it has an environmental impact study done to assess any negative impacts that may result from such a project.

The proponents of the project suggest that such a wharf could be constructed close to the main wharf, and this should be a suitable location. However, the Government of Tuvalu should identify a specific area if they intent to pursue this option. Following on from this, the costing provided for this project would have changed over the last 5 years, since the ADB project team produced their report, so a new costing would need to be done. In this regard, an engineer should be hired to draw up plans and provide specifications on the wharf to be built, with a more current costing of the project. Alternately, the government could put the project out to tender and invite overseas companies to come and bid on the project, allowing then to do the design and specifications. The Government of Tuvalu could fund this project themselves, or seek donor aid funding for this project, as this could be an attractive small project to donors in the context of developing fisheries. In saying this, the government would have to ensure that the reclaimed land was used for fisheries development type projects.

**Suggestion 147:** That if the Government of Tuvalu wishes to pursue this option, they identify a specific location for the project site.

**Suggestion 148:** That once a project site is identified, the Government of Tuvalu either hire an engineer to draw up plans and provide specifications on the wharf to be built, with a more current costing, or put the project out to tender and invite overseas companies to come and bid on the project, allowing then to do the design and specifications.

**Suggestion 149:** That if the Government of Tuvalu wishes to proceed with this project, they seek donor aid funding, as this would be in pursuit of fisheries development in the country.

It should be noted here that under this current study/review, the reclaiming of land is also suggested under a larger project to provide a safe anchorage for fishing vessels, through the proposed construction of a small-boat harbour. This is discussed in Section 3.2 of this report.



The buildings and equipment proposed by the ADB team for the reclaimed land seemed to be based on the implementation and success of two other projects. These are the small-boat project, which is discussed in Section 5.7.4 below, and the purse seine project discussed under Section 5.7.1. The size and type of freezing and storage facilities would indicate that the project is based on brine freezing fish for storage and shipping to tuna canneries in the region. Given the current prices being paid on the world market for canning skipjack tuna, say USD 500/t (actually around USD \$450/t) and larger yellowfin at say USD 1200/t, tuna would need to be caught, purchased, frozen, stored, and transported to market for USD 0.60 and 1.20/kg (skipjack and yellowfin respectively). Even at an exchange rate of two to one (AUD to USD), this would make the price AUD 1.20 and 2.40/kg. Given the operating costs of such a large complex and the wages to be paid, at least half of the catch value, and possibly all of it, would be needed to operate the plant, and this is assuming large volumes of fish being landed, which may or may not be the case.

Fishermen currently sell their tuna catch on the local market for AUD 2.50–3.00/kg (both skipjack and yellowfin, although the local market is limited). NAFICOT will purchase tuna for very short periods of time (three or four days) a couple of times per year at AUD 1.70/kg. The local fishermen are happy to sell at this price as they can sell all of their catch at one time and it does not really effect their local sales, it is viewed as an additional short-term market. However, if they were to be receiving a lower price than AUD 1.70/kg for most of their catch, which is what the proposed fish base would have to pay, then it is doubtful that fishermen would sell their catch to the base. It would seem that this proposal is a little grandiose and large for Tuvalu, and this project in its proposed size should not be considered any further.

**Suggestion 150:** That the Government of Tuvalu not consider the Funafuti fish base project in its proposed size any further, as it is felt to be non-viable.

The concept of a new fish processing and storage facility in Funafuti is still plausible (refer Section 3.5), although it would be on a much smaller scale and would need to be developed and implemented by the private sector. Land availability is essential (refer Sections 3.1 and 3.2) for any development to occur, and the main focus would probably be on exporting high-value species or value-added products, although transport limitations, especially airfreight (refer section 3.6) would need to be overcome as well. These options are presented in this report, and not repeated here.

#### 5.7.4 Small-scale fishing fleet project

The ADB project team proposes to establish a fleet of around 50 ‘*alia*-type’ catamarans in Funafuti, with these vessels used to troll for tunas around FADs set from two to five miles outside the lagoon. The proponents have selected the *alia* as the most suitable vessel to develop small-scale trolling based on factors, which include efficiency as a fishing platform, carrying capacity, safety, fuel economy, and acceptability to local fishermen. The vessels would be constructed locally at a boat building facility, which could deliver at least two vessels per month, which would have this project set for a three year period. The proponents project that the fleet will employ 200 fishermen. The principal catch would be skipjack, which would be sold to the fish base proposed under Section 5.7.3 to freeze and store, with the carrier vessel proposed under section 5.7.1 used to transport the catch to overseas markets.

The second stage of this project would be to expand this fishing to the outer islands. This would require the setting up of small onshore storage facility with power generator, on each outer island. Fish would be landed and sold to the shore facility, where the catch would be frozen and stored. The catch could then be shipped to Funafuti on the inter-island cargo vessel, which has some freezer capacity on board. The fish would then be stored at the fish base for marketing via the purse seine carrier vessel.

It is proposed that this artisanal fishing programme would operate as part of NAFICOT’s commercial activity, but with its main objective to maximise local employment opportunities, rather than

maximising profit for the company. A 'boat buying credit and support scheme' is proposed, to allow fishermen the opportunity to own their own boats after about four years. Under this scheme, the payback of the 'loaned' boats would be based on a share of the annual catch sold to the company as cannery fish.

The ADB project team further propose to develop other artisanal and semi-commercial activities. These include options for a small gillnet and longline operation and a small pole-and-line operation. The gillnet and longline operation proposed is based on a similar fishery in Sri Lanka, with catch data from this fishery used to do the costings for Tuvalu. The vessels used would be 12 m long, constructed from plywood with fibreglass sheathing, with insulated fish holds and a hydraulic net spool. It is proposed that one such vessel would be used in this operation.

The small pole-and-line vessels proposed are also 12 m and constructed of plywood with fibreglass sheathing. It is proposed that a fleet of eight vessel be used, with the catch and costings for this component based on a similar Indonesian fishery. The fishing of these vessels relies on each vessel being able to catch sufficient live bait in the Funafuti lagoon, with the fishing grounds being within a 70 nm radius (from Nukufetau to Nukulaelae). A daily catch of 1000 kg is estimated per boat with 180 fishing days per year.

### *Discussion and assessment*

The project proposed here is a very ambitious one, with lots of assumptions. Firstly the *alia*-type catamaran has been selected as the most suitable vessel to develop this troll fishery, although no local fishermen have purchased this type of vessel themselves. Possibly this is due to the cost of importing such a vessel, as the current facilities preclude the construction of such a vessel at present, especially in aluminium. When looking around the region, Samoa, the home of the *alia* catamaran, and American Samoa, seem to be the only two countries that are actually using this design of vessel. Troll fishermen in other Pacific countries seem to prefer small monohull planing vessels (4.5–7.0 m long), so they can get to and from the fishing grounds quickly and have the speed to chase free-swimming tuna schools, as well as being able to fish around FADs. Given that the latter type of vessel is currently being used in Tuvalu for trolling, and many vessels are constructed locally, it would appear that this would be the most accepted design for trolling locally, not the *alia*-type vessel.

