



Secretariat of the Pacific Community

FIELD REPORT No. 22

on

**DEVELOPMENT OPTIONS AND
CONSTRAINTS INCLUDING TRAINING
NEEDS AND INFRASTRUCTURE
REQUIREMENTS TO DEVELOP A
DOMESTIC TUNA FISHING
INDUSTRY AND SUPPORT
SERVICES IN TOKELAU**

28 August to 10 September 2003

by

Lindsay Chapman
Fisheries Development Adviser

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Secretariat of the Pacific Community
BP D5
98848 Noumea Cedex
New Caledonia

Tel: (687) 26 20 00
Fax: (687) 26 38 18
e-mail: fishdev@spc.int
<http://www.spc.int/coastfish>

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SUMMARY

The Secretariat of the Pacific Community (SPC) was requested to provide input to the drafting of a tuna fishery management and development plan by the Tokelau Department of Natural Resources and the Environment and the Forum Fisheries Agency (FFA). This was a collaborative project coordinated between Tokelau and FFA with input from several sections of SPC. Fieldwork was carried out between 28 August and 10 September 2003, and this report is the input provided to the process.

There is good potential for developing domestic tuna longline fishing operations in Tokelau, because the resource is known to frequent the Tokelau EEZ. However, the government needs to provide an enabling environment with basic infrastructure to encourage development in the private sector. This will not be easy with the very limited infrastructure currently in place.

There is a range of infrastructure needs that the government can examine to see which are achievable in the short term. The idea of expanding a passage at each atoll to allow vessels to enter the lagoon needs to be explored more, including environmental impact assessments. Wharves and other shore facilities can also be explored and included in the environmental impact assessment. This would provide safe anchorages for small-scale and medium-scale longline vessels, which hopefully would encourage the private sector to invest in such vessels.

Transport is a major limiting factor to development, with only sea freight being an option at present. The use of a seaplane is an option, and a full assessment of the feasibility of such an operation needs to be explored. If it is deemed to be feasible, then a further assessment needs to be made on the size of seaplane that can be used that would be viable for both passenger and cargo use. The other alternative is to have an airfield constructed on one of the three atolls. A previous study has been undertaken on this and sites identified. A decision needs to be made by the Tokelau Government on this and funding identified if this is to proceed.

The Government of Tokelau is going to implement a 5-year FAD programme to assist local subsistence and artisanal fishermen. This will be implemented at all three atolls, with materials purchased including spares, with two or three FADs deployed initially at each atoll. Mid-water fishing techniques can also be introduced through the running of workshops at each atoll. Coupled with the FAD programme could be a donor-funded, and SPC implemented, tuna fishery development project for Tokelau. This will use the existing alia-type vessels in Tokelau. The vessels will be refitted to bring them back into fishing operation. SPC will provide technical assistance in training up the crews of the vessels and conducting fishing trials. The vessels will land their fish to the freezer complexes at Nukunonu and Fakaofu for processing and freezing. The frozen fish, plus some fresh fish on ice in insulated fish boxes, will be transported to Samoa on board F/V *Tokelau* for sale to a fish buyer there.

There is also the potential for developing small-scale value-adding to product to reduce freight costs and hopefully increase returns to the country on a per kilo basis. The production of tuna jerky is one option that has been tried in the past, and this could be explored again. Any facility constructed for value-adding though, will need to meet all health requirements and standards, as well as a HACCP plan developed for each facility. Salting and drying is another value-adding process that can be explored, although marketing prospects may be limited.

Training is an area that the government needs to examine, especially in the areas of implementing the tuna development and management plan, surveillance and compliance, observer coverage, and the lack of trained skippers and engineers for developing domestic tuna longline operations. The last point is an important one as there are very few people with skills in hydraulics and refrigeration, which are essential for an engineer working on a medium-scale tuna longline vessel.

RÉSUMÉ

Le Secrétariat général de la Communauté du Pacifique (CPS) a été invité à participer à l'élaboration d'un plan de développement et de gestion de la pêche thonière par le Ministère des ressources naturelles et de l'environnement de Tokelau, et l'Agence des pêches du Forum (FFA). Il s'agit d'un projet mené en collaboration par Tokelau et la FFA auquel ont participé plusieurs sections de la CPS, et dont fait état le présent rapport. Des travaux sur le terrain ont été effectués entre le 28 août et le 10 septembre 2003.

Il existe à Tokelau un bon potentiel de développement de la pêche thonière à la palangre puisqu'on sait que la ressource est présente dans la zone économique exclusive. Toutefois, les pouvoirs publics ont besoin de fournir des conditions propices à l'action ainsi qu'une infrastructure de base pour favoriser le développement du secteur privé. Il ne s'agira pas d'une tâche facile compte tenu des installations limitées qui existent actuellement.

Il existe toute une gamme de besoins en matière d'infrastructure que doivent examiner les pouvoirs publics pour déterminer les projets prioritaires réalisables à court terme. L'élargissement d'une passe dans chaque atoll permettant aux navires d'entrer dans le lagon est une idée qui mérite d'être approfondie et qui doit notamment faire l'objet d'études d'impact sur l'environnement, tout comme la construction éventuelle de quais et d'autres installations à terre. De telles infrastructures constitueraient des mouillages sûrs pour les palangriers de petit à moyen tonnage, ce qui pourrait inciter le secteur privé à investir dans de tels navires.

Le transport représente un frein majeur au développement, le fret ne pouvant être acheminé actuellement que par voie maritime. Le recours à un hydravion est envisageable, bien qu'il soit nécessaire d'effectuer une étude complète de faisabilité à ce sujet. Si une telle étude était concluante, il conviendrait de réaliser une étude complémentaire sur la taille de l'appareil nécessaire, lequel pourrait servir à la fois au transport de passagers et de marchandises. L'autre possibilité est de construire un aéroport sur l'un des trois atolls. Une étude a déjà été menée à ce sujet, et des sites ont été identifiés. Une décision doit être prise par les pouvoirs publics de Tokelau, et il conviendrait de trouver un financement si le projet devait se concrétiser.

Les pouvoirs publics de Tokelau comptent mettre en œuvre un programme de mouillage de DCP d'une durée de cinq ans pour venir en aide à la pêche artisanale et de subsistance. Les matériaux nécessaires à la fabrication des DCP seront achetés, y compris les pièces de rechange, et l'on commencera par déployer deux ou trois DCP dans chacun des trois atolls. Des ateliers seront également tenus à chaque endroit pour aider les pêcheurs à se familiariser avec les techniques de pêche semi-pélagique. En plus du programme de mouillage de DCP, la CPS pourrait mettre en œuvre le projet de développement de la pêche thonière avec le concours financier d'un bailleur de fonds. Ce projet fera appel à des navires existants de type-*alia*. Les navires seront regrées pour qu'ils puissent de nouveau être utilisés pour la pêche. La CPS fournira une assistance technique pour former les équipages des navires et effectuer des essais de pêche. Les navires débarqueront leurs prises dans les installations de congélation de Nukunonu et de Fakaofo à des fins de traitement et de congélation. Les prises congelées, ainsi que du poisson frais sur glace mis dans des glacières, seront expédiés au Samoa à bord du navire de pêche Tokelau, afin d'y être vendus.

En outre, des possibilités existent pour la création d'entreprises artisanales de valorisation du produit de la pêche dans le but de réduire les coûts du fret, voire peut-être d'accroître le revenu par kilo généré par la filière. La production de la charque de thon est une activité qui a été mise à l'essai par le passé et qu'il conviendrait de nouveau d'étudier. Toute installation construite à des fins de valorisation doit respecter les exigences et les normes en matière de santé, tant locales qu'internationales, chaque installation devant faire l'objet d'un plan HACCP. Le salage et le séchage constituent un autre processus de valorisation qui peut être envisagé, bien que les perspectives de commercialisation puissent être limitées.

La formation est un autre domaine auquel devraient s'intéresser les pouvoirs publics, notamment en ce qui concerne la mise en œuvre du plan de gestion et d'une stratégie de développement de la pêche thonière, des contrôles et de la conformité, et de la couverture assurée par les observateurs. C'est aussi

par la formation que pourra être comblée la pénurie de capitaines et de mécaniciens qualifiés qui pourraient contribuer au développement des entreprises locales de pêche thonière à la palangre. Dernier point, et non des moindres : le pays manque cruellement de personnes possédant des compétences en hydraulique et en techniques de réfrigération, qualifications essentielles pour tout mécanicien employé à bord d'un thonier palangrier commercial de taille moyenne.

SUMMARY OF SUGGESTIONS MADE IN THE REPORT

Infrastructure requirements

1. That the government have a study done to identify appropriate locations for a passage and a costing for work needed at each of the three atolls in Tokelau.
2. That an environmental impact assessment be undertaken for each site or area identified in the study.
3. That the government decide on the size of vessel they want entering the lagoon at each atoll, so that parameters can be set around the size of the passage needed at each atoll, with this considered during the study and environmental impact assessment.
4. That if enlarged passages are made, the government have a study undertaken to identify suitable sites for the building of wharves at each atoll, taking into consideration the size of vessel to use the wharf, the depth of water needed alongside the wharf, the availability of land for construction, and the availability of both fresh water and electricity to the site or area.
5. That the study include an environmental impact assessment of the effects of constructing wharves at the identified sites or areas.
6. That care is taken to identify all land owners for any land chosen as potential sites for building wharves or shore facilities.
7. That in the case of Fakaofu and Nukunono, land adjacent to existing freezer facilities would be the most appropriate for any additional tuna fishery related shore facilities to be constructed.
8. That if land is in short supply on the main island where people live, consideration be given to constructing tuna fishery related wharves and shore facilities on a separate island at each atoll.
9. That a full environmental impact assessment be undertaken at each location before any construction is considered on identified land for tuna fishery related infrastructure.
10. That the government not consider the construction of a slipway in Tokelau unless one or more atolls have an enlarged passage to the lagoon to allow medium-scale vessels to enter.
11. That in the event that one or more atolls have a passage enlarged, the government consider the construction of a slipway at one atoll only, with this to service the vessels from all three atolls.
12. That if and when a slipway is considered for Tokelau, a study be undertaken to assess the size of the slip needed, the location and the environmental impact of constructing such a facility.
13. That the government look at providing scholarships or incentives to young school leavers to take up apprenticeships in carpentry or welding, with the people working for government or entering the community workforce at the end of their training.
14. That the government look at providing scholarships or incentives to young school leavers to take up apprenticeships or vocational training to become engineers or electricians, with the people working for government or entering the community workforce at the end of their training.
15. That the government encourage the Men's Group on each atoll to work together to bring in the fishing gear and sea safety equipment in bulk to meet their needs and reduce overall costs.
16. That the government assist the Men's Group through ensuring that no duty or taxes are payable on fishing gear and sea safety equipment.
17. That the Men's Groups look at bringing in VHF radios and small GPS units as basic sea safety equipment for their use.
18. That the communities on Nukunono and Fakaofu use their commercial blast freezer to make ice in the short term for tuna longline fishing trials, while storing bait in their holding freezer.
19. That a standard size mould be used for making ice at Nukunono and Fakaofu with an ice crusher used to crush the blocks into a usable form for chilling fish.
20. That the community, when looking at bait needs, also consider selling bait to local fishermen for their small-scale fishing operations.

21. That the communities on Nukunonu and Fakaofu look at purchasing block ice makers with a capacity of at least one tonne per day per location and an ice crusher to suit the size of blocks made, to overcome the ice situation in future.
22. That the community of Atafu decide if and when they will proceed with the construction of their freezer complex, and if they proceed they purchase a block ice machines with at least one tonne per day capacity and install this at the same time.
23. That any new fishing enterprise to be established in Tokelau for tuna fishing will need to have their own ice making facility to meet their needs for both their fishing and processing operation.
24. That any new tuna fishing ventures look at RSW as an alternative chilling medium to ice for their fishing vessels.
25. That the Taupulega or Men's Group look at importing bait from Samoa and storing it for sale to small-scale operators and their alia-type longliners.
26. That any commercial tuna longline operator working from Tokelau work out the purchasing of bait and its storage in Tokelau to ensure their fishing vessels can keep fishing.
27. That the communities on each atoll only look at bringing in export packing materials when the need arises and that the appropriate material be brought in for the product to be exported, especially value-added products.
28. That any company entering into tuna longlining activities and/or processing for export, ensure they bring in their own bait and export packing materials to suit the product they plan to export.
29. That if a company starts to import bait for their fishing operation, they bring in extra to sell to local fishermen that require it.
30. That the communities on each atoll consider purchasing and installing a small desalination plant with large storage tanks in support of their freezer complex, future ice making and processing needs, and the needs of the local population in times of water shortages.
31. That any new processing facility, regardless of fresh water capacity requirements, should have a desalination plant and large storage tank as part of their operation.
32. That any new fish processing facility include the provision of a filtration or purification system to ensure fresh water quality to meet any export health and sanitation requirements.
33. That the generators that came with the freezer units be installed as part of each freezer complex and used to generate power to operate the blast freezer unit.
34. That whenever the freezer complex generator is in operation, it provide power to both the blast and holding freezers.
35. That a switchboard be installed at each freezer complex to allow the holding freezer to be operated from either the town power or generator power, with town power used whenever the blast freezer is not in operation.
36. That if a passage is expanded at one of the atolls to allow larger vessels access to the lagoon, then the installation of a small bulk fuel facility could be considered for that atoll.
37. That the Government of Tokelau either ensure more fuel is taken to the atolls on each fuelling trip, or the fuelling trips should be conducted more frequently to avoid fuel shortages on the atolls.
38. That a minimum of one month's supply of diesel be held at each atoll in reserve for emergency use when needed.
39. That any fishing operation being based in Tokelau order enough fuel ahead of time to ensure that there is no shortage and their fishing vessels can continue to operate.
40. That the government of Tokelau and the Taupulega of Nukunonu fully support the private sector tuna longlining operation to give it every chance of success.
41. That the government allow and encourage the local private sector to bring proven tuna longline vessels to fish in Tokelauan waters.

42. That the government monitor the arrangements used by the private sector to bring in tuna longline vessels, to ensure that a local is not being used as the front person for a foreign company trying to gain access to Tokelauan waters.
43. That the government, through the Taupulega at each atoll, develop a HACCP plan for the freezer facilities, and have staff trained appropriately to implement the plan, so fish can be exported to fish buyers in Samoa.
44. That the Government of Tokelau carefully consider the construction of one airfield, and identify which atoll this will be constructed on.
45. That the Government of Tokelau have a study undertaken on the feasibility of operating a seaplane in the Tokelau situation, and if feasible, what size the seaplane would need to be, to be viable/profitable for both passenger and fish cargo transportation.

Training needs and requirements

46. That the private sector or government look at either sending crew selected for tuna longlining to Samoa for training, or they bring suitable trainers and equipment to each atoll in Tokelau, so that the prospective crew can gain a sea safety certificate.
47. That the government arrange for training in Tokelau on the correct handling, processing and preservation of the catch as sea, possibly through the proposed tuna longlining project.
48. That the government identify potential skippers and have them sent overseas for some basic training, possibly having these people under a cadetship arrangement.
49. That the government in the short-term send several people overseas for training in outboard repairs and maintenance, and possibly basic hydraulics.
50. That the government in the longer-term send several people overseas for training as engineers, with a focus on diesel engines, hydraulics and refrigeration.
51. That the government consider having all training under a cadetship arrangement to ensure the trained people come back to Tokelau and use their skills.
52. That the Fisheries Department assess the needs of small-scale tuna fishermen at each atoll, and identify the most appropriate training for each location.
53. That the Fisheries Department either organise, or identify the appropriate group to organise, tailored training in the form of hands-on workshops, with the most appropriate people used for the training.
54. That the government identify an appropriate training institution and have a course developed on managing a small fishing business for Tokelau, with the course delivered at each atoll by the institution.
55. That the Fisheries Department support Tokelauans entering or expanding their fishing business to a larger-scale, by nominating them to attend the annual SPC/NZSOF Enterprise Management Course, to develop better business management skills.
56. That the government make HACCP training a high priority for staff involved with the freezer facilities at Fakaofu and Nukunonu.
57. That the Tokelau Government, approach USP and request that some students be encouraged to look at new value-added products for tunas and byproduct species, that could assist local product development.
58. That the Tokelau Government, provide several scholarships for Tokelauan students at USP in the field of food technology, with their thesis to be on product development or another host-harvest activity.
59. That the government look at cadetships or even apprenticeships to get people trained in all trade areas.
60. That the government recruit additional staff to the Fisheries Department as a matter of urgency to ensure there are adequate staff for the implementation of future tuna fishery development and management arrangements.

61. That the government ensure that at least one Fisheries Officer in based on each atoll in future.
62. That the Fisheries Department identify environmental science and fisheries science, with a focus on tuna, as areas requiring qualified staff, and request the government to offer scholarships in these fields.
63. That the Fisheries Department arrange for staff involved in the implementation of the National Tuna Development and Management Plan to receive training, either through a USP course, by sending them overseas on recognised courses, or by entering into a job exchange programme with a recognised agency involved in fisheries management and/or fisheries development.
64. That the Fisheries Department fully implement the requirements of VMS in all future fishing access agreement under the terms and conditions of access.
65. That the Fisheries Department implement VMS as a requirement for larger domestic tuna fishing vessels.
66. That the Fisheries Department and other relevant government departments identify specific areas of training for surveillance and compliance officers, and approach Australia or New Zealand for assistance with the provision of a suitable trainer in the areas identified.
67. That the Fisheries Department request both FFA and SPC to assist in the setting up and running of an observers workshops, or possibly a sub-regional workshop with neighbouring countries participating as well.
68. That the Fisheries Department preferably select non-government employees as observers, to increase the skills of Tokelauans in the private sector workforce, with the Fisheries Department employing these people on an as-needs basis.
69. That the government train up some port samplers to collect data from any planned domestic tuna longline fishing activities, or use observers for this task once some people have been trained.

Constraints and options for development

70. That the Government of Tokelau focus on providing basic infrastructure needs that will create an enabling environment for private sector development in the fishing sector.
71. That as the private sector expands in different areas, the government or community, withdraw from these areas and allow the private sector to expand and prosper.
72. That tuna longlining trials be conducted, and if the trials are successful, these results should be provided to the private sector to promote development.
73. That if initial trials are unsuccessful, an assessment of where things did not work be made, so that additional trials can be planned and conducted, with the results presented to industry.
74. That the government consider providing subsidised freight rates to fish being exported as part of tuna longline fishing trials.
75. That the appropriate government department develop and implement regulations similar to those being proposed in Kiribati for qualifications and manning levels for the fishing industry.
76. That the Fisheries Department work together with the appropriate government department to develop workable requirements for sea safety appliances, based on size of vessel and area of operation.
77. That the Fisheries Department put a funding proposal together to establish VHF radio base stations on each atoll, with a requirement for local fishermen to have hand-held VHF radios, with the purchase of these radios possibly subsidised to encourage their use.
78. That the Government of Tokelau retain their current no duty or tax policy on imported goods that are used in the fishing industry.
79. That the Government of Tokelau look at dropping the six per cent duty on fuel as an incentive to developing a domestic tuna longline fishery.
80. 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 Tokelau EEZ, to carry an observer from time to time.

81. That the Fisheries Department seek government approval to implement an observer fee of USD \$1000/licence/year for foreign fishing vessels.
82. That the Fisheries Department consider implementing an observer fee of USD \$300/licence/year for domestic medium-scale tuna vessels.
83. That the Fisheries Department collect a 'development fee' as an additional charge or portion of a licence under the Plan, and deposit these funds in a trust fund/account for specific work in fisheries development or possibly research.
84. That the 'development fee' be set at around USD \$1000/licence/year for foreign fishing vessels, and around USD \$300/licence/year for local medium-scale tuna vessels.
85. 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.
86. That the Fisheries Department make it a licensing condition that all foreign tuna fishing vessels complete the appropriate SPC logbook when fishing in Tokelau waters.
87. That the Fisheries Department adopt the SPC regional tuna longline logbook for domestic tuna longlining activities, and make the completion of this logbook a licensing requirement.
88. That the Fisheries Department seek assistance from SPC to develop a simple logbook for the small-scale domestic tuna fishery, with the catch split by fishing method, and have fishermen complete it and provide a copy to fisheries each month.
89. That the Government of Tokelau assist Tokelauans in developing a standard contract for employment on foreign vessels, with the Kiribati contract possibly used as a model.
90. That once the observer programme is running, the Fisheries Department work with SPC's OFP to set the level of observer coverage and any specific scientific data requirements.
91. That regardless of whether or not the funding mechanism of a development fee on foreign fishing licences is implemented, the Fisheries Department looks at options for ongoing funding of a FAD programme.
92. That the Fisheries Department with technical assistance from SPC, implement a five-year FAD programme under the National Tuna Development and Management Plan, for Tokelau.
93. That the FAD programme being implemented under the National Tuna Development and Management Plan, have the following requirements:
 - 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.
94. That the Fisheries Department seek funding for a deep-water echo sounder (rated to 2500–3000 m) through either the proposed development fund or through government budget.
95. That SPC assist and train Fisheries Department staff in the conducting of site surveys, and the rigging and deployment of FADs as part of their 5-year FAD programme as developed under the National Tuna Development and Management Plan.
96. That the Fisheries Department look at introducing mid-water fishing techniques in association with FADs, through a series of workshops, using participant's vessels to conduct practical fishing trials.
97. That the Fisheries Department approach SPC for technical assistance in running the first couple of workshops to train up fisheries staff, with these staff conducting future workshops.
98. That the government not look directly at the user-pays approach for funding FADs, but rather consider the implementation of a small licence fee for all vessels, with all or part of the fee funding the on-going FAD programme.

99. That the Fisheries Department assist the Men's Group to put a list of specific gear needed for mid-water fishing techniques and possible overseas suppliers, so that this gear can be purchased and made available for sale to local fishermen after the methods are introduced.
100. That the Fisheries Department, SPC and the communities on each atoll work together to ensure the best success of the planned tuna longline fishing trials and training.
101. That the Government of Tokelau identify funding to cover the restoration of the six alia-type longline vessels including the outboards and fishing gear.
102. That the community, through the Taupulega at each atoll, be responsible for maintaining the vessels at their respective atolls in future, possibly through retaining a small percentage of the catch value and placing this in a maintenance fund account to be used as needed.
103. That the crew of the vessels be paid their normal community wage, plus a bonus based on a small percentage of the catch value.
104. That the owner of the private sector vessel make his own arrangements for paying the crew on his vessel.
105. That the government consider subsidising the cost of electricity, the same as they do for residents on each atoll, to assist the fishing trials.
106. That during the fishing trials, good records of power usage be kept on the freezers so that an assessment can be made of the economic viability of this type of operation in Tokelau.
107. That the Taupulega at Nukunonu and Fakaofu look at retaining a small percentage of the catch value to put into a fund to maintain the freezers and to cover running costs.
108. That given the current situation on Atafu with there being no freezer complex, the two vessels and crew from Atafu be moved to one of the other two atolls for the planned fishing trials and training.
109. That if the planned longline fishing trials and training are to be conducted off Atafu, then the freezer complex needs to be constructed and be operational for this to occur.
110. That insulated fish boxes be used when moving fish from the catching vessels to the freezer and from the freezer to the transport vessel, to maintain a controlled temperature of the product.
111. That the Fisheries Department, with assistance from SPC, set up a training programme to familiarise small-scale fishermen with tuna longlining gears, possibly through workshops including sea time to undertake trial sets.
112. That people in the private sector wishing to purchase a second-hand tuna longliner seek advice from experienced people, including SPC, on the vessel parameters needed for this type of fishing operation.
113. 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.
114. 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.
115. That Tokelauans in the private sector wishing to purchase a medium-scale longliner consider basing their operation out of Samoa or American Samoa.
116. That an assessment of the sale price be undertaken for main species, fresh and frozen, so that where possible, fish are sent to Samoa in the form that will bring the highest price.
117. That the fishermen at each atoll keep in regular communication with the Samoan fish buyer to ensure that only fish that have a good market value at the time are being sent.
118. That the Fisheries Department encourage local small-scale vessel operators and future medium-scale tuna longline fishermen to purchase sea safety equipment for their vessel, with the government assisting with the provision of a soft loan for the initial purchase of the gear.
119. That the Fisheries Division develop or request materials from SPC, and run an awareness campaign on sea safety and the use of safety equipment, for all small-scale fishermen.

120. That the Government of Tokelau focus on supporting and encouraging small-scale value-added processes and not large scale processes in the immediate future.
121. That the government encourage and support in what ever way it can, the development of companies or community activities focused on small-scale value-added processes such as producing tuna jerky.
122. That any processing facility for value-added products be constructed and fitted out according to health requirements and a HACCP plan developed for each facility.
123. That before any value-adding for export takes place, either SPC or USP be approached to provide information and training.
124. That the government support and encourage the development of small-scale salting and drying projects.

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1. INTRODUCTION

The information contained in this report forms a specific component to develop a 'National Tuna Fishery Development and Management Plan' (NTFDMP) for Tokelau. The NTFDMP will be drafted by the Forum Fisheries Agency (FFA), in consultation with the Tokelau Department of Natural Resources and the Environment and the Taupulega (Council of Elders) on each of the three atolls, and drawing on input from other sectors involved or interested in the tuna fishery. This report forms the basis of the development component of the NTFDMP, which includes training needs and infrastructure requirements, with a focus on small-scale and medium-scale development in the tuna fishery.

This component of the overall programme has the following specific Terms of Reference. The fisheries development specialist shall:

- (i) assess the feasible options that are available for tuna fishery development in Tokelau, focusing on the scope for tuna longline development;
- (ii) identify constraints to further development of the country's tuna resources;
- (iii) identify potential infrastructure developments that would promote future tuna-related development;
- (iv) review the current availability of skilled fisheries-related personnel in-country (such as vessel officers, crew, welders, electricians, refrigeration mechanics, vessel managers, and so on) and, for the different tuna development options available, identify those skills for which additional in-country and/or regional training is required;
- (v) discuss these issues with relevant national stakeholders, FFA staff, and other members of the project team;
- (vi) produce a written report addressing the above issues; and
- (vii) as part of the project team, assist FFA to prepare and review those sections of the draft NTFDMP relating to the above issues.

The Fisheries Development Adviser of the Secretariat of the Pacific Community, Lindsay Chapman, travelled to Tokelau (28 August to 10 September 2003) to undertake this work. Initial meetings were held with senior staff of the Department of Natural Resources and the Environment, who then set up meetings with the Taupulega as well as with the Men's Groups, Youth Groups and Sports Groups on each of the three atolls. Consultations were held with a large number of stakeholders, and many reports were reviewed to gather the information compiled in this report. Appendix A provides a list of the people or groups consulted, while Appendix B provides a bibliography of the reference materials.