**Suggestion 151:** That the Government of Tuvalu let the local fishermen decide what style of vessel they want to use to develop troll fishing in Tuvalu, whether around FADs or fishing free-swimming tuna schools.

The concept of having a boatyard is a good one, although it appears from the proposal that this would be government funded in their scenario. Having a set schedule for constructing vessels and having selected fishermen lined up to take on the vessels under the proposed boat purchase credit scheme seems optimistic. This is especially true when looking at the projected cashflow for the vessels based on a catch of 240 kg/day (180 fishing days/year) and a price of USD 0.55/kg (roughly AUD 1.10/kg). The fuel consumption used in the calculations also seems lower than that reported in the trials of the *alia*-type vessel in Tuvalu in the early 1990s. This would greatly effect the calculations on profitability of such fishing operations, and the price proposed to be paid for fish would be too low to allow the fishing operations to be viable

The question of marketing is address through the Funafuti fish base and the purse seine carrier vessel, although it is suggested that both of these projects are not viable at this point in time or in their current form. With no fish base and NAFICOT being the only company to purchase tuna in Funafuti, apart from domestic sales to local consumers, then the scope of developing a fishery with 50 vessels is not feasible. However, going back to the boatyard concept, this is a real possibility, although it should be developed by the private sector, not the government. There are several people building boats in Funafuti at present, and they could expand if they choose and make this into a real business. The supply of vessels would be on demand, rather than to a timetable, and the demand should increase as marketing opportunities are developed, hopefully in the private sector.

**Suggestion 152:** That the Government of Tuvalu support private sector development of a boatyard, although not enter into this activity themselves.

**Suggestion 153:** That the construction of vessels for the troll fishery be left to supply and demand, rather than to a schedule.

**Suggestion 154:** That the purchase of troll vessels be left to the individual fishermen, with them making their own arrangement for financing to purchase.

The proposal looks at expanding the operation to the outer islands, as a 'Phase II' to the Funafuti work. This to some degree has already commenced with the establishment of Community Fishing Centres (CFCs) on all outer islands. The main problems here are marketing, as fish will need to be transported to Funafuti for marketing in most cases. These operations are fully funded by the government and will be subsidised to hopefully keep them operational. It is highly unlikely that any of these operations will become self funding, even on the actual annual operating expenses. The operation of the CFCs will be discussed more under Section 5.3.3 of this report.

The proposal looks at the introduction of several other fishing methods, in support of increasing throughput to the fish base facility. The first method is a joint gillnet and longline configuration used in Sri Lanka. The proponents are clear at pointing out that the gillnet component of this gear should not be mixed with commercial driftnets, as this is a much smaller operation. However, given the concerns over the use of gillnets and the possible loss of gear with it washing onto the reefs of Tuvalu, it is strongly suggested that gillnet component of this fishing style not be introduced in Tuvalu. The longlining component though is worth considering, although marketing constraints for the catch would need to be overcome. The idea of promoting and introducing tuna longlining is discussed in Section 5.9.6, so will not be repeated here.

**Suggestion 155:** That the Government of Tuvalu not consider the introduction of any pelagic gillnetting operations in Tuvaluan waters.

The final fishing method suggested in this proposal is the introduction of eight, 12 m vessels to conduct pole-and-line operations, based on a fishery in Indonesia. Tuvaluans have traditionally used a local poling technique, so the method is already known. Bait fishing trials in Funafuti lagoon have indicated a limited live baitfish resource, which would probably not be sufficient to support 8 vessels, given that one larger vessel could not get enough for its operation. The bait resource could possibly support three or four small-scale vessel, although it should be up to the private sector to develop this, possibly with technical assistance provided through the Fisheries Department's extension service. The main limiting factor though is the marketing, as without a good market that can absorb the anticipated catch without displacing the troll fishermen, then this is not viable. A possible solution to the marketing is value-adding to the catch at a shore processing facility. This will be explored further in Section 5.10 of this report.

**Suggestion 156:** That under the current marketing constraints, the possibility of introducing small-scale pole-and-line fishing is limited, although possible if local markets can be found.

**Suggestion 157:** That if local markets can be found, the Fisheries Department's Extension Service promote this method with the private sector to encourage several fishermen to purchase vessels and use the pole-and-line fishing method.

### 5.7.5 *Market facility*

The ADB project team propose the refurbishment or rebuilding of a fish market, as the market in Vaiaku town centre was in disrepair and inadequate to properly serve the needs of the community. They also state that the existing facility would become more inadequate as the population on Funafuti grows and fishing activity increases. It is estimated the new facility could be constructed and fitted out for around USD 55,000. There is no mention of any freezers or cold storage facilities at the proposed new market. There would also be recurrent costs of around USD 20,000 annually, in wages to staff and minor repairs and maintenance.

#### *Discussion and assessment*

The current situation on marketing fish in Funafuti is that local fishermen can either sell direct to the public, or sell their catch to NAFICOT, the government owned and operated fish market. Local fishermen, especially the tuna troll fishermen, do not ice their catch, although the fish is usually only a few hours old when it is landed for sale. These fishermen have their fish on display on an open table for the consumers to select from. No ice is used at any time of their operation. Occasionally, NAFICOT will purchase tuna, although they much prefer to purchase reef fish.

NAFICOT has three retail outlets, at their main processing facility in Teone, a fish shop at Vaiaku (the one mentioned in the ADB proposal), and a display cabinet in one of the supermarkets in town. The market in question is small, although adequate for the iced fish that is sold through there at present. The fish is all stored at the Teone site, and taken by road, well iced in ice chests to Vaiaku each day. This arrangement seems adequate at present, and there is no point in the government either upgrading or rebuilding the Vaiaku shop. The best approach would be for the government to promote private sector development of a fish shop, so that the government (NAFICOT) could withdraw from buying and selling fish and leave this purely to the private sector. This is not going to happen overnight, although it is hopefully what the government is working towards. It should be noted that the main processing area at NAFICOT is to be upgraded, and this is discussed in Section 3.5.

**Suggestion 158:** That the Government of Tuvalu stay with the current fish shop arrangement at Vaiaku, and focus more on promoting private sector development of an alternative fish shop, with the long-term plan to have NAFICOT withdraw from buying and selling fish, leaving this to the private sector.

### 5.7.6 *Tuna jerky production centre*

The ADB project team propose the development of a tuna jerky facility at one of the outer islands (pilot facility) to produce a high-value export product using solar energy to dry strips of tuna. It is estimated that the wholesale value of the tuna jerky would be around USD 45.00/kg, based on 1994 prices in Hawaii, and a catchy marketing name could assist sales. It is also proposed that other markets in Japan, Australia and the US Mainland could also be tapped into.