The suggestions contained in this report are based on information collected during fieldwork at the three atolls. The suggestions do not account for any changes that may have occurred to legislation or other circumstances, since the time of this work. Therefore, some of the information and suggestions may not now be relevant based on changes that may have occurred since the time the fieldwork was undertaken.

2. BACKGROUND

2.1 General

Tokelau is a territory of New Zealand with the 2001 census showing a population of 1428 people actually living in the country. It is also estimated that over 5000 Tokelauans live in New Zealand with another 87 living in Samoa. The country itself is made up of three atolls, Nukunonu, Fakaofu and

Atafu, with the administrative centre rotating between the atolls annually. Transport to and from Tokelau is by boat, with a regular shipping service out of Samoa every couple of weeks.

Tokelau is situated in the central Pacific between 6° and 11°S, and 167° and 176°W. The three atolls have a total land area of 10 km², with low-lying islets encircling the lagoons, which have a total area of around 165 km². In contrast, the Tokelau EEZ covers an area of around 309,748 km² and borders five other countries or territories — the Phoenix Islands group of Kiribati, Wallis and Futuna, Samoa, American Samoa and the Cook Islands.

2.2 Nearshore fisheries

Tokelau has a strong fishing tradition, both in the lagoons of each atoll and on the high seas, that dates back to the 1800s. When fishing outside the reef for tunas and other pelagics, the main traditional methods were mid-water handlining, poling using pearlshell lures, trolling from sailing canoes and noose fishing. Of these methods, fishing offshore tuna schools from traditional outrigger sailing and paddling canoes using a pole with pearlshell lures was the most common, although it required a lot of skill.

Tuna fishing activities have been conducted in the vicinity of Tokelau since the late 1950s/early 1960s, with tuna longline data being available from 1962 for distant water fishing fleets. Japan was the first nation fishing in the vicinity of Tokelau, followed by Korea and then Taiwan. Albacore tuna was the target species in the early years (over 50% of the annual catch from 1962 to 1974), with Japan changing to target bigeye and yellowfin tuna as the sashimi market developed in Japan. Korea changed over to targeting bigeye tuna in 1975. From 1975 the main tuna species taken changed to yellowfin with increased catches of bigeye tuna, as albacore catches dropped off to less than 25 per cent of the total annual catch.

The 1970s, also saw some of the traditional fishing methods and gear change with the introduction of modern equipment, such as outboard engines, commercially-made dinghies or skiffs (fibreglass and aluminium), trolling lures etc. In 1979 it was estimated that there were 244 private fishing craft in Tokelau, with about half of these being large and small canoes and the other half being classified as open motor boats. It was also noted that some canoes used outboard engines in preference to sails, as this made fishing operations much easier.

Pole-and-line fishing by Japanese distant water vessels commenced in the early 1970s in the vicinity of Tokelau. In 1976, 3000 mt of tuna was taken during 292 fishing days by the Japanese pole-and-line vessels working in this area. This was an exceptional year for fishing effort and catch in this area, with catches of less than 500 mt recorded annually during the latter part of the 1970s.

In November 1978, the SPC's Skipjack Survey and Assessment Programme spent five days in Tokelau conducting tagging trials and baitfish surveys using a 192 GRT pole-and-line vessel chartered from Japan. A total of 71 tuna schools were sighted during the five days in Tokelau. The waters adjacent to all three atolls were surveyed with 64 skipjack and one rainbow runner tagged and released off Fakaofu. Baitfishing was conducted in the lagoons of Atafu and Fakaofu, however, modified catching methods had to be used as there was no access to the lagoons for vessels, especially one the size of the project pole-and-line vessel. One attempt was made to use a lampara net at night with light attraction at Atafu, and four day time hauls of a beach seine net were made at Fakaofu. In total 45.5 kg of bait was taken, mainly made up of blue-spot mullet. The poor bait catches thus restricted the ability of the pole-and-line vessel during fishing operations.

Japanese pole-and-line vessels continued to fish in the vicinity of Tokelau in the 1980s with catches and effort fluctuating greatly from one day of fishing for 2 mt of tuna in 1984, to a high of 133 fishing days and a catch of 1389 mt in 1980. Skipjack tuna was the main species taken and generally made up over 95 per cent of the catch.

Longline fishing activity continued in the late 1970s and 1980s in the vicinity of Tokelau. Annual catches fluctuated greatly from a high of 6287 mt in 1980 (around 50% yellowfin, 20% bigeye and 20% albacore) to a low of 764 mt in 1989 (around 45% bigeye, 35% yellowfin and 10% albacore).

Purse seine fishing operations commenced in the vicinity of Tokelau in 1981, with the US fleet arriving in the western Pacific. Other nations, such as Russia, Japan, and FSM also started fishing in this area, although most effort was conducted by the US boats. Catches fluctuated greatly during the 1980s from no catch in 1988 and 1989 to a high of 1605 mt in 1983. This in many cases reflected the seasonal variation in skipjack abundance as a result of changing oceanographic conditions.

The 1980s also saw some small-scale domestic tuna fishery development in Tokelau. Local authorities commenced a fish aggregating device (FAD) programme with the deployment of 9 FADs between the three atolls to assist subsistence fishermen through reducing operational costs for their outboard-powered dinghies. By this time the numbers of traditional canoes was dropping as fishermen changed to aluminium dinghies. With this change came the loss of traditional fishing methods, such as the noose fishing method for coastal pelagics and pole fishing of surface tuna schools with pearlshell lures. To try to assist Tokelau, SPC introduced mid-water fishing techniques used in association with FADs in 1986. The main method introduced was the vertical longline. Unfortunately very few fish were caught during the fishing trials and training, and the method did not catch on.

The 1980s also saw the introduction of deep-water snapper fishing techniques to Tokelau by SPC in an effort to increase fish catches, while reducing operating costs. Tokelau fishermen had traditionally fished for many of these species, for which they had local name, but fishing was conducted on an ad hoc basis. In 1982, SPC conducted their first training in deep-water snapper fishing techniques at all three atolls. This was followed up in 1986 with additional training and test fishing at Atafu and Nukunonu. Low catch rates were recorded at all locations, with the conclusion that the deep-water snapper fishery in Tokelau was limited.

Tokelau's first attempt at fish processing and marketing commenced in 1990 with the establishment of the Kileva Fisheries Project. This was a small processing facility built on Atafu, where local fishermen could sell their yellowfin tuna for processing into tuna jerky. The tuna jerky was of good quality and orders were received for the product. Unfortunately, the project only operated until 1992, when it folding due to the low supply of fish for processing and marketing difficulties.

In 1993, the Tokelau authorities requested technical assistance from SPC in regard to their FAD programme. Training was provided in the conducting of site surveys to locate suitable deployment sites, as well as the rigging and deployment of the FADs. A total of six FADs were rigged and deployed, two at each atoll. Several other replacement FADs were deployed in later years by those trained by SPC. The FADs were reported to work well with good catches being taken. Unfortunately the FAD programme finished in 1998.

The rising costs associated with tuna pole-and-line fishing operations saw a reduction in the use of this method in the early 1990s, and by 1996, no such activity was carried out in the vicinity of Tokelau. Both tuna longlining and purse seining continued in the vicinity of Tokelau. Tuna longline catches fluctuated through the 1990s from 610 mt in 1997 to 2978 mt in 1990. The purse seine catch also fluctuated during the 1990s, from a low of 57 mt in 1990 (there was no catch in 1995) to a catch of 25,386 mt in 1991.

The Government of Tokelau commenced its own domestic tuna longline development project, the Ika project, in 1997. Using their PDF (project development fund) funds administered by the FFA, they purchased six alia-type catamarans from 1998 to 2001, two for each atoll. From 2001 to 2003, two freezer complexes were also established, one on Nukunonu and the other on Fakaofu. Unfortunately only limited fishing activity has occurred with the catch being distributed to the community as the freezers were not operational at the time. This is an ongoing project that will be discussed more in the body of this report.

3. GOAL, OBJECTIVES AND STRATEGIES

The goal, objectives and strategies presented here are for the domestic development of the tuna fishery in Tokelau. However, when looking at development options, careful consideration needs to be given to each atoll, as there are different views and aspirations and each is at a different ‘stage’ of development.

It is noted that the Council of Faipule have produced a ‘Sustainable Economic Development Plan for Tokelau’ with the vision of this being ‘*to improve the quality of life for people in Tokelau*’. Under this vision there are six broad goals:

- A self-sustaining process of **economic growth**;
- Creation of **jobs at acceptable wages** with appropriate benefits and career progression;
- Producing goods and services that meet **social needs** like affordable housing, reliable energy supply at lowered costs, better health care and education;
- **Community control**, accountability and participation in the process of making decisions;
- Broadening **business and asset ownership** within the community; and
- Respect for our unique **cultural heritage** and traditional ways.

3.1 Goal

The overall goal for domestic development of the Tokelau tuna fishery could be:

To have a sustainable and profitable industry harvesting at or near the total allowable catch (TAC), fully owned by Tokelauans living in Tokelau, employing the maximum number of Tokelauans, with maximum retained value in the country.

3.2 Objectives

The objectives of developing a domestic tuna fishery in Tokelau could be:

- Provide an enabling environment that will promote and encourage private sector development in commercial fishing, charter/sport fishing, processing and support sectors in Tokelau;
- Encourage and work with the Taupulega on each atoll in the implementation of the Ika project as a first step to domestic tuna longlining in Tokelau;
- Promote sustainable and responsible domestic development and harvesting of the tuna resource in the Tokelau EEZ in an environmentally friendly way, to provide both food for local consumption and export-oriented income;
- Maximise the benefits and economic return to Tokelauans, local communities, and Tokelau as a whole;
- Create employment and income generating opportunities for Tokelauans at all three atolls;
- Collect accurate data from all tuna fishery activities in Tokelau, ensuring that all bycatch and any interactions with protected species are recorded;
- Ensure that all development within the Tokelau tuna fishery is consistent and compatible with any obligations or requirements as set out in local legislation and/or international agreements that affect Tokelau; and

- Eventually reduce and replace foreign fishing access with Tokelauan owned and operated vessels.

3.3 Strategies

The following are some examples of strategies that can be used to meet the objectives, and overall goal, of developing a domestic tuna fishery in Tokelau.

- Identify infrastructure needs on the three atolls, and develop projects to address the identified needs;
- Develop specific proposals in identified areas for external funding, that will address part or all of the development objectives;
- Look at implementing a licensing policy for foreign vessels with part of the fee going towards the development of domestic tuna fishing operations;
- Target tuna longlining as the most likely method to be successful, economically viable and adopted domestically, and focus development and training on this in the short-term;
- Implement the Ika project to fully assess the economic viability of a locally-based tuna longlining operation;
- Look at options for development, which could include post-harvest activities to increase the value of the landed catch;
- Identify constraints and come up with workable solutions to overcome these constraints;
- Develop and implement a long-term data collection system for all tuna fishing activities in Tokelau, with regular analysis of the aggregated data provided to industry for their information and benefit;
- Review the current government duty and tax on fuel (petrol and diesel) to encourage domestic development in the tuna fishery (all other items used in the fishing industry are tax and duty free at present);
- Provide training for small-scale operators in different fishing techniques and business management, to ensure they have the best chance of running a viable fishing business;
- Use FADs as a means of assisting small-scale operators and develop a project to support an ongoing FAD programme; and
- Develop the capacity of the Department of Natural Resources and the Environment to be able to better manage their tuna fishery and conduct surveillance of the tuna fishery, including the collection of data, the implementation of an observer programme and port sampling.

4. 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 transportation options. In Tokelau's case, the availability of land also needs to be considered.

4.1 Shore facilities

There is currently two small wharf areas on the lagoon side of Fakaofu, plus several areas where small boats can come to the shore at all three atolls in Tokelau, also on the lagoon side. Each atoll has a passage for the work barge to carry people and cargo between cargo/passenger boats and shore (Figure 1). However, they are open to the sea and rough weather conditions at different times of the year. These passages do not go into the lagoon. None of the atolls have a deep-water passage, or even passages to allow a vessel with several metres draft to enter the lagoon, so only small craft can enter the lagoons, usually at high tide. This creates a major problem for any locally-based tuna fishery development work in the country.



Figure 1: Passage for work boat

The current alia-type vessels in Tokelau can only enter the lagoons at each atoll at high tide, which greatly limits their operation. To assist these vessels, and to allow larger vessels to have access to the lagoon for safer anchorage, at least one deeper-water passage is needed at each atoll to allow this to happen. This would best be achieved through enlarging an existing passage or gap in the reef, preferable on the lee side of the atoll from prevailing weather conditions. The first stage of this would be to have a study done to identify appropriate locations for a passage and a costing for work needed. Once suitable passage sites are identified, a full environmental impact assessment should be made for each site or area.

Suggestion 1: That the government have a study done to identify appropriate locations for a passage and a costing for work needed at each of the three atolls in Tokelau.

Suggestion 2: That an environmental impact assessment be undertaken for each site or area identified in the study.