The estimated start-up costs for a project in the outer islands would be around USD 150,000, including the hire of a expert to conduct a study and a technical assistant to implement and oversee the project for the first 18–20 months. The proposal refers to commercially successful projects to produce tuna jerky in Kiribati and Marshall Islands. The proposal further suggests that the production of tuna jerky could be done at the NAFICOT Teone processing facility. Costings are provided for both the establishment of a facility in the outer islands, and in Funafuti.

#### *Discussion and assessment*

The operation of a shore-based value-adding facility in the outer islands producing a dried product, whether a marinated tuna jerky or salted and dried tuna strips, is probably one of the few ideas that has the potential for economic success in the outer islands. A similar project to that suggested was trialled in Nukufetau and Nanumea around the time of this work or soon after. Anecdotal information

indicates that the product was good and tasty, had a long shelf-life, and was readily saleable in Funafuti. It is unclear if any exporting trials were undertaken, and if so, how successful they were. One of the problems identified with the project was that the technical advisers were removed too soon to allow full transfer of the skills and knowledge to local Tuvaluans to continue the work. It is certainly worth further investigating this as a real development option for the outer islands, and this will be discussed more in Section 5.10.

**Suggestion 159:** That the Government of Tuvalu encourage the development of private sector value-added tuna products in the outer islands.

The costing of the project seems reasonable, although the actual costs of producing the finished product seem sketchy. It also assumes that suitable fish can be purchased for around USD 1.00/kg, which could be acceptable under the current fish purchase price. The freight rate quoted for exporting the product is grossly underestimated, and this will greatly effect the viability of the whole operation. Further investigation on this is needed.

The ADB project team also suggest the conversion of the NAFICOT processing facility at Teone to one to produce tuna jerky. It is estimated that 750 kg of fish would be processed daily, which would produce 112 kg/day of finished product. The assumption here is that the premises have enough space to dry around 500 kg of sliced tuna, and that the process is complete in one day. If the process takes several days to fully dry a batch of fish, then double the space is needed to dry the product. It is doubtful that the estimated throughput could occur on a daily basis, and the initial cost of setting up the facility would appear to not make this a viable operation on the scale proposed. However, NAFICOT does do some salting and drying of reef fish fillets, so they could look into the production of tuna jerky on a small scale to start. This could be a good first step in encouraging others, both in Funafuti and the outer islands, to produce value-added tuna products.

**Suggestion 160:** That NAFICOT commence a small-scale operation on producing a tuna jerky for both local and export markets as a first step in encouraging private sector development in this field, both in Funafuti and in the outer islands.

## **5.8 Assessment of tuna-related development options presented in the 1994 CFTC study**

The tuna-related development options provided in the 1994 CFTC report are primarily focused on the development and improvement of NAFICOT and its performance as a fishing and marketing entity. Several sections are focused on the ways to reduce operating costs through wise use of electricity, and increased throughput of product. Exporting of product is considered essential, as the domestic market is finite, especially with a high level of subsistence and artisanal fishing. Some of the appropriate ideas presented in the report are summarised below with some discussion and assessment.

### *Mothership arrangement*

The report suggests the use of a collection vessel or mothership as a means of getting fish from the outer islands to Funafuti for processing and sale (domestic and export). The mothership would be used to provide ice, sell fishing gear and fuel and purchase fish, staying in an area for five to seven days. It would also purchase fish from the local CFC and provide an extension service for outboard repairs etc. The mothership could travel between islands providing this service. The fisheries extension vessel is identified as a suitable vessel to undertake fish collection trials.

Government-run mothership operations have been trialled and used in many countries around the region over the last two decades, with none of them being economically viable. The concept has many pitfalls, including coming up with a workable schedule, mechanical breakdowns, a death on the island will have many people cease fishing, the cost of operating the vessel, quality of product purchased (especially if it is kept on the mothership for a week on ice with the gills and guts still in), and the motivation of the skipper and crew of the mothership to keep the operation moving. Therefore, it would not seem feasible for this type of government operation to work in Tuvalu when it has failed in

many other countries in the region. However, in several countries the private sector provides a similar service to selected villages or fishermen, and this can work provided it is developed and implemented by the private sector on a small-scale.

**Suggestion 161:** That the idea of having a government-run dedicated mothership to operate as a collection vessel as outlined in this proposal be abandoned as it is doomed to failure and will not be economically viable.

**Suggestion 162:** That if an operator in the private sector wants to set up a small-scale fish collection service with selected villages or fishermen, the Fisheries Department and NAFICOT support and encourage this.

The fisheries extension vessel is currently being used as a collection vessel for the CFCs, as part of other duties. There is no way around this, although the vessel could be better used to do research and extension work, which was the original purpose of the vessel. Therefore, it would be best to restrict the amount of time the extension vessel is used for collection work, although tying the collection with extension work may assist NAFICOT to get fish in from the outer islands on an ad hoc basis.

**Suggestion 163:** That the fisheries extension vessel be primarily used for research and extension work, with fish collection from CFCs kept to a minimum, and possibly tied into extension work at the island.

#### *Deep bottomfishing on seamounts*

The information presented here indicates that a 17–19 m vessel would not be viable in developing the seamount deep-water snapper fishery. This is a totally different picture than that presented in the ADB proposal on the same issue. Based on the Fiji experience, it is postulated that catches would decrease over time, although a smaller vessel may be able to work at a profit. The Tongan fishery is also cited, with this being a sustainable fishery producing around 150 t annually.

It is likely that the seamount deep-water snapper fishery will be fragile, and probably around 40–50 t is a realistic annual catch figure. Comments and suggestions on the development of this fishery are provided under Section 5.7.2.

#### *Coastal pole-and-line fishing and trolling*

This section of the CFTC report looks at a few different vessel designs that could be used for development. The *alia* catamaran is dismissed as too expensive, while the Maldivian dhoni design is considered a possible boat for pole-and-line fishing in Tuvalu. The local vessels are good for inshore trolling, although their area of operation offshore is limited. The report suggests that the 50 vessel small-boat fleet suggested in the ADB report would best be reduced to 30 vessels, 10 each based at Funafuti, Vaitupu and Nukufetau.

Section 5.7.4 provides comment and suggestions on the ADB project proposal, and the same comments are provided for this interpretation of a very similar project.

#### *Longlining*

This is raised as a possibility in the future, as there are too many limitations to base a tuna longliner in Tuvalu at this point in time. It is proposed that one or two longliners could be based in Fiji, and work the southern waters of the Tuvalu EEZ.