When looking at enlarging or making passages through the reef, consideration needs to be given to the size of vessel that will enter the lagoon, as this will determine the specifications of the passage. If the government is only looking at small-scale and possibly medium-scale vessels entering the lagoon, then a passage would be around 15 to 20 m wide and have a depth at low tide of around 3 m. However, if the government wants larger vessels to enter the lagoon, such as M/V *Tokelau*, then the passage would need to be 20 to 30 m wide and have a depth at low tide of around 4 to 5 m. These decisions need to be made before the study is made to ensure these factors are taken into consideration during the survey and environmental impact assessment.

Suggestion 3: That the government decide on the size of vessel they want entering the lagoon at each atoll, so that parameters can be set around the size of the passage needed at each atoll, with this considered during the study and environmental impact assessment.

If the government of Tokelau proceeds with the enlarging of a passage at each atoll to allow vessels to enter the lagoon, other shore facilities will be required for the vessels. A study could be undertaken to identify or select suitable sites for the building of wharves on the lagoon site of the islands at each atoll. When looking at the study requirements, the size of vessel and depth of water at the wharf edge need to be considered. In addition, careful attention needs to be paid to the availability of land for the construction of building, and the availability of both fresh water and electricity to the site. The study should also include an environmental impact assessment of each site or area at the three atolls.

Suggestion 4: That if enlarged passages are made, the government have a study undertaken to identify suitable sites for the building of wharves at each atoll, taking into consideration the size of vessel to use the wharf, the depth of water needed alongside the wharf, the availability of land for construction, and the availability of both fresh water and electricity to the site or area.

Suggestion 5: That the study include an environmental impact assessment of the effects of constructing wharves at the identified sites or areas.

4.2 Availability of land

Availability of land is an interesting issue in Tokelau, and it appears there is a mix of privately owned land, community owned land, and some registered land, with the mix varying at each of the three atolls. Given this mix of ownership, it will be important that the actual owners are identified for any land chosen as potential sites for building wharves or shore facilities. Negotiations can then take place between the owners and the government, community or private sector entrepreneur on any purchase or lease arrangements for the identified land. In the case of Fakaofu and Nukunonu, where existing freezers are already installed, land adjacent to these facilities would be the most appropriate for any additional tuna fishery related shore facilities to be constructed.

Suggestion 6: That care is taken to identify all land owners for any land chosen as potential sites for building wharves or shore facilities.

Suggestion 7: That in the case of Fakaofu and Nukunonu, land adjacent to existing freezer facilities would be the most appropriate for any additional tuna fishery related shore facilities to be constructed.

Also, most people at each atoll live on one island (two in the case of Fakaofu) with spare or unused land on these islands being limited in some cases. Given this scenario, especially for Atafu where no tuna fishery related shore facilities exist at present, it may be more appropriate to look at other islands at each atoll (Figure 2) for tuna fishery development infrastructure. That is, have a wharf or shore facilities for tuna fishing and processing on a separate island to the one the people are living on. This may also allow for larger land holding to be negotiated to allow for future expansion of shore facilities.



Figure 2: Uninhabited islands around the rim of the lagoon

Suggestion 8: That if land is in short supply on the main island where people live, consideration be given to constructing tuna fishery related wharves and shore facilities on a separate island at each atoll.

Once land is identified, whether it is on the main island or other island at each atoll, a full environmental impact assessment should be undertaken before any construction is considered at each location. This could be conducted at the same time as any assessment work for wharves as suggested in Section 4.1.

Suggestion 9: That a full environmental impact assessment be undertaken at each location before any construction is considered on identified land for tuna fishery related infrastructure.

4.3 Support services

A range of support services are required by any fishing industry to develop and to keep it operational. In Tokelau'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. There also needs to be a reliable supply of fresh water and electricity. For Tokelauans wishing to enter the tuna fishery with their own vessel, these services are essential if they want to base their vessel(s) in Tokelau.

4.3.1 Slipways

There is currently no slipway at any of the three atolls in Tokelau. Given the current situation with no access to the lagoon by fishing vessels there would not appear to be any immediate need to construct a slipway. The current small-scale longline vessels at each atoll in Tokelau can be pulled out of the water for general repairs using existing means, which is happening now. However, if a passage is enlarged or constructed at one or more atolls, then this will allow larger vessel to enter and there may be a need for a slipway to do repair or maintenance work at that time. If this is the case, only one slipway is needed in Tokelau to service the medium-scale vessels from all three atolls.

Suggestion 10: That the government not consider the construction of a slipway in Tokelau unless one or more atolls have an enlarged passage to the lagoon to allow medium-scale vessels to enter.

Suggestion 11: That in the event that one or more atolls have a passage enlarged, the government consider the construction of a slipway at one atoll only, with this to service the vessels from all three atolls.

In considering the size and use of a slipway in Tokelau, in the event that one is to be constructed in the future, it would probably only need to have a capacity of up to 100 t, which would cater to vessels of around a 24 to 28 m. Vessels larger than this would travel to neighbouring countries for slipping. However, before the government goes down the path of constructing a slip in the future, a study should be undertaken to assess the size of the slip needed based on the vessels working in, or likely to be working in Tokelau at the time, and likely to use the slip. The location of the slip is also important, as it should be close to support services or the wharf area, if and when these are constructed. Once the size of slip and location is finalised, an environmental impact assessment should be undertaken.

Suggestion 12: That if and when a slipway is considered for Tokelau, a study be undertaken to assess the size of the slip needed, the location and the environmental impact of constructing such a facility.

4.3.2 Carpenters, welders (steel and aluminium) and fibreglassers

There are currently a limited number of people working in the trades of carpentry, welding and fibreglassing on the three atolls of Tokelau. These people are associated with the community

workforce on each atoll. The private sector itself is very small and people do repairs on their own canoes or get repairs done through the community workforce on aluminium dinghies.

There is a need to develop these trade skills on each of the three atolls, although the amount of work available is limited. Possibly the government could look at providing scholarships or incentives to young school leavers to take up apprenticeships or vocational training in these trade areas. At the end of their trade, the people would return to Tokelau to work with the government or in the community workforce to use their trade skills.

Suggestion 13: That the government look at providing scholarships or incentives to young school leavers to take up apprenticeships in carpentry or welding, with the people working for government or entering the community workforce at the end of their training.

4.3.3 Engineers (diesel, hydraulic, refrigeration and general) and electricians

There are currently very few people working in the engineering (diesel, hydraulic, general, and to a lesser extent, refrigeration) and electrical trades. The couple of people with these skills are working at the power plants on each atoll. There is also very little need for people with these skills in Tokelau at the present time. There are no diesel machinery outside the truck and power generators at each atoll. Refrigeration requirements are also limited to household fridges and freezers, although Nukunonu and Fakaofu now have larger commercial blast and storage freezers. The need for electricians is also limited, although increasing with the full electrification of the three atolls.

There is a need for people to be trained up as engineers (diesel, hydraulic, refrigeration and general) and electricians, especially with the electrification of the atolls and the increased use of household fridges and freezers. The government could take a similar approach to that suggested above for carpenters and welders, by providing scholarships or incentives to young school leavers to take up apprenticeships or vocational training in these trade areas. At the end of their trade, the people would return to Tokelau to work with the government or in the community workforce to use their trade skills.

Suggestion 14: That the government look at providing scholarships or incentives to young school leavers to take up apprenticeships or vocational training to become engineers or electricians, with the people working for government or entering the community workforce at the end of their training.

It should be noted that people with engineering skills would also be needed on commercial fishing vessels to maintain the machinery. If larger vessels start fishing from the atolls in Tokelau, then employment opportunities will be available.

4.3.4 Suppliers of fishing gear, safety equipment and vessel electronics

There are no suppliers of fishing gear, sea safety equipment or vessel electronics on any of the three atolls in Tokelau at present. Currently fishermen bring in their own fishing gear from New Zealand to meet their own needs. This is unusual because most men on the atolls are involved in fishing activities. Possibly the Men's Group on each atoll could look at purchasing fishing gear and sea safety equipment in larger volumes based on their needs, to lower the price to all. If the Men's Group were to do this, the government could assist by making sure that no duty or taxes are payable on such items.

Suggestion 15: That the government encourage the Men's Group on each atoll to work together to bring in the fishing gear and sea safety equipment in bulk to meet their needs and reduce overall costs.

Suggestion 16: That the government assist the Men's Group through ensuring that no duty or taxes are payable on fishing gear and sea safety equipment.

There is very little need for vessel electronics in Tokelau at present. This will change with the introduction of tuna longlining as well as when vessels start to fish further offshore. Vessels fishing

further offshore should have VHF radios and small GPS units as basic sea safety equipment. These items should be included in the list of sea safety equipment and the Men's Groups could look at bringing these in for their use. Small echo sounders could also be a great help to those wanting to do some deep-water snapper fishing.

Suggestion 17: That the Men's Groups look at bringing in VHF radios and small GPS units as basic sea safety equipment for their use.

4.3.5 Suppliers of ice, bait and export packing materials

There are currently no commercial ice making facility, or suppliers of bait or export packing materials on any of the three atolls in Tokelau. This will need to change though, as the planned tuna longline fishing trials (refer Section 6.4.6) will require a supply of ice and bait for the fishing operations. Two of the atolls, Nukunonu and Fakaofu, have community owned freezer complexes, but no ice making capability. The freezers will be used to store the bait once this is purchased, with this bait used during fishing trials. The bait could also be sold to other local fishermen for their small-scale fishing operations. Ice making though is a limiting factor. In the first instance, ice can be made in the blast freezer, however, this is an expensive method of making ice. Moulds will be needed to freeze standard size blocks of ice and an ice crusher will be needed to crush the blocks into a usable form for chilling fish.

Suggestion 18: That the communities on Nukunonu and Fakaofu use their commercial blast freezer to make ice in the short term for tuna longline fishing trials, while storing bait in their holding freezer.

Suggestion 19: That a standard size mould be used for making ice at Nukunonu and Fakaofu with an ice crusher used to crush the blocks into a usable form for chilling fish.

Suggestion 20: That the community, when looking at bait needs, also consider selling bait to local fishermen for their small-scale fishing operations.

The suggestions above solve a short-term problem, however, in looking to the future it is important that the atolls of Nukunonu and Fakaofu look at purchasing ice machines for making ice in the future. Given the remote and isolated location of these atolls, it would be best to purchase block ice makers with a total capacity of at least one tonne per day per atoll. An ice crusher would also be needed to suit the size of blocks being produced.

Suggestion 21: That the communities on Nukunonu and Fakaofu look at purchasing block ice makers with a capacity of at least one tonne per day per location and an ice crusher to suit the size of blocks made, to overcome the ice situation in future.

A different situation exists on Atafu, where there is no commercial freezer at present. The atoll has received many of the materials to construct the same size freezer complex as the other two atolls, however, the building to house the complex has not been commenced, and the freezers not constructed. Given this scenario, block ice machines with at least one tonne per day capacity could be purchased at the time the freezer complex is constructed and installed as part of the facility. However, it is up to the community of Atafu to decide if and when they will proceed with the construction of their freezer complex.

Suggestion 22: That the community of Atafu decide if and when they will proceed with the construction of their freezer complex, and if they proceed they purchase a block ice machines with at least one tonne per day capacity and install this at the same time.

The above suggestions for ice production are to meet the current and expected needs of the existing boats and their operation. 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 23: That any new fishing enterprise to be established in Tokelau for tuna fishing will need to have their own ice making facility to meet their needs for both their fishing and processing operation.

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

Bait is an important part of any tuna longlining venture, and there is no local supply at present. For the tuna longlining trials planned for 2004 (refer Section 6.4.6), bait will be brought in and stored in the freezers at Nukunonu and Fakaofu. It is expected that additional bait will be imported to allow some to be sold to local operators for use in small-scale mid-water fishing activities (refer Section 6.4.5). This approach is fine for the fishing trials, although an alternative approach needs to be found for the future. Possibly the Taupulega or the Men's Group can look at importing bait from Samoa and storing it in either the freezer complexes, or in domestic freezers if small amounts are being bought in. The bait can then be sold to the community longline vessels or to small-scale mid-water fishermen. Anyone in the private sector entering the tuna longline fishery will need to work out the purchasing of bait and its storage in Tokelau, to ensure the continued and uninterrupted operation of their fishing vessels.

Suggestion 25: That the Taupulega or Men's Group look at importing bait from Samoa and storing it for sale to small-scale operators and their alia-type longliners.

Suggestion 26: That any commercial tuna longline operator working from Tokelau work out the purchasing of bait and its storage in Tokelau to ensure their fishing vessels can keep fishing.

The current approach to developing the tuna fishery is to focus on frozen albacore for the cannery trade and to possibly land fresh fish in Samoa for marketing through a local processor there. If this approach is taken, then there is no need at present to have export packing materials in Tokelau. However, if this approach changes, or value-adding processes are implemented, then the appropriate export packing materials will need to be brought into Tokelau for this purpose. Alternately, if a new company establishes itself at one of the atolls in Tokelau, it would need to bring in the appropriate export packing materials for its operation. Such a company would also bring in bait for their fishing operation, and this could be sold to local fishermen if they require it.

Suggestion 27: That the communities on each atoll only look at bringing in export packing materials when the need arises and that the appropriate material be brought in for the product to be exported, especially value-added products.

Suggestion 28: That any company entering into tuna longlining activities and/or processing for export, ensure they bring in their own bait and export packing materials to suit the product they plan to export.

Suggestion 29: That if a company starts to import bait for their fishing operation, they bring in extra to sell to local fishermen that require it.