This is certainly a realistic proposal, although it is questionable what the benefits to Tuvalu would be from having a Tuvaluan fishing venture based in Fiji. Comments in Section 5.7.2 are relevant to this proposal, as it is felt that the major benefits to basing a fishing operation in Fiji, would accrue to Fiji.

This could be a reasonable first step to train up Tuvaluans in tuna longlining, and NAFICOT may want to look closely at this, using one vessel to start to see if it is viable or not.

**Suggestion 164:** That NAFICOT look at the feasibility and practicality of purchasing a tuna longliner and basing it in Fiji to work in the southern waters of the Tuvalu EEZ.

#### *Regional purse seining and carrier vessel for transshipment*

The CFTC report looks at the proposal presented in the ADB report and does not discount this, although urges caution. The carrier vessel and its capabilities are also questioned in times of good catches. This report suggests a study be undertaken on this in 1996, although this time has passed.

Section 5.7.1 outlines the ADB proposal and the comments and suggestions provided to this proposal, which includes a study being undertaken before any move is made to enter this highly volatile fishery.

#### *Shore base development and port development*

This covers the possibility of developing shore base facilities, and suggests that land availability is a major problem. It is also stated that no development of shore facilities should occur until several development initiatives have proven successful. The report goes on to mention the possibility of putting in a breakwall to the Funafuti main wharf, to provide some shelter for small craft.

Section 5.7.5 and 3.5 discuss shore base facilities, while Section 3.2 discusses the possibility of a small-boat harbour being developed. Each of these sections have suggestions for a way forward on these important issues.

#### *Different value-adding processes*

The CFTC report looks at a range of value-adding processes for fish products. These are summarised as follows:

- Tuna loining: not feasible in the medium term as a high volume of tuna is needed;
- Tuna jerky: has potential, although needs a review of the activities prior to embarking on a project;
- Arabushi: considered feasible if wood, water and labour is available, although a financial analysis should be undertaken and local tuna production needs to be increased; and
- Tuna canning: may be feasible on a small scale with a CFTC study team looking at this for different centres in the Pacific. The results of this study are needed, plus a market study on options for value-added skipjack will be required.

The only value-added process mentioned above that has a potential for development in Tuvalu is the production of tuna jerky. Comments and suggestions for value-added processes are provided under Sections 5.7.6 and 5.10.

## **5.9 Development options**

A range of development options are possible for Tuvalu in relation to the tuna resource that passes through its EEZ. These options cover potential areas of employment in the tuna fishery and possibly support to the fishery. This section explores these different options as to their viability and practicality in Tuvalu based on the current situation.

### *5.9.1 Transshipment of tuna catches from other fleets*

The Fisheries Department expressed interest in getting some of the foreign vessels fishing in the Tuvalu EEZ to come to Funafuti to transship their catch. Such transshipment can be undertaken in several ways, unloading to a carrier vessel direct, or unloading to a shore facility from the catching vessel. In Tuvalu's case, there are no shore facilities to unload to, so any transshipment would be direct from the catcher vessel to the carrier vessel. One such transshipment was undertaken in Tuvalu in 1994/95, with several US purse seiners unloading to one carrier vessel. No other transshipments have occurred since that time.

Many of the US purse seiners fish in the northern part of the Tuvalu EEZ on a seasonal basis, with the amount of activity fluctuating from year to year based on oceanographic conditions. Depending on how far south the purse seiners were fishing, there is the possibility that they could come to Funafuti to transship if they choose, although a carrier vessel would need to come as well. Therefore there is the possibility of this occurring, so the Fisheries Department needs to be ready. The areas they need to be able to cover is the monitoring of the transshipment, including some port sampling of the catch. Some of the Licensing Officers are trained as observers, so they should be able to undertake these tasks, although additional people should be trained up as well to assist. SPC and FFA should be in a position to assist with this training.

**Suggestion 165:** That the Fisheries Department use their Licensing Officers to do the monitoring of any transshipments with port sampling of the catch, while other people are trained up to assist or undertake these duties, with training possibly provided by SPC and FFA.

As there were no licensing officers available during this study, it was not clear if there were any fees currently in place for transshipment. Under the Customs Legislation, there were no export permit fees or export taxes, so unless the Fisheries Department has some transshipment fee in place, there would be no fees payable by foreign vessels. Fisheries did try to charge a fee of AUD 2.00/t for the 1994/95 transshipment, although special arrangements had to be made and the company went bankrupt and did not pay the fee. If this is the case, then the Fisheries Department needs to implement a transshipment fee, or formalise the earlier arrangement. If the fee is set at AUD 2.00/t, on a transshipment of 1,000 t (normal amount a US vessel would unload at one time), this would be AUD 2,000/transshipment. This would certainly cover the cost of monitoring and sampling the catch. Possibly this transshipment fee could be placed in the same account as the proposed observer and development fees from foreign fishing licences (refer Section 5.4.3). The best approach would be to include the transshipment fee under the National Tuna Development and Management Plan for Tuvalu.

**Suggestion 166:** That if the Government of Tuvalu does not have a formal transshipment fee in place, it develop a fee structure, or formalise any previous arrangement, to cover the costs of monitoring and sampling the transshipment, and include the fee under the National Tuna Development and Management Plan for Tuvalu.

**Suggestion 167:** That the transshipment fee be paid into the account as the proposed observer and development fees from foreign fishing licences.

### *5.9.2 Possible use of stevedores and crewing on foreign vessels*

With the possibility of transshipping fish from foreign vessels through Tuvalu likely to be an infrequent occurrence, there is limited chance of employment being generated in this area through the use of stevedores. The Ports and Marine Department do have stevedores they use when unloading cargo vessels, although this is only on a four to six weekly basis. Therefore, in the event that a tuna transshipment were to occur, and stevedores were needed, and should be encouraged, it appears that there would be people available to undertake this work. The usual fee charged by Ports and Marine is AUD 10.00/t for moving cargo, so it is assumed the same fee would apply to transshipping fish, although this may need to be negotiated with the companies involved in the transshipment. There will also be the requirement for Ports and Marine to provide appropriate clothing for freezer work, so the



department should look into purchasing appropriate clothing and boots for stevedores engaged in this type of work.

**Suggestion 168:** That in the event that transshipping of tuna occurs in Funafuti, the government encourage the use of Tuvaluan stevedores to do the transshipment work.

**Suggestion 169:** That the Ports and Marine negotiate a fee per tonne for the transshipment of tuna in Funafuti, which is acceptable to both parties.

**Suggestion 170:** That Ports and Marine purchase appropriate clothing and boots for stevedores engaged in the transshipment of fish in freezers.

Foreign fishing vessels are always looking for good crew from Pacific Islands. Countries such as Kiribati and Vanuatu have specific training establishments to provide the necessary training for their nationals that are interested in working on foreign fishing vessels. In Tuvalu, the emphasis has been for many years to train up local men to be crew on foreign merchant vessels. Currently there are around 450 Tuvaluans on merchant vessels all over the world.

The Tuvalu Maritime Training Institute has around 60 students pass through its courses per year, with the training specific to the merchant marine. Three companies in Funafuti place trained crew on foreign vessels, predominantly vessels owned by German companies. The wages earned range from USD 336–998/month, with no deductions at all (free food and accommodation). With wages like this and the merchant working conditions, it is doubtful that any trained Tuvaluans would seek employment of foreign fishing vessels, where the pay is usually considerably less.

However, if there are Tuvaluans who want to pursue this line of employment on foreign fishing vessels, they should ask the Fisheries Department, or one of the local agents, to assist with the development of a common contract for terms and conditions of their employment. This point is raised as crew from other countries have run into problems with employment contracts, as they were not clearly laid out and people feel they have not been treated fairly. To overcome this, a standard contract should be developed and used for each Tuvaluan working on a foreign fishing vessel.

**Suggestion 171:** That if there are Tuvaluans interested in employment on foreign fishing vessels, they ask the Fisheries Department, or a local agent, for assistance in developing a standard contract with agreeable terms and conditions for employment.

### *5.9.3 Observer Programme and port sampling*

A part of any foreign fishing access agreement in the Tuvalu EEZ, should be the requirement for observer placements from time to time. This should be written into all access agreements in Tuvalu, and it should form part of any new licensing policy or licensing conditions that is implemented as part of the National Tuna Development and Management Plan. The need for observer training has been discussed in Section 4.3.1.

Funding for observers and port samplers is an issue that the Fisheries Department will need to address. Section 5.4.3 looks at a mechanism for at least partially funding these activities, through a percentage of licence fees being channelled into these areas. Hopefully the proposed approach will be supported by government. Regardless of whether or not this approach is accepted, the Fisheries Department will need to have some funding available to undertake these services, and this should be built into the annual fisheries budget.

**Suggestion 172:** That the Fisheries Department build some funding for observers and port samplers into their annual budget allocation from government to undertake these activities.

Tuvalu needs a pool of observers and port samplers, and they do not need to be employed by government. Once trained, these people can be hired on a casual basis when there is the need for their

services. This could be for work locally on domestic vessels, or for work on US purse seiners through FFA. This approach would share the work around as the people would not be government employees, and this is the approach the merchant shipping agents use for their seamen, so many Tuvaluans could be use under this working arrangement.

**Suggestion 173:** That the Fisheries Department ensure there is a pool of trained observers and port samplers in Tuvalu, who are not government employees, so they can be employed on a casual bases when needed.

There is also possible employment for port samplers in Tuvalu, especially if the trust fund is established to cover the wages of observers and port samplers. At present there is no domestic tuna fishery of any size to sample the catch from, although there is the domestic troll catch that should be sampled. The need for port samplers will only grow if a domestic tuna fishery develops, although one or two people need to be trained now to assist with transshipments, if and when they occur. Employment by the Fisheries Department could be the same as observers, that is, on an as-needs casual basis.

**Suggestion 174:** That the Fisheries Department have several people trained as port samplers, and hire them on a casual basis when there is a need to sample tuna catches.

With the establishment of a new regional tuna management Commission as a result of the MHLC process, there is the chance that observer coverage under this Commission may increase. Currently under the US Treaty, FFA fully funds Pacific Islanders working as observers on US purse seiners. This concept could be applied to all vessels in the coming years under the Commission, which could increase employment opportunities for Tuvaluans trained as observers. It is anticipated that observers working through the Commission would be funded by or through the Commission.

#### *5.9.4 Fish aggregating devices (FADs)*

There is scope for development in the artisanal and subsistence areas based on the tuna fishery and the use of fish aggregating devices (FADs) to concentrate these species in known locations. FADs have been used in Tuvalu with good success, with these devices attracting tunas and associated species. Currently there are no FADs in the waters around Tuvalu, although the Fisheries Department has some materials left from previous FAD programmes, although not enough for a complete unit. The Fisheries Department has no funding in their budget for FAD materials, and no proposals in for funding with donor agencies. Therefore, the main problems with having an ongoing FAD programme appears to be locating funds. A possible solution to the funding issue, or at lease partial funding, has been presented in Section 5.4.3, through the implementation of a ‘development fee’ of around USD 1000 on all foreign fishing licences. Regardless, the Fisheries Department needs to identify funding to allow an on-going FAD programme to be implemented.

**Suggestion 175:** That regardless of whether or not the funding mechanism of a development fee on foreign fishing licences is implemented, the Fisheries Department identifies funds in their budget to commence an on-going FAD programme.

The Extension Section of the Fisheries Department should establish a five-year FAD programme for Funafuti and the outer islands. Such a programme could be used to encourage development and expansion of Tuvaluans becoming involved in the tuna fishery, albeit on a smaller-scale. Such a programme would provide specific fishing locations for subsistence and artisanal operators, allowing them to minimise their running costs while maximising their chance of a good catch. From a sea safety perspective, knowing where people are working at sea on smaller vessels will greatly assist if a vessel is to break down and there is a need to mount a search and rescue operation for the overdue vessel.

**Suggestion 176:** That the Fisheries Department, through their Extension Section, consider implementing a five-year FAD programme under the National Tuna Development and Management Plan, for Tuvalu.

A FAD programme should include the bulk purchase of materials to maintain a set number of FADs at the main fishing locations around the country. The number of FADs could be based on the number of main fishing locations and markets for the catch, with possibly three devices off Funafuti, and one at each of the outer islands. Spare materials will need to be kept on hand to replace lost FADs in a reasonable timeframe. A set maintenance programme needs to be implemented by the Extension Section to try and maximise the lifespan of each FAD, thus reducing the overall cost of the programme. Data collection should also be implemented as a requirement of fishing around FADs, so that a cost benefit analysis can be undertaken periodically through the life of the FAD programme, monitoring the success and the dependence of fishing operations on FADs.

**Suggestion 177:** That if the Fisheries Department implements a FAD programme under the National Tuna development and Management Plan, the following requirements be included:

- Bulk ordering of materials to reduce costs;
- Spare materials be kept on hand to replace lost FADs in a reasonable timeframe;
- A set maintenance programme be implemented to increase the lifespan of FADs in the water;
- Data collection system implemented for all operators fishing around the FADs; and
- A cost benefit analysis be undertaken periodically through the 5-year programme to monitor the programmes' success.

The Fisheries Department has a suitable vessel for deploying FADs with GPS and plotter, although it does not have a suitable deep-water echo sounder (to work in 2,500–3,000 m). This vessel could be used to deploy FADs in all locations, although a deep-water echo sounder is needed to ensure accurate deployment. Therefore, funding for an on-going FAD programme should include the purchase of a deep-water echo sounder for the fisheries vessel, whether this funding is through the development fund or the fisheries budget.