4.3.6 Availability of fresh water

The supply of fresh water will be a major constraint to the development of any shore-based fish processing facility in Tokelau. It is also a limiting factor in the production of ice in times of water

shortage. There is no underground water, so all water is collected from rain and stored in above ground storage tanks. Many of the houses have the water storage tank built under the house, or rather the house is built on top of the tank. This has been adequate for the household consumption or use of the people, however, it is insufficient for any processing facility or possibly ice making facility.

Given this situation, there is a need for an alternative means of producing fresh water for ice production and for processing. The current freezer complexes have fresh water storage under them, but again this is limited. If one tonne per day ice machines are installed then this will be a minimum of 1000 litres of water used per day in ice production. The freezer complexes also have an area for fish processing, however, they are empty rooms at this stage. If these rooms are used, additional water will be used in the processing. To alleviate this potential problem, which would also assist the local population in the time of water shortages, a desalination plant could be installed with additional water storage tanks to keep an adequate reserve of fresh water available.

Suggestion 30: That the communities on each atoll consider purchasing and installing a small desalination plant with large storage tanks in support of their freezer complex, future ice making and processing needs, and the needs of the local population in times of water shortages.

Any new fishing operation or planned processing facility should carefully consider their fresh water needs as part of their operation. The new facility should include a desalination facility as part of their operation, and this should include large storage tanks to meet their needs.

Suggestion 31: That any new processing facility, regardless of fresh water capacity requirements, should have a desalination plant and large storage tank as part of their operation.

When talking about the use of fresh water for fish processing facilities, regardless of location, if export is the primary focus then water quality may become an issue. This can be addressed through the fitting of a filtration or purification system to ensure fresh water quality to meet any export health and sanitation requirements. It would make sense to include such a system as standard equipment so that this is not a problem in the future.

Suggestion 32: That any new fish processing facility include the provision of a filtration or purification system to ensure fresh water quality to meet any export health and sanitation requirements.

4.3.7 Electricity supply

Electricity on the three atolls in Tokelau is not around the clock. Each atoll has its own generator and it is up to the council as to how many hours per day it operates. This is changing though with the electrification of all three atolls. Under this project, all buildings and homes will have electricity and the power will be 24 hours per day.

One of the problems faced by those implementing the electrification programme is in regard to the freezers on Nukunonu and Fakaofu — should they be on the town power or should they have their own generator for power? In both locations, the freezers were supplied with a 60 kVa generator to provide power, although these generators have been taken and added to the town power supply. However, the concern is that if the freezers are on town power, at peak load times, the freezers cutting in and out may cause a power surge that will blow something, possibly even the freezer motors. There is also the issue of getting the generators synchronised so that they can be operated at the same time to give the total power needed at each atoll, once the freezers are included.

A possible way forward could be to have the holding freezers hooked up to town power, as they would be running more constantly, while having the generator specifically to operate the blast freezer. If this approach is used, the generator could also be used as a back up for the holding freezer in the event the town power was down. Given this scenario, the generators that came with the freezers should be installed at the freezer complex. This would then be the primary power source for the blast

freezer and the holding freezer when needed. The redirecting of electricity from town supply to generator supply would be done through a switchboard at the freezer facility.

Suggestion 33: That the generators that came with the freezer units be installed as part of each freezer complex and used to generate power to operate the blast freezer unit.

Suggestion 34: That whenever the freezer complex generator is in operation, it provide power to both the blast and holding freezers.

Suggestion 35: That a switchboard be installed at each freezer complex to allow the holding freezer to be operated from either the town power or generator power, with town power used whenever the blast freezer is not in operation.

4.3.8 Fuel availability

There are no bulk fuel storage facilities at all in Tokelau. All fuel is bought to the atolls by boat in 200 litre drums. When the local cargo boat, M/V *Tokelau*, is doing a fuel run to the atolls, passenger travel and the freighting of other cargo is limited for safety reasons. Given the situation of the atolls with no access for a fuelling vessel to discharge fuel to a bulk storage facility, the current approach to fuel delivery should continue. However, if one of the atolls expands a passage through the reef (refer Section 4.1) that would allow larger vessels access to the lagoon, then it may be feasible to install a small bulk fuel facility for that atoll.

Suggestion 36: That if a passage is expanded at one of the atolls to allow larger vessels access to the lagoon, then the installation of a small bulk fuel facility could be considered for that atoll.

Fuel shortages occur from time to time on the atolls, especially outboard fuel as most families have access to outboard-powered boats and canoes for fishing and local transport. Given this scenario, it is essential that either more fuel is taken to the atolls on each fuelling trip, or the fuelling trips should be conducted more frequently. This will be essential for both the generators on each atoll to keep the power on 24 hours per day, and for any fishing venture that relies on purchasing its fuel in Tokelau. The weekly usage of diesel fuel for the generators should be easy to calculate and a good stockpile of diesel should be kept on each atoll, with at least one month's supply held in reserve for emergencies (like the fuel boat arriving late due to bad weather). However, the usage of outboard fuel is harder to estimate, especially if vessel numbers continue to increase. It is therefore essential for any fishing venture to look closely at the fuel needs of the operation and order enough fuel ahead of time to ensure that there is no shortage and their fishing vessels can continue to operate.

Suggestion 37: That the Government of Tokelau either ensure more fuel is taken to the atolls on each fuelling trip, or the fuelling trips should be conducted more frequently to avoid fuel shortages on the atolls.

Suggestion 38: That a minimum of one month's supply of diesel be held at each atoll in reserve for emergency use when needed.

Suggestion 39: That any fishing operation being based in Tokelau order enough fuel ahead of time to ensure that there is no shortage and their fishing vessels can continue to operate.

4.4 Local tuna fishing fleet and suitable vessels

The main tuna fishing activities currently employed by local fishermen are trolling, traditional polling using pearlshell lures, and mid-water handlining, which are all small-scale methods. The vessels used are small, generally 4–9 m in length, and powered by outboards from 10 to 40 horsepower. Most of these vessels are imported aluminium dinghies, although on Atafu, traditional outrigger canoes are still used (Figure 3).



Figure 3: Traditional canoe with outboard engine at Atafu plus an aluminium dinghy

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 Tokelau. First would be the use of mid-water fishing techniques, especially in association with fish aggregating devices (FADs). FADs have been used in Tokelau in the past, with mid-water fishing methods being introduced to Tokelau in the 1980s and 1990s. The use of FADs will be covered under Section 6.4.4, while the possibility of promoting small-scale tuna fishing methods is covered under Section 6.4.5.

Small-scale and medium-scale tuna longlining are the main method of tuna fishing with promise for domestic participation by Tokelauans, once infrastructure and transportation problems are overcome. Of the fishing vessels in Tokelau at present, there are currently six alia-type small-scale tuna longline vessels (Figure 4), two at each atoll, with these owned and operated by the community through the Taupulega. These vessels have not fished much and have fallen into disrepair. The boats themselves are in good order, however, the outboard engines need repairing or possibly replacing and the fishing gear in most cases needs to be replaced. The use and operation of these vessels will be discussed more under Section 6.4.6.



Figure 4: One of the aluminium alia-type tuna longline vessels in Tokelau

In addition to the six community-owned small-scale tuna longliners, a local businessman has purchased a 13 m longliner (Figure 5) similar, but larger than the community vessels. This vessel is fully operational although in September 2003, had just arrived and was not fishing. The Government of Tokelau and the Taupulega of Nukunonu should support this private sector operation to give it every chance of success. This will include the use of the freezers on Nukunonu to freeze and store the catch for later export to Samoa for marketing.



Figure 5: Longline vessel owned by a local businessman on Nukunonu

Suggestion 40: That the government of Tokelau and the Taupulega of Nukunonu fully support the private sector tuna longlining operation to give it every chance of success.

There are many proven types and styles of tuna longline vessels working in the Pacific at present. Another local entrepreneur may wish to bring in one of these vessels. This should be encouraged, especially if the vessel has a proven record as a successful tuna longliner in other locations in the region. The arrangement (joint venture, charter etc.) that the local private sector investor uses to bring the vessel into Tokelauan waters should be monitored by the government, to ensure that a local is not being used as the front person for a foreign company trying to gain access. If the venture is genuinely local, then this should be strongly supported by the government.

Suggestion 41: That the government allow and encourage the local private sector to bring proven tuna longline vessels to fish in Tokelauan waters.

Suggestion 42: That the government monitor the arrangements used by the private sector to bring in tuna longline vessels, to ensure that a local is not being used as the front person for a foreign company trying to gain access to Tokelauan waters.

4.5 Processing facilities

There are currently no fish processing facilities in Tokelau, although the freezer complexes at Fakaofu and Nukunonu do have space for processing activities to be conducted (Figure 6). Apart from these facilities, and possibly one built on Atafu, there is no real scope for additional processing facilities to be constructed given the current infrastructure. However, if the infrastructure changes, such as a passage being enlarged to allow larger vessels access to the lagoon and wharves are built, then there may be scope for building processing facilities. There is also scope for post-harvest activities, such as salting and drying and the production of tuna jerky, and these will be discussed more under Section 6.5.



Figure 6: Building that houses the freezer complex on Nukunonu

In looking at the current freezer complexes, they will be forming part of a chain for exporting the fish from Tokelau to fish buyers in Samoa, who will then market the fish, some being exported. Therefore, these facilities will need to have a HACCP (hazard analysis and critical control point) plan, as they will form part of the catching and processing chain. Temperature control of the product will be the primary focus of the facilities, as the fish will need to be reduced to a temperature of below 4° C as quickly as possible and maintained at or below this temperature, including the transportation of the fish to Samoa. Staff at each atoll will also need to be trained to do the monitoring and recording as developed in the HACCP plan.

Suggestion 43: That the government, through the Taupulega at each atoll, develop a HACCP plan for the freezer facilities, and have staff trained appropriately to implement the plan, so fish can be exported to fish buyers in Samoa.

4.6 Transportation

Transportation is one of the main constraints facing Tokelau for any development projects to be successful. There are currently no airstrips on the atolls in Tokelau, so there is no air transport. Studies have been undertaken and sites identified for airstrips, however, the cost of constructing such infrastructure is high and no final decision has been made. In the event that a decision is made, it would be best if only one airstrip is constructed, and the government will need to decide which atoll this will occur on.

Suggestion 44: That the Government of Tokelau carefully consider the construction of one airfield, and identify which atoll this will be constructed on.

An alternative to the construction of an airfield is to look at the feasibility of using a seaplane, which could be operated out of Samoa or American Samoa and land on the lagoon at each atoll. The seaplane could be used for passengers and freight, as well as medical emergencies. To be useful to the fishing industry and the export of fish the seaplane would need to have a suitable carrying capacity to make the export of fish viable. A study could be undertaken to look at the feasibility of operating a seaplane in the Tokelau situation, and if feasible, what size the seaplane would need to be, to be viable/profitable for both passenger and fish cargo transportation.

Suggestion 45: That the Government of Tokelau have a study undertaken on the feasibility of operating a seaplane in the Tokelau situation, and if feasible, what size the seaplane would need to be, to be viable/profitable for both passenger and fish cargo transportation.

The only transportation link Tokelau has at present is by sea, and it is a 26-hour trip from Samoa to the closest atoll. The current cargo vessel, M/V *Tokelau* (Figure 7), has a 40 m³ capacity freezer hold, so frozen fish can be transported back to Samoa for marketing. Fish can also be transported fresh on ice in insulated fish boxes on the deck. This form of transportation is limited, and will be discussed more as part of a proposed fisheries development project that is discussed under Sections 6.4.6 and 6.4.7.



Figure 7: M/V Tokelau

5. TRAINING NEEDS AND REQUIREMENTS

There is a range of training areas in Tokelau to meet the future needs of the fishing industry, the support sector, and within the Fisheries Department. As there are no training institutions, training will need to occur off-atoll or trainers will need to be brought to Tokelau.

5.1 Fishing industry

An important point to note is that all people heading to sea should have an STCW-recognised sea safety certificate (this came into effect on 1 February 2002). This means anyone wanting to commence a tuna fishing venture in Tokelau should have crew with current sea safety certificates. As there is no training institution in Tokelau that can run the appropriate courses, it will be necessary for people to travel to Samoa for the training, or the private sector or government could look at bringing trainers to each atoll to conduct the training. The problem with the latter approach is that the survival at sea and fire fighting courses require specific equipment, and it may be difficult to get the equipment to Tokelau to conduct the best course.

Suggestion 46: That the private sector or government look at either sending crew selected for tuna longlining to Samoa for training, or they bring suitable trainers and equipment to each atoll in Tokelau, so that the prospective crew can gain a sea safety certificate.

Another area of training that needs to be focused on is the correct handling, processing and preservation of the catch at sea, especially catch that is going to be exported. Therefore there is a need for training to be undertaken in this area, with the best approach being to have a trainer come to Tokelau. This could be addressed as part of the proposed tuna longline project (refer Section 6.4.6).

Suggestion 47: That the government arrange for training in Tokelau on the correct handling, processing and preservation of the catch at sea, possibly through the proposed tuna longlining project.

5.1.1 Crew for foreign tuna vessels

There are currently no Tokelauans working on foreign tuna vessels, although the opportunity is there if people wish to pursue such a career. To do this a person would need to hold a current sea safety certificate and have some basic training in the tuna fishing method (pole-and-line, longlining or purse seining) being used on the foreign vessel to be worked on. Alternately, crew that are trained up as part of any tuna longlining activities that take place in the near future in Tokelau should have the basic skills to gain employment as crew on foreign longline vessels.

5.1.2 Skippers for local tuna vessels

There are no skippers in Tokelau with experience on tuna fishing boats. The only qualified skippers are on the M/V *Tokelau*, the local cargo vessels that services Tokelau. Given the planned tuna longline project to take place in 2004, it is necessary for skippers to be trained up to take charge of the vessels involved. It will therefore be necessary for the government to identify potential skippers and have them sent overseas for some basic training. This should be done as soon as possible so that when a longline project commences, there will be skippers available. Possibly the government could look at doing this through some sort of cadetship, with there being a commitment for the trained people to come back to Tokelau to use the skills they have gained.

Suggestion 48: That the government identify potential skippers and have them sent overseas for some basic training, possibly having these people under a cadetship arrangement.

5.1.3 Engineers for local tuna vessels

Tokelau is facing the same problems with engineers for tuna fishing vessels as they are for skippers. The one saving grace here is that all of the small-scale tuna longline vessels to be used in the near

future are outboard-powered, so the training needed for outboards will not be as intensive, and some people will have some basic knowledge for the maintenance of their own outboards. However, it will be necessary for some people to be trained up as outboard mechanics, especially working on the brand of outboards to be used during any longlining project. The other area that these people will need training in is hydraulics, if this is to be used on the vessels. It should be noted that this is a short-term solution, and the government should look at sending several people overseas for training as engineers, with a focus on diesel engines, hydraulics and refrigeration. All of this training could be conducted through cadetships, with there being a commitment from the trained people to come back to Tokelau to use the skills they have gained.

Suggestion 49: That the government in the short-term send several people overseas for training in outboard repairs and maintenance, and possibly basic hydraulics.

Suggestion 50: That the government in the longer-term send several people overseas for training as engineers, with a focus on diesel engines, hydraulics and refrigeration.

Suggestion 51: That the government consider having all training under a cadetship arrangement to ensure the trained people come back to Tokelau and use their skills.

5.1.4 Small-scale coastal tuna fishermen

The small-scale fishing sector will require different training to the tuna longline fishery. Small-scale operators will need training in appropriate tuna fishing methods for their size vessels, such as trolling and mid-water fishing techniques (especially vertical longlining), which are often used in association with FADs. It is noted that there is a number of small-scale tuna vessels at each atoll that troll and pole using pearlshell lures. However, there are other areas of training that are needed, such as the correct handling and chilling of the catch and possibly post-harvest activities, such as value-adding processes. The best approach to this style of training is hands-on workshops conducted at each atoll. Depending on the subject area, this could be done by the Fisheries Department, or technical assistance can be requested from SPC. The most important point though is that the Fisheries Department identifies the type of training needed, and then organises the most appropriate trainers to undertake the training. It should also be noted that it would be very difficult for all small-scale fishermen to focus on fishing for tunas only. Some may choose to do this, but not all. Therefore the training should be more general and not just covering tuna-related topics, but also include topics like basic outboard maintenance and repair, and other fishing techniques (deep-water snappers etc).

Suggestion 52: That the Fisheries Department assess the needs of small-scale tuna fishermen at each atoll, and identify the most appropriate training for each location.

Suggestion 53: That the Fisheries Department either organise, or identify the appropriate group to organise, tailored training in the form of hands-on workshops, with the most appropriate people used for the training.

5.1.5 Managing a small fishing business

As more people become involved in commercial fishing (not just tuna 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 is a need for specific training in running a small fishing business. SPC has specific training materials available for the financial management of a small fishing business, and these could be developed into a more specific course for small fishing businesses in Tokelau. To do this, an appropriate training institution needs to be identified to develop the materials and then run the courses in Tokelau.

Suggestion 54: That the government identify an appropriate training institution and have a course developed on managing a small fishing business for Tokelau, with the course delivered at each atoll by the institution.

People or companies in Tokelau, possibly the manager of the one tuna longline vessel on Nukunonu, wishing to run a larger fishing operation, may 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, Tokelau will need to apply to attend; normally, one position is available per country.

Suggestion 55: That the Fisheries Department support Tokelauans entering or expanding their fishing business to a larger-scale, by nominating them to attend the annual SPC/NZSOF Enterprise Management Course, to develop better business management skills.

5.2 Processing sector

There is basically no processing sector in Tokelau, apart from the two freezer complexes as discussed in Section 4.5, and it is essential that HACCP plans are developed as soon as possible for each of these freezing facilities. The staff that work in each of these facilities will need to be trained in HACCP, if product, especially tuna, is to be exported to the US via Samoa, which is the current strategy. The government should request assistance with HACCP training for staff at Fakaofu and Nukunonu.

Suggestion 56: That the government make HACCP training a high priority for staff involved with the freezer facilities at Fakaofu and Nukunonu.

Product development is an area that should be looking at. With the increase in tuna and associated species (byproduct) expected to be landed, and the very limited transport available, an alternative is to do more processing or value-adding in Tokelau. There is a range of known products that processors can moving into. However, there could be new products that can be developed. The University of the South Pacific (USP) has the facilities and students doing higher education. Possibly the government could request that some students be encouraged to look at new value-added products that could assist local product development. Even better, possibly the Tokelau Government could provide a couple of scholarships for Tokelauan students at USP, with the requirement that their studies be in food technology and their thesis be on product development or another post-harvest activity. This would assist in there being experienced food technologists in Tokelau to assist any future processing sector.

Suggestion 57: That the Tokelau Government, approach USP and request that some students be encouraged to look at new value-added products for tunas and byproduct species, that could assist local product development.

Suggestion 58: That the Tokelau Government, provide several scholarships for Tokelauan students at USP in the field of food technology, with their thesis to be on product development or another post-harvest activity.

5.3 Support sector

The support sector is very limited in Tokelau, with the few trades people employed through the community workforce on each atoll. There seemed to be a lack of people with the skills for working in all trade areas. Given this situation, the government should look at cadetships or even apprenticeships to get people trained in all trade areas.

Suggestion 59: That the government look at cadetships or even apprenticeships to get people trained in all trade areas.

5.4 Fisheries Department

The Fisheries Department only has a couple of staff at present. This is very limiting, especially when the department will be taking on new roles and responsibilities as part of the implementation of tuna fishery development and management initiatives. It is therefore essential that new staff be recruited into the Fisheries Department, with at least one Fisheries Officer located on each atoll. All Fisheries Officers will need a range of training to gain the necessary skills to manage different fisheries in general, and implement the National Tuna Development and Management Plan for Tokelau when finalised.

Suggestion 60: That the government recruit additional staff to the Fisheries Department as a matter of urgency to ensure there are adequate staff for the implementation of future tuna fishery development and management arrangements.

Suggestion 61: That the government ensure that at least one Fisheries Officer is based on each atoll in future.

It would appear there is a growing focus on the marine sector in Tokelau. This is good as this is such an important area for the country. Therefore, more Tokelauans should be looking to do a degree in marine sciences. The USP offers several courses in the marine sciences, including a Diploma in Tropical Fisheries, a Diploma in Ocean Resource Management and Policy, and a Diploma in Fisheries Economics and Management. There are also overseas courses that can be undertaken.

The Fisheries Department is trying to raise the profile of marine science in Tokelau, especially in regard to tunas, 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 needs to identify these as priority areas, and seek government scholarships in these fields.

Suggestion 62: That the Fisheries Department identify environmental science and fisheries science, with a focus on tuna, as areas requiring qualified staff, and request the government to offer scholarships in these fields.

No staff at the Fisheries Department appear to 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 — there may not be anyone at the Fisheries Department qualified or able to implement this plan 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. Some training is available through USP courses, or people can be sent overseas for training. One approach to addressing this training need could be 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 Tokelau and in the agency involved in fisheries management or fisheries development. Note that this could only work if the Fisheries Department has additional staff to meet the anticipated future workload.

Suggestion 63: That the Fisheries Department arrange for staff involved in the implementation of the National Tuna Development and Management Plan to receive training, either through a USP course, by sending them overseas on recognised courses, or by entering 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 could be international implications for Tokelau, especially in regard to fishing access by foreign vessels. The Forum Fisheries Agency (FFA) has completed a vessel monitoring system (VMS) programme, which is being implemented regionally, and countries should require this under fishing access agreements. Tokelau should ensure the implementation of VMS as part of any future access agreement. VMS should also be a requirement for larger domestic tuna fishing vessels, as there are flag-state control issues that Tokelau will need to address if their 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 64: That the Fisheries Department fully implement the requirements of VMS in all future fishing access agreement under the terms and conditions of access.

Suggestion 65: That the Fisheries Department implement VMS as a requirement for larger domestic tuna fishing vessels.

There also appears to be a need for on-the-job training in some fields of surveillance and compliance, 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 other relevant government departments should identify specific areas of training in surveillance and compliance, and approach either Australia or New Zealand for assistance with the provision of a suitable trainer in the areas identified.

Suggestion 66: That the Fisheries Department and other relevant government departments identify specific areas of training for surveillance and compliance officers, and approach Australia or New Zealand for assistance with the provision of a suitable trainer in the areas identified.

Another way of conducting surveillance on fishing vessels is to have observers on board to monitor and verify catch (including bycatch and discards), to monitor fishing location, and to collect any samples or specific data needed by scientists. Several Tokelauans have been trained as observers in the past, but have not used these skills in Tokelau. Therefore there is a need to train observers and to commence observer placements, to meet 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 observers were not government employees. This would allow observers to be employed on a casual basis when there is work available, and would increase the skills in the private sector workforce.

There is a need to train up observers so there is a pool of trained people to draw from. Both SPC and FFA have been involved in training national observers in the region for tuna fishing vessels. Both SPC and FFA are in a position to assist in the running of a future observer workshop when the need arises. Given the small size of Tokelau, it may be best to have some Tokelauans attend a sub-regional observer training rather than have a specific training for Tokelau. This would provide a pool of qualified observers to assist in the monitoring of catch and fishing location of tuna fishing vessels working in Tokelau under the National Tuna Development and Management Plan, or to work through FFA to observe on US purse seiners under the Multilateral agreement.

Suggestion 67: That the Fisheries Department request both FFA and SPC to assist in the setting up and running of an observers workshops, or possibly a sub-regional workshop with neighbouring countries participating as well.

Suggestion 68: That the Fisheries Department preferably select non-government employees as observers, to increase the skills of Tokelauans in the private sector workforce, with the Fisheries Department employing these people on an as-needs basis.

Port sampling is not conducted in Tokelau at present. With the focus on developing a domestic tuna longline fishery, port sampling will need to be introduced, so that data can be collected from a representative sample of the domestic landed catch as well as any foreign transshipments. Therefore there is a need to train up port samplers, although observers could be used once there are some people in Tokelau with these skills.

Suggestion 69: That the government train up some port samplers to collect data from any planned domestic tuna longline fishing activities, or use observers for this task once some people have been trained.

6. CONSTRAINTS AND OPTIONS FOR DEVELOPMENT

There is a range of constraints facing domestic development of the tuna fishery in Tokelau. 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 Tokelauans in the tuna fishery. However, the major constraints to development in Tokelau at present are in the area of basic infrastructure, such as harbour facilities for vessels and transporting fish to export markets in reasonable volumes at prices that are economically viable. These constraints have been discussed under various headings in Section 4. Therefore, the options for development presented in this section really hinge on some or all of the infrastructure constraints being addressed.

Development of Tokelauan involvement in the tuna fishery can be in several areas. Previous sections have already 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 or community structure to foster this, with the government pulling back to support private sector development.

6.1 Encouraging private sector development

The Government of Tokelau, or rather the communities at each atoll, have tried developing the tuna fishery within the country over the last couple of years. This development attempt has been made partially through the Fisheries Department, but mainly through the Taupulega on each atoll. The focus now needs to be on encouraging private sector participation, which is very difficult given the current situation in Tokelau. This report in general tries to point out the areas that need to be addressed to create an enabling environment to allow private sector development to occur.

For any development in the fisheries sector to occur in Tokelau, 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, and you need to be able to get it to the market at a realistic price. Currently in Tokelau, the infrastructure needed is substantial, the domestic market is very small to non-existent, and there is limited 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.

Tokelau needs to develop export markets for fish, as there is basically no domestic market. 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. Currently sea transport is the only options for export, as discussed in Section 4.6, which suits frozen product or processed product that has a long shelf-life, with or without refrigeration.

The best way forward for the Government of Tokelau is for them to fund developments in infrastructure needs. This could include looking at the current situation on airfields or the use of a seaplane, if these are economically viable. Once an avenue has been created to export fish, other infrastructure requirements can be addressed, such as expanding passages in the reef, which will

encourage fishermen to purchase larger vessels and keep them safe. When larger vessels are brought in by the private sector, support services may develop to maintain the vessels, as well as employment being generated on the vessels themselves. If land is available, 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 stay out of commercial activity in the fishing sector, as local fishermen develop and expand, as they cannot compete.

Suggestion 70: That the Government of Tokelau focus on providing basic infrastructure needs that will create an enabling environment for private sector development in the fishing sector.

Suggestion 71: That as the private sector expands in different areas, the government or community, withdraw from these areas and allow the private sector to expand and prosper.

The government or community at each atoll may be embarking on tuna longline fishing trials with SPC technical assistance, as an attempt to develop tuna longlining in Tokelau, as the private sector is not in a position to do this at the current time. This is a positive step, provided the focus is to prove the resource is there and it can be caught in reasonable quantities, and hopefully it can be marketed in reasonable volumes at a profit. The results of fishing trials will be very important to the future development of a tuna longline fishery in Tokelau. If trials are successful, then all information should be shared with the private sector. However, if trials are unsuccessful, an assessment of where things did not work should be made, so that additional trials can be planned and conducted, with the results conveyed to the private sector.