**Suggestion 178:** That the Fisheries Department include funding in any on-going FAD programme budget to purchase a deep-water echo sounder (rated to 2,500–3,000 m).

Several of the current fisheries staff have been involved in the construction and deployment of FADs, although the most recent deployment was in 1996. The lifespan of the FADs have been short in many cases, so it would seem opportune for the government to seek assistance and training from the SPC in FAD work, if a FAD programme is developed under the National Tuna Development and Management Plan. This would allow the transfer of technical information and skills from SPC staff to staff of the Fisheries Department, NAFICOT, and other fishermen that wanted to participate.

**Suggestion 179:** That the Fisheries Department officially request technical assistance from SPC in the conducting of site surveys, and the construction and deployment of FADs if a 5-year FAD programme is developed and funded through the National Tuna Development and Management Plan.

#### *5.9.5 Promotion of small-scale tuna fishing methods*

As part of one SPC technical assistance project in Tuvalu in 1985, some vertical longlining was trialled around FADs with limited success. Fishermen were also trained in the construction of this and other mid-water fishing gears and their use, although these methods never caught on. In fact, the FADs were lost in many locations, so these methods would not have been used much. There is a large potential for small-scale tuna fishing activities in Tuvalu, provided there is an on-going FAD programme to support this. The main problem though is the limited market for tuna in Funafuti at present, although the use of FADs could reduce operating costs to local fishermen in the short term. The other approach is to develop some value-adding to tuna, to find alternative markets for this product, especially export markets. Value-adding will be discussed more under Section 5.10.

Fishermen will need to focus on producing a good quality product, especially skipjack tuna and small yellowfin tuna, when they are caught from small vessels.

The Fisheries Department could promote small-scale mid-water fishing methods around FADs. Such fishing techniques would include vertical longlining (both with rope and monofilament gear), mid-water handlining (both drop-stone and palu-ahi methods) and single-hook driftlining (light and heavy gear). Rather than fitting out the fisheries boats to demonstrate these methods, a better approach would be to run a series of workshops at different locations to make up the gear, and then use the vessels of workshop participants to do practical fishing trials around the FADs. SPC could be approached to provide technical assistance in the running of the first couple of workshops and train up fisheries staff at the same time to run future workshops. The Fisheries Department would need to identify funds for purchasing materials to make up the mid-water fishing gears needed at the workshops, and possibly fund the operation of the practical fishing trials.

**Suggestion 180:** That the Fisheries Department look at introducing mid-water fishing techniques in association with FADs, through a series of workshops at different locations, using participants vessels to conduct practical fishing trials using the new gear.

**Suggestion 181:** That the Fisheries Department identify funding to purchase materials for making up mid-water fishing gears and to cover operating costs of practical fishing trials, so that workshops to introduce these techniques can be set up.

**Suggestion 182:** That if the workshops on mid-water fishing techniques are to go ahead, the Fisheries Department approach SPC for technical assistance in running the first couple to train up fisheries staff, with these staff conducting future workshops in other locations.

The mid-water fishing techniques proposed for fishing around FADs will require fishermen to purchase specific gear that is readily available in other countries, but not Tuvalu. It is hoped that a supplier of fishing gear in Tuvalu, preferably not NAFICOT or the Fisheries Department, will bring in the appropriate materials once these methods are introduced to local fishermen. The Fisheries Department could assist local suppliers of fishing gear by providing them with the contact details of potential overseas suppliers and the specifics of the actual gear.

**Suggestion 183:** That the Fisheries Department provide a list of specific gear needed for mid-water fishing techniques and possible overseas suppliers to local stores in Tuvalu who may want to sell the gear, so that this gear can be purchased and made available for sale to local fishermen after the methods are introduced.

The final component required for mid-water fishing is suitable bait, as multiple-hook rigs like a vertical longline require 15–20 baits per line per set, depending on the number of hooks used. Local bait such as bigeye scad (*Selar* sp.) and small mackerels (*Decapterus* sp.) would be the best, although they may be difficult to purchase on a year-round basis. To overcome this, imported frozen tuna longline bait may be the best alternative, as it can be purchased when needed. Importing of bait was discussed under Section 3.3.5, while the catching of local bait is discussed under Section 5.9.7.

#### *5.9.6 Promotion of small to medium scale tuna longlining*

The next level of tuna fishing development, which is higher to the small-scale fishing activities suggested in Section 5.9.5, is small-scale and medium-scale tuna longlining. Tuna longlining targets the larger, deeper-swimming tunas that are generally handled carefully and exported fresh to overseas markets. It is a very expensive step up from a small-scale vessel conduction small-scale fishing methods to tuna longlining, even to a small vessel of 11–14 m in length. To put this in perspective, small-scale tuna longlining needs to be looked at separately to medium-scale.

It is also noted that without a safe anchorage for larger vessels required for tuna longlining, and a transport system that can get fish out of the country to an overseas market at a realistic profit, people

are going to be reluctant to invest in this fishery until this basic infrastructure is provided. Therefore, the information presented here is provided in the hope that infrastructure requirements will be forthcoming, and people in the private sector will start to invest in larger vessels and possibly processing facilities.

There is one tuna longline fishery in the Pacific at present that uses small tuna longline vessels successfully, that is Samoa. They have established a fishery using 9–11 m aluminium catamarans with outboard power. The mainline reel used is hand-crank, and generally around 300 hooks are used per set. The catch rates have been high although the handling of the catch has been marginal in some cases. Albacore tuna is the target species, and it is generally landed fresh to the processors, frozen and then shipped to the canneries in American Samoa. The whole situation in Samoa works and is profitable using these small longline vessels. However, fish quality is low as many vessels can not carry ice, there have been many sea safety problems with many fishermen lost at sea, and there is no real consideration of the general comfort of those onboard the small vessels.

The Fisheries Division in Samoa is trying to rectify the current problems of the smaller aluminium catamaran vessels called *alias*. The Fisheries Division has had a new *super alia* built, which is 12.2 m long, powered by twin inboard diesel engines and has two built-in insulated fish holds, one in each hull. The vessel has a cabin with bunks, modern electronics for navigating and fishing, and a hydraulic system for the fishing operation. SPC supervised the sea and fishing trials on this new *super alia*, which has a Samoan skipper and crew. The results from the fishing trials indicate this vessel is a large improvement on the smaller vessels, with increased fish quality, increased crew comfort, and increased vessel stability. The projected fishing ability and catch for a 12 month period, based on the catches and expenses recorded through the four month fishing trials, indicates a good profit after all costs (fixed and variable) are subtracted. This vessel may work in other countries in the region, like Tuvalu, for small-scale tuna longline development. The concept of this vessel could be introduced to the private sector in Tuvalu, although NAFICOT may wish to purchase one of these vessels to trial it as a suitable multipurpose vessel for both tuna longlining and deep-water snapper fishing. This would introduce the vessel to the private sector, and allow an assessment of the vessel as to its suitability to fishing in Tuvaluan waters. NAFICOT could then look to leasing this vessel out to the private sector to operate.

**Suggestion 184:** That NAFICOT look at purchasing one *super alia* to use as a multipurpose tuna longliner and deep-water snapper vessel, as a way to introduce the vessel to the private sector, with the vessel being leased to the private sector once the vessel and method has been accepted by local operators.

If NAFICOT chooses to purchase a *super alia*, they will probably require some training in the tuna longlining technique for the skipper and crew. Once trained, a larger training programme could be established to introduce the fishing technique to other local fishermen who are interested. SPC would be the organisation to request technical assistance from, should NAFICOT decide to purchase this or any other tuna longliner. Training of interested fishermen could be in the form of workshops, followed by a two or three day fishing trip to gain a practical understanding of the gear and how to use it.

**Suggestion 185:** That if NAFICOT purchases a *super alia*, or any other tuna longline vessel, they request technical assistance from SPC to get their skipper and crew trained in tuna longlining gear and techniques.

**Suggestion 186:** That NAFICOT, with assistance from the Fisheries Department, set up a training programme to familiarise small-scale fishermen with the new gears, possibly through workshops including sea time to undertake trial sets.

Looking to medium-scale tuna longline vessels in the 18–25 m length range, the costs involved in purchasing such vessels is very high, and this should be left to the private sector, even though NAFICOT is interested in becoming involved in this type of fishing. The fisheries extension vessel is

the only suitable vessel in Tuvalu at present for conversion to tuna longlining, and the Fisheries Department may want to look at this, to do some trial fishing and training.

**Suggestion 187:** That the Fisheries Department consider fitting their extension vessel with tuna longlining gear to conduct trial fishing and training.

If in the future there is private sector development in tuna longlining, Tuvaluans may look to the purchase of second-hand vessels. Section 3.4 of this report provides a list of boat parameters people should consider when looking at purchasing a vessel, new or used. In addition to these parameters, the private sector should be cautioned on the type of second-hand vessels being purchased. It is important that fishermen purchase vessels with common brand-name machinery that spare parts are readily available for in the region. This includes all machinery (engines, refrigeration equipment, hydraulic equipment (mainline reel, line shooter, anchor winch), generators, pumps etc.)

**Suggestion 188:** That the private sector be cautious when purchasing second-hand tuna longliners, to ensure they have common brand-name machinery that spare parts are readily available for in the region.

If local Tuvaluans do enter the tuna longline fishery, they should seek technical assistance from SPC in preparing their boat for fishing, and actually fishing. This request will need to go through the Fisheries Department and Department of Foreign Affairs. Such training would include the correct on board handling, processing and chilling of the catch.

**Suggestion 189:** That the Fisheries Department request technical assistance from SPC to work with any new entrants in the private sector who undertake tuna longlining activities, including the rigging of vessels and gear, and on board handling, processing and chilling of tunas to export standards.

#### 5.9.7 *Catching bait*

Suitable bait is a major component of any tuna longlining operation. It is also required for small-scale mid-water fishing activities. Suitable bait species include pilchards, herring, mackerels, scads, and squid, with an average bait weighing from 60–120 grams. No bait is imported to Tuvalu at present, although this will need to occur if any tuna longlining activity or mid-water fishing activities are to commence. This had already been discussed in Section 3.3.5.

Funafuti lagoon is known to hold bait species that are readily used for pole-and-line fishing operations. However, it is unknown if there is a supply of suitable tuna longline bait in the lagoon. As a first step, the Fisheries Department could conduct some research into bait and the catching of bait species in the lagoon, which would be suitable for tuna longlining activity. They could trial a range of gears to see which would be the most suitable for harvesting suitable bait species, if any are located in sufficient numbers. If there is a bait supply in the lagoon, then the Fisheries Department could encourage the private sector to harvest this in a sustainable manner, and sell it to other operators who are needing bait for their fishing operation.

**Suggestion 190:** That the Fisheries Department start some research into the availability of suitable bait for tuna longlining from the Funafuti lagoon, using a variety of different gears to harvest it.

**Suggestion 191:** That if bait fishing trials are successful, the Fisheries Department encourage the private sector to harvest this resource in a sustainable manner.

Another area where the Fisheries Department could conduct some research is in squid fishing, both for bait and for human consumption. If research fishing proved to be successful, the private sector could be encouraged to develop this fishery for local use and possibly for export.

**Suggestion 192:** That the Fisheries Department conduct some research in squid fishing, both for bait and for human consumption, with the private sector encouraged to develop this fishery if trials are successful.

#### **5.10 Value-adding processes as development options**

Tuvalu has a wide range of constraints to developing economically-viable fishing and processing operations, both in Funafuti and the outer islands. Without major developments in the basic infrastructure of the country, which have been identified in earlier sections of this report, development options are limited. It is easy to increase the production of fish in Tuvalu, with the re-introduction of FADs or other small-scale and medium-scale fishing techniques, although marketing becomes the main problem area, both in actual transport out of the country, and in cost. Given the problems with getting export items out of the country, it makes sense to do as much processing in-country as possible, to minimise the weight of product being exported and maximising the per kilo value of the item to be exported. For fish products, value-adding through small-scale processes would appear the most logical approach given the current situation in Tuvalu.

Small-scale value-added processes are stressed here, as larger scale value-adding, like the production of canned tuna, smoked product, tuna loining, *arabushi* or *tetaki* production for the Japanese market, all require resources that are not readily available in Tuvalu, such as availability of land, adequate fresh water supply, consistent electricity supply, adequate fire wood for smoking processes, adequate processing facilities and chiller and freezer storage. The list could continue. Section 5.7.6 of this report touches on the possibility of small-scale value-adding processes, and this is explored more here.

Australian aid funded the production of dried fish products in the outer islands of Nukufetau and Nanumea from 1995 to 1997. Anecdotal information indicates that the projects were successful at producing a good quality product, although whether this was economically viable or not is not known. The Fisheries Department should make an assessment of this work so that any problem areas that were identified can be examined and rectified in future projects. This in itself would be a good first step towards future development in this area.

**Suggestion 193:** That the Fisheries Department assess the report from the Australian-funded dried fish projects in Nukufetau and Nanumea, as a first step towards future development in this area.

The logical value-added processes to use in Tuvalu are salting and drying, and the production of tuna jerky with different flavours. The salting and drying of fish is already conducted in many parts of the country, although these techniques plus the necessary techniques to produce different flavoured tuna jerky could be further introduced through the running of specific workshops in areas where there is an interest. This would especially hold true in the outer islands where there are government owned and run CFCs, who are looking to buy and sell fish products. Therefore there is a ready market, provided the price is sufficient to make this viable. The Fisheries Department Extension service should acquire the necessary skills (possibly request assistance from regional organisations), if they do not already possess them, and start to introduce the techniques for producing salted and dried fish and different flavoured tuna jerky.