Suggestion 72: That tuna longlining trials be conducted, and if the trials are successful, these results should be provided to the private sector to promote development.

Suggestion 73: That if initial trials are unsuccessful, an assessment of where things did not work be made, so that additional trials can be planned and conducted, with the results presented to industry.

The main point here is that fishing trials are testing the fishery to promote development. They are the conduit for starting things off, and once the viability has been proven and the private sector moves in and starts to develop, the government and community should withdraw and leave it to the private sector. This will be a difficult task, but essential if the private sector is to develop.

Marketing is an area that the government or community will also have to support in the short-term at least. As there is no domestic market, all marketable fish will need to be exported to Samoa for sale to a fish buyer there. Given the only sea transport at present is the government cargo vessel, the government may want to subsidise the freight of the fish, both fresh and frozen, to assist in initial tuna longlining trials.

Suggestion 74: That the government consider providing subsidised freight rates to fish being exported as part of tuna longline fishing trials.

This again will be a trial to endeavour to establish markets that will purchase Tokelauan fish at a price that makes the fishing operation viable. Once this is established, it is anticipated that the private sector would take over this role as part of their fishing operation. Value-adding is also a very serious option, and this is discussed more in Section 6.5.

6.2 Government policies and the role of the Fisheries Department

There are a range of government policies that can effect and/or assist the development of the tuna fishing industry including: maritime regulations, new legislation; duty on fuel, bait, fishing gear and other items; licensing; and data collection and use.

6.2.1 *Role of the Fisheries Department*

As previously stated, the Fisheries Department should not be involved in commercial activities. Their primary role should be to manage the resource sustainably, so as to maximise the economic returns to Tokelau, local communities, and the private sector. Managing the resource includes the surveillance and monitoring of both local and foreign fishing activity in the Tokelau EEZ. These are all areas that will come out in the management side of the national plan, and other team members are working on this areas.

The Fisheries Department also has a major role to play in extension, to work with and train local fishermen in different fishing techniques and fish quality. Extension activities for training and encouraging development in the tuna fishery will be discussed in later sections of this report.

6.2.2 *Marine Regulations*

There appears to be no marine regulations in place in Tokelau, although the New Zealand standards are used in regard to their cargo boat. However, there are no formal requirements for local fishing vessels at present. The Government of Tokelau, through the appropriate department, will need to look at the need for regulations for fishing vessels, with qualifications, sea safety equipment and the standard of living. Under regulations proposed in Kiribati, which is in a similar situation to Tokelau, a 20 mt vessel would be able to work within the EEZ with a Master Class 6 skipper plus a Class 6 engineer (can be the same person). Vessels 20 to 80 mt, working within the EEZ would need a Master Class 5 skipper, Master Class 6 mate, and a Class 5 engineer (engines under 250 kWt) or Class 4 engineer (250 to 500 kWt engine). Given the vessels to be used during proposed fishing trials in Tokelau, which are less than 20 mt, the skipper and engineer requirements appear to be appropriate, and the appropriate government department should look at developing and implementing regulations similar to these.

Suggestion 75: That the appropriate government department develop and implement regulations similar to those being proposed in Kiribati for qualifications and manning levels for the fishing industry.

Sea safety requirements is another area that needs to be addressed by the appropriate government department. When looking at sea safety requirements, and sea safety appliances, they need to be matched to the size of the vessel and the area of operation. One set of regulations will not suit all vessels. Therefore, a range of equipment requirements are needed, based on vessel size and area of operation. Possibly the Fisheries Department can work with the appropriate government department to come up with a workable solution for this.

Suggestion 76: That the Fisheries Department work together with the appropriate government department to develop workable requirements for sea safety appliances, based on size of vessel and area of operation.

A good start to the issue of sea safety could be the Fisheries Department establishing a VHF radio base station on each atoll, with the requirement that all vessels fishing off the coast needing to have a hand-held VHF radio for reporting. Funding would need to be identified for the establishment of the base station, and possibly the hand-held radios could be sold to local fishermen at a subsidised rate to encourage their use.

Suggestion 77: That the Fisheries Department put a funding proposal together to establish VHF radio base stations on each atoll, with a requirement for local fishermen to have hand-held VHF radios, with the purchase of these radios possibly subsidised to encourage their use.

6.2.3 *Duty and taxes on gear and equipment used in the tuna fishery*

The current policy in Tokelau is to not impose duty or taxes on the importing of materials used in the fishing industry. This includes boats, engines, spare parts, fishing gear, bait, ice machines, building materials etc. This is a good policy to keep as an incentive to locals to invest in the tuna fishery. However, there is one commodity, fuel (petrol and diesel) that the government charges six per cent duty on. This will be a disincentive to development of domestic tuna fishing operations, and the government may want to look at dropping the duty on fuel to encourage local people to enter the tuna longline fishery. Availability of fuel will be a major issue as well, and this has been discussed in Section 4.3.8.

Suggestion 78: That the Government of Tokelau retain their current no duty or tax policy on imported goods that are used in the fishing industry.

Suggestion 79: That the Government of Tokelau look at dropping the six per cent duty on fuel as an incentive to developing a domestic tuna longline fishery.

6.2.4 *Licensing*

The issue of licensing will be covered by another of the team members, as the issue of licence numbers, fees, and the criteria for eligibility is an issue that needs resolution sooner rather than later. The input here is more to do with observer coverage and possible funding of observers and trying to create a development fund using part of the licence fee.

Having observer coverage on tuna 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. Therefore, it is essential that the Fisheries Department develop an observer programme to validate the catch of tuna vessels working in its EEZ. The easiest way to ensure 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 the Tokelau EEZ.

Suggestion 80: 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 Tokelau EEZ, to carry an observer from time to time.

The idea of having a separate fee to cover the wages and allowances of observers is not new. The funds collected can be paid into a separate account, specifically for this task. A realistic fee would be around USD \$1000/licence/year for foreign vessels. The government may also want to consider implementing the same requirement for domestic medium-scale tuna vessels, but at a much reduced rate as these vessels may be working from the atolls in Tokelau. A realistic fee for local medium-scale tuna vessels would be around USD \$300/licence/year.

Suggestion 81: That the Fisheries Department seek government approval to implement an observer fee of USD \$1000/licence/year for foreign fishing vessels.

Suggestion 82: That the Fisheries Department consider implementing an observer fee of USD \$300/licence/year for domestic medium-scale tuna vessels.

When looking at the perceived benefits to the small-scale fishing sector from having foreign tuna fishing vessels working in the Tokelau EEZ, there are few. In fact, some groups within the small-scale fishing sector would argue that having tuna longline vessels working in the Tokelau EEZ is a negative benefit, as the catch from these vessels may be perceived as effecting the catch rates of small-scale vessels. Having a trust fund to deposit an observer fee to cover the cost of observers would be a good first step in increasing the perceived benefits from foreign tuna fishing activity by the small-scale

domestic fishing sector. However, observers are used to monitor and verify the fishing activities occurring in the Tokelau EEZ, so there is only a small perceived benefit to the small-scale fisheries sector from this activity. What would be perceived as a benefit or even a boost to this 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, once established, could be used with a separate account for development work, or a separate fund could be established. The fee could be set at around USD \$1000/licence/year for foreign fishing vessel. For local medium-scale tuna vessels, the amount could be a lot less (USD \$300/licence/year), paid into the development fund.

Suggestion 83: That the Fisheries Department collect a ‘development fee’ as an additional charge or portion of a licence under the Plan, and deposit these funds in a trust fund/account for specific work in fisheries development or possibly research.

Suggestion 84: That the ‘development fee’ be set at around USD \$1000/licence/year for foreign fishing vessels, and around USD \$300/licence/year for local medium-scale tuna vessels.

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 could be the funding of an ongoing FAD programme in locations where they will benefit local fishing communities. Some of the funds could be used for research purposes, although this should be minimised.

Suggestion 85: 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.

6.2.5 Data collection and use of data

There is currently no data collection system in Tokelau for foreign vessels, as there has been no real fishing access granted in the past. This will probably change once the tuna plan is implemented and licensing criteria and conditions are set in place. SPC has logbooks for foreign fishing vessels, and the completion of these should be made a condition of licensing to ensure data collection.

Suggestion 86: That the Fisheries Department make it a licensing condition that all foreign tuna fishing vessels complete the appropriate SPC logbook when fishing in Tokelau waters.

There is also no logbook system in place for domestic tuna longline vessels, as this is yet to develop. In this regard, the Fisheries Department should work with SPC’s Oceanic Fisheries Programme (OFP) and use the logbooks that have been developed for the region. SPC currently has a one line per day logsheet for tuna longlining, which is currently under review and being totally revised into a one page per day logsheet. The Fisheries Department could adopt the SPC longline log, and make this a licence requirement for all domestic tuna longline vessels.

Suggestion 87: That the Fisheries Department adopt the SPC regional tuna longline logbook for domestic tuna longlining activities, and make the completion of this logbook a licensing requirement.

A good cross check for the catch data would be the use of observers in the tuna fishery. This has been discussed under Section 6.2.4, which looks at the need for observers and a way of at least partially funding this activity.

There is a significant small-scale domestic tuna fishery conducted in the waters around the three atolls in Tokelau. There appear to be no official figures for the catch taken by these vessels. Most of the catch is taken by trolling or poling using pearlshell lures. It is planned that a new FAD programme (refer Section 6.4.4) will be implemented in 2004. As part of this project, mid-water fishing methods will also be demonstrated with fishermen encouraged to use these methods. With this potential

development, it would be good to start to collect catch and effort data by fishing gear type. Possibly the Fisheries Department could seek assistance from SPC to develop a simple logbook for the small-scale tuna fishery.

Suggestion 88: That the Fisheries Department seek assistance from SPC to develop a simple logbook for the small-scale domestic tuna fishery, with the catch split by fishing method, and have fishermen complete it and provide a copy to fisheries each month.

6.3 Financing for new fishing operations

The financing options for Tokelauans to get their own vessel and enter the tuna fishery are being covered by another member of the team working on this project. This is a difficult area to address, given the amount of money needed to purchase a suitable tuna longline vessel.

6.4 Development options

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

6.4.1 Transhipment of tuna catches and the use of Tokelauan stevedores

The waters of Tokelau are on the edge of the main fishing ground for the foreign tuna fishing fleets in the western and central Pacific Ocean. As a result of this, it is unlikely that vessels would want to come to Tokelau to tranship fish. Also, Tokelau's location is relatively close to the tuna canneries in American Samoa, so vessels would probably go there to unload and take on provisions. Therefore there appears little scope for transhipment to occur in Tokelau, so there is no opportunity for local employment as stevedores at this time.

6.4.2 Tokelauan crewing on domestic and foreign tuna fishing vessels

Tokelau has no real background in providing crew for merchant vessels and foreign fishing vessels. The exception is the government's cargo boat that operates between Samoa and Tokelau. However, there is a possibility for Tokelauans to become crew on foreign fishing vessels, and this was discussed in Section 5.1.1. If this approach is followed, then the government should assist Tokelauans in developing a standard contract for employment on foreign vessels so that both the employer and employee have a clear understanding of the conditions of employment. This could be based on contracts used in other countries such as Kiribati, where this type of employment has been going on for decades.

Suggestion 89: That the Government of Tokelau assist Tokelauans in developing a standard contract for employment on foreign vessels, with the Kiribati contract possibly used as a model.

6.4.3 Observer programme and port sampling

There is currently no observer programme or port sampling programme in Tokelau. This will need to change under the new tuna plan and the need for additional staff at the Fisheries Department has been discussed under Section 5.4. It is hoped that one of the people to be recruited would be specifically to coordinate an observer and port sampling programme. Once the observer programme is up and running, the observer coordinator, through the Fisheries Department, should work with the SPC's Oceanic Fisheries Programme (OFP) to determine the level of observer coverage and any specific data requirements the scientists may need. This will allow the coordinator to get the observer programme to the right level to meet the needs of the Tokelau Government and the scientists who will use the information in the regional stock assessments.

Suggestion 90: That once the observer programme is running, the Fisheries Department work with SPC's OFP to set the level of observer coverage and any specific scientific data requirements.

6.4.4 Fish aggregating devices (FADs)

There is scope for development and assistance 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 Tokelau in the past with mixed success, with these devices attracting tunas and associated species. However, premature loss of several FADs, did not allow the full benefits of the devices to be realised. Currently there are no FADs in the waters around Tokelau.

The Government of Tokelau has identified funding for FAD materials, although this is for a once off purchase with no ongoing funding identified. Therefore, the main problem with having an ongoing FAD programme appears to be the location of ongoing funds. A possible solution to the funding issue, or at least partial funding, has been presented in Section 6.2.4, through the implementation of a 'development fee' of around USD \$1000/year on all foreign fishing licences. If this funding is not enough, then the government should look at other alternatives for ongoing funding for a FAD programme.

Suggestion 91: That regardless of whether or not the funding mechanism of a development fee on foreign fishing licences is implemented, the Fisheries Department looks at options for ongoing funding of a FAD programme.