**Suggestion 194:** That the Fisheries Department look at organising one or two workshops to demonstrate the techniques for producing salted and dried fish and different flavoured tuna jerky, drawing on expertise from local regional organisations if necessary.

**Suggestion 195:** That the Fisheries Department actively promote the development and expanded production of small-scale value-added products, especially in the outer islands.

If people start to produce value-added products, this will encourage more people to catch the fish and make them available for sale to those who are processing them. Alternatively, some people may want to catch their own fish for processing. Regardless, there is scope for the Fisheries Department to assist

all sectors with the provision of information on different catching and processing techniques. Additionally, the Fisheries Department and NAFICOT could be assisting with market research on new markets for salted and dried fish and tuna jerky, or possibly other small-scale value-added processes that could be introduced to Tuvalu.

**Suggestion 196:** That the Fisheries Department and NAFICOT conduct some market research on new markets for salted and dried fish and tuna jerky, or possibly other small-scale value-added processes that could be introduced to Tuvalu.

NAFICOT, being responsible for buying and selling fish in Tuvalu, should take the lead in developing overseas markets for salted and dried fish products and tuna jerkies, as a matter of urgency. They should be setting the standards for the product based on market requirements, and actively promoting this in the communities that produce these products. This could be done by working with the Fisheries Department Extension Service, and incorporating this information in the workshops that are run. This would allow expansion of fish production in Tuvalu, through a low-technology process, and generate employment in outer island communities.

**Suggestion 197:** That NAFICOT as a matter of urgency, develop overseas markets for salted and dried fish products and tuna jerkies, providing information to the producers on market requirements for the products.

## **6. CONCLUSION**

The general prospect for developing a domestic tuna fishery in Tuvalu is limited at present. The best initial approach will be for the government, through the Fisheries Department and NAFICOT, to compile a specific development plan for the domestic tuna fishery. This report provides some useful information and suggestions that could be used in the development of such a plan. However, the plan needs to be developed with the input of the different stakeholders in Tuvalu, so that they feel some ownership of the plan and support it.

There are major infrastructure needs to be addressed to provide a climate for the private sector to develop. These infrastructure needs include a safe anchorage for vessels, a longer runway so that larger aircraft with greater freight carrying capacity can land in Tuvalu, and the availability of electricity and fresh water in the amounts needed. Land availability is also an issue, which will limit the possibility of processing facilities being constructed for exporting fish or fish products.

The single most important issue that will assist development in the tuna fishery is the establishment of export markets for the fish, in a whole or processed form. However, the markets have to pay a price that will make it viable for NAFICOT, the outer island CFCs, and the fishermen themselves. This will be very difficult as the freight costs alone from Tuvalu to potential markets are very high, and in some cases higher than the purchase price of the fish. This is mainly due to there being irregular shipping and the limited amount and the high price of airfreight space. Addressing the infrastructure issue regarding the runway should greatly assist this.

An alternative approach could be to focus on value-adding to the tuna catch, especially in the outer island CFCs. This would result in a higher valued product being produced with reduced weight compared to whole fish. Value-adding processes could include salting and drying and the production of tuna jerky. With products like these where they have a longer shelf-life and do not necessarily need refrigeration, sea freight can be used provided the product can reach the market in a reasonable timeframe.

If viable markets can be established and a reasonable price paid to the fishermen for their tuna catch, then the Fisheries Department can look at ways to promote the catching side. This could be in several forms. First, a FAD programme could be established to provide specific fishing locations for tuna fishing. The Fisheries Department could then provide training for local fishermen, including the



introduction of mid-water fishing techniques used in association with FADs, and better handling practices for the catch including the correct use of ice. Training could also be provided to fishermen in medium-scale fishing techniques, especially tuna longlining, as a means to encourage local fishermen to invest in larger vessels.

The government's policy is to remove itself from commercial activities and to promote private sector development. This is especially needed in fisheries, with both the Fisheries Department and NAFICOT needing to cease certain commercial activities as soon as possible. However, there is a longer-term role for NAFICOT to play as the wholesaler of fish in Tuvalu, as there is no way this will be taken up by the private sector in the short-term. The government should continue with their aim of privatising NAFICOT, although it will need to be a money-making venture before the private sector will invest in it.

Training will also be needed in a range of other areas. The Fisheries Department staff involved in the implementation of the National Tuna Development and Management Plan will need specific training in this area. Skippers and crew for fishing vessels will also need specific training as well. There is also a need for training within the support sector, so that there are properly qualified trades people available to provide the maintenance services that fishing vessel will need. The training will come over time, especially if the infrastructure needs are addressed and local people become involved in developing a domestic tuna fishery.

### **People consulted during the study**

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- Sautia Maluofenua, Director of Fisheries
- Taeka Satupa, Finance Manager, Tuvalu Electricity Corporation
- Tapaeko Apisai, Technical Advisor, Public Works Department
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- Vale Sinnapati, Acting Director, Marine and Ports Service
- Ms Talime Teponga, Clark, Tuvalu Telecommunications Corporation
- Tui Teii, Senior Customs Officer, Department of Customs and Taxation Control
- Lotoala Metia, Secretary for Works, Energy and Communication
- Vitoli F. Iosefe, Travel Officer, Government of Tuvalu
- Talaa Mataika, Fisheries Extension Officer (with CFCs)
- Captain Tito Tapungao, Chief Executive Officer, Tuvalu Maritime Training Institute
- Satalaka Petaia, Managing Director, National Fishing Corporation of Tuvalu (NAFICOT)
- Brendon McHarg, Maritime Surveillance Adviser, seconded from the Australian Navy
- David Manuella, Director, Department of Education
- Olapea Apinelu, Loan Recovery Supervisor, Bank of Tuvalu
- James Conway, Technical Adviser to the Office of the Prime Minister
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- Ioata Taulialia, Acting Director, Department of Foreign Affairs
- Simeti Lopati, Secretary of Tourism, Trade and Commerce
- Ms Feta Titi, Higher Executive Officer, USP Campus, Tuvalu
- Vete Sakaio, Manager, B.P. Tuvalu
- Taukave Poolo, General Manager, Development Bank of Tuvalu
- Peter Drown, Adviser (ASOP volunteer) to the Manager of the Development Bank of Tuvalu
- Soloseni Penitusi, commercial fisherman
- Viliamu Siuele, Observer, Surveillance and Licensing Section of Fisheries
- Simeona Iosia, Secretary General, Funafuti Town Council
- Capt. John Hensford, Alpha Pacific Navigation Ltd.
- John Mellors, Consultant working on Public Sector Reform in Tuvalu

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