SPC will be working with the Tokelau Fisheries Department to establish a five-year FAD programme for the three atolls in Tokelau. The programme will be used to encourage development and expansion of Tokelauans becoming involved in the tuna fishery, albeit on a smaller-scale. Such a programme will 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 was to break down and there was a need to mount a search and rescue operation for the overdue vessel.

Suggestion 92: That the Fisheries Department with technical assistance from SPC, implement a five-year FAD programme under the National Tuna Development and Management Plan, for Tokelau.

A FAD programme will include the bulk purchase of materials to maintain a set number of FADs at the main fishing locations around the country, with two or three FADs positioned at each atoll. Spare materials will be kept on hand to replace lost FADs in a reasonable timeframe. A set maintenance programme will be implemented by the Fisheries Department to try to maximise the lifespan of each FAD, thus reducing the overall cost of the programme. Data collection will 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 93: That the FAD programme being implemented under the National Tuna Development and Management Plan, have the following requirements:

- 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 will have to use the cargo vessel, *M/V Tokelau*, for FAD deployments as it is the only suitable vessel in Tokelau at present. This vessel has a suitable GPS and plotters for deploying FADs, although they do not have a suitable deep-water echo sounder (to work in 2500–3000 m). Therefore, funding for an ongoing FAD programme should include the purchase of at least one deep-water echo sounder that can be used on *M/V Tokelau*, or a different suitable vessel in the future, whether this is funded through the development fund or the government's budget.

Suggestion 94: That the Fisheries Department seek funding for a deep-water echo sounder (rated to 2500–3000 m) through either the proposed development fund or through government budget.

The rigging and deployment of the first FADs will be conducted by SPC as a training exercise for staff of the Tokelau Fisheries Department. This would allow the transfer of technical information and skills from SPC staff to staff of the Fisheries Department and other fishermen that wanted to participate.

Suggestion 95: That SPC assist and train Fisheries Department staff in the conducting of site surveys, and the rigging and deployment of FADs as part of their 5-year FAD programme as developed under the National Tuna Development and Management Plan.

6.4.5 *Promotion of small-scale tuna fishing methods*

The Fisheries Department in Tokelau can promote small-scale mid-water fishing methods around FADs once these have been deployed. 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). A workshop could be run at each atoll 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. Materials needed for the workshop could be funded as part of a planned Tuna Fishery Development Project for Tokelau (refer Section 6.4.6).

Suggestion 96: That the Fisheries Department look at introducing mid-water fishing techniques in association with FADs, through a series of workshops, using participant's vessels to conduct practical fishing trials.

Suggestion 97: That the Fisheries Department approach SPC for technical assistance in running the first couple of workshops to train up fisheries staff, with these staff conducting future workshops.

An alternative source of funding for FADs is to apply the user-pays principle. That is, those fishermen that want to fish around FADs pay a fee or contribute to the cost of the FAD. In practice this is very difficult to do as there is no way to monitor and control whom actually fishes around the FADs. It also can create jealousy as some people can and some cannot fish around the FADs, and this may lead to vandalism and loss of the devices. A better approach would be to implement a small licence fee for local fishing vessels, and use the fee to partially fund the ongoing FAD programme, this way everyone is contributing to the cost of the FADs, and each fisherman can choose if and when he wants to fish around them.

Suggestion 98: That the government not look directly at the user-pays approach for funding FADs, but rather consider the implementation of a small licence fee for all vessels, with all or part of the fee funding the on-going FAD programme.

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 Tokelau. The possibility of the Men's Group bringing in general fishing gear was discussed in Section 4.3.4. If this approach is to go ahead, then mid-water fishing gears could be added to the fishing gear items to be imported to Tokelau and sold to local fishermen. The Fisheries Department could assist the Men's Group in

putting a list of gear items together to ensure the correct gear is ordered, as well as provided a list of suppliers to get quotes from.

Suggestion 99: That the Fisheries Department assist the Men's Group to put a list of specific gear needed for mid-water fishing techniques and possible overseas suppliers, 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 is covered under Section 4.3.5, as part of the planned tuna longline fishing trials.

6.4.6 *Promotion of small-scale and medium-scale tuna longlining*

The next level of tuna fishing development, which is higher than the small-scale fishing activities suggested in Section 6.4.5, 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 conducting 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 longlining.

There are currently seven small-scale tuna longliners in Tokelau, although only one is fully operational. The other six, two at each atoll, are owned and operated through the Taupulega on each atoll. Funding needs to be identified to conduct tuna longline fishing trials and the training of local fishermen in tuna longlining techniques. This project is planned for 2004 with SPC providing technical assistance. The aim of the project is to use the existing equipment in Tokelau, namely the six alia-type longliners and the freezer complexes at Fakaofu and Nukunonu to freeze and store the catch, with the catch, some frozen and some fresh on ice, transported on M/V *Tokelau* to Samoa for sale to a fish buyer there. The one private sector vessel currently in Tokelau would be included in the fishing trials and training.

Suggestion 100: That the Fisheries Department, SPC and the communities on each atoll work together to ensure the best success of the planned tuna longline fishing trials and training.

In looking at the planned fishing trials and the proposed tuna fishery development project, the current community-owned vessels will need to be brought back into full operation. This will include outboard repairs and upgrading the existing tuna fishing gear. Funding will be needed to get all six vessels fully operational, and the Government of Tokelau will have to identify funds for this to occur. Once the vessels are refurbished, it should be up to the community on each atoll to maintain the boats, outboards and fishing equipment. This could be achieved by the Taupulega on each atoll keeping a maintenance fund, with a small percentage of the catch value being placed in this account to cover maintenance and repair costs when needed.

Suggestion 101: That the Government of Tokelau identify funding to cover the restoration of the six alia-type longline vessels including the outboards and fishing gear.

Suggestion 102: That the community, through the Taupulega at each atoll, be responsible for maintaining the vessels at their respective atolls in future, possibly through retaining a small percentage of the catch value and placing this in a maintenance fund account to be used as needed.

The crew of the vessels involved in the planned fishing and training will need to be paid so that they receive some financial benefits from the operation. The vessels will be crewed by the able-bodied men on each atoll, and as part of their community work will draw a weekly or fortnightly wage. Therefore the payment of crew should be in addition to the community wage, more like a bonus based on a

small percentage of the catch value to cover the additional hours worked when at sea. There is also the possibility of some fish being taken home at the end of the trip, depending on the catch and the species composition. It is also noted that the owner of the private sector vessel will need to come to some sort of arrangement for paying the crew of this vessel, as this will be outside the scope of the planned tuna fishing trials.

Suggestion 103: That the crew of the vessels be paid their normal community wage, plus a bonus based on a small percentage of the catch value.

Suggestion 104: That the owner of the private sector vessel make his own arrangements for paying the crew on his vessel.

Part of the planned tuna longline project includes the use of the freezers and Nukunonu and Fakaofu, although the cost of operating these freezers is not known. The full cost of electricity to run the freezers will be high, so the government may need to look at a subsidised rate similar to what other residents on each atoll pay. In doing this, records need to be kept on power usage so that an assessment can be made of the economic viability of using the shore freezers. Money will also need to be put aside for ongoing maintenance of the freezers. Again, the Taupulega may need to retain a small percentage of the catch value to cover the maintenance costs of the freezers. Funding will need to be identified for the operation of the freezers as part of the planned tuna fishing trials.

Suggestion 105: That the government consider subsidising the cost of electricity, the same as they do for residents on each atoll, to assist the fishing trials.

Suggestion 106: That during the fishing trials, good records of power usage be kept on the freezers so that an assessment can be made of the economic viability of this type of operation in Tokelau.

Suggestion 107: That the Taupulega at Nukunonu and Fakaofu look at retaining a small percentage of the catch value to put into a fund to maintain the freezers and to cover running costs.

As stated above, two of the three atolls have operational freezer complexes. Atafu has most of the freezer components, however, no construction has commenced. Given this scenario, it may be best for Atafu to wait to see how successful the planned tuna longlining trials are before they put funds towards their freezer complex. So that the people of Atafu do not miss out on the planned fishing trials and training, possibly the two vessels and crew from Atafu could be moved to one of the other two atolls for the project. The expenses of these vessels could be kept separate along with all other operating costs. Alternately, if fishing trials are to be conducted on Atafu, then the freezer complex would need to be constructed and be operational for this to occur.

Suggestion 108: That given the current situation on Atafu with there being no freezer complex, the two vessels and crew from Atafu be moved to one of the other two atolls for the planned fishing trials and training.

Suggestion 109: That if the planned longline fishing trials and training are to be conducted off Atafu, then the freezer complex needs to be constructed and be operational for this to occur.

Another area of the proposed fishing trials that needs to be considered is the handling of fish from the catching vessels to the freezer, then from the freezer to M/V *Tokelau*. Insulated fish bins will be used for this purpose to try to maintain a controlled temperature. It is essential that the bins are used and that the fish is kept out of the sun at all times. This will be very important as HACCP requirements (refer Section 4.5) come into play for any fish being exported to Samoa. Funding will need to be identified to purchase suitably sized insulated fish bins for the proposed fishing trials and test marketing.

Suggestion 110: That insulated fish boxes be used when moving fish from the catching vessels to the freezer and from the freezer to the transport vessel, to maintain a controlled temperature of the product.

Once the planned trials are conducted and the success of the operation proven, the technique of tuna longlining can be demonstrated to other private sector fishermen in the hope that they will invest in the fishery by purchasing a suitable vessel. Workshops could be run, which would include at-sea fishing trials so they see the gear in operation.

Suggestion 111: That the Fisheries Department, with assistance from SPC, set up a training programme to familiarise small-scale fishermen with tuna longlining 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 the communities on each atoll are currently involved. If in the future there is private sector development in tuna longlining, Tokelauans may look at purchasing second-hand vessels. It is important that fishermen purchase suitable vessels for the type of fishing they are planning to undertake. Therefore, before people select a vessel for tuna longlining, they need to consult with experienced people, including SPC, to get advice on the vessel parameters needed for this type of fishing. Another important consideration is to ensure that a second-hand vessel has 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 112: That people in the private sector wishing to purchase a second-hand tuna longliner seek advice from experienced people, including SPC, on the vessel parameters needed for this type of fishing operation.

Suggestion 113: 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 Tokelauans 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 114: 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.

When looking at larger vessels for the tuna longline fishery in Tokelau, there are other options to basing the vessels in Tokelau. One approach would be to base the vessel in Samoa or American Samoa, so the vessel fishes in Tokelauan waters, but unloads its catch direct to the buyers in Samoa. This would increase the operating costs of the vessel slightly (increased travel time and fuel costs), however, these would be more than offset by the higher prices paid for the catch and there being no need to double handle the catch or keep a freezer complex running in Tokelau. In the long run, this may be a more economically viable option to having vessels based in Tokelau.

Suggestion 115: That Tokelauans in the private sector wishing to purchase a medium-scale longliner consider basing their operation out of Samoa or American Samoa.

Another alternative approach is to have a larger vessel with freezer capacity working as a mothership, with the smaller alia-type vessel fishing and landing their catch to the mothership for processing, preservation, and eventually transporting the catch to market. This type of operation has not been

successful in the past in other location, as it can be a costly exercise having a larger vessel moored for weeks at a time waiting for fish to make up a load to take to market.

6.4.7 Marketing the catch from Tokelau

Marketing of the catch will be a key component of the planned tuna fishery development project in Tokelau. As previously stated, the M/V *Tokelau* will be used as the transport vessel to carry the catch to Samoa for marketing. Marketing trials will include both fresh and frozen fish. Frozen fish will be stored in the freezer hold while fresh fish will be transported on the vessel's deck, iced in insulated fish bins. M/V *Tokelau* may not be the most suitable vessel for this task in the long run, although it is fine for the initial trials and the fishing will need to fit in with the boat schedules. This last point is very important as there is no point catching and storing fish on ice if the boat schedule is unknown or the schedule is subject to change without notice. Therefore it is important that there is close communication between the atolls and the transport vessel.

Tokelau is going to be at a great disadvantage with the marketing of the catch due to the method of transportation. Most of the catch will need to be frozen, and frozen fish will bring a much lower price, probably half or less, to the same species if they were fresh. Albacore tuna is the main exception, as this fish has a good value frozen. The market will also have specific species they want to buy, so the fishermen at the atolls will need to keep in contact with the fish buyer in Samoa to ensure that the species sent to Samoa are the species the fish buyer is after. Therefore, to maximise the price received from product, as much of the catch as practical should be transported to Samoa fresh, especially the higher value species such as larger bigeye and yellowfin tuna, wahoo and mahi mahi.

Suggestion 116: That an assessment of the sale price be undertaken for main species, fresh and frozen, so that where possible, fish are sent to Samoa in the form that will bring the highest price.

Suggestion 117: That the fishermen at each atoll keep in regular communication with the Samoan fish buyer to ensure that only fish that have a good market value at the time are being sent.

An alternative to selling the catch fresh or frozen is to do some processing or value-adding to the lower value species. This is discussed in Section 6.5.

6.4.8 Sea safety issues, especially for small-scale fishing operations

The development of small-scale offshore fishing operations is not without safety problems. The Samoa fishery during its early years of development lost 25 fishermen and many boats over an 18 month period in the late 1990s. More recently, two small Samoan longliners have showed up months after they had gone missing, in each case, several people died. Tokelau wants to ensure that they do not go down the same path, but rather learn from the Samoan experience and implement a sound sea safety policy and provide training in this area. The need for regulations regarding sea safety requirements and the possible establishment of a VHF radio base station on each atoll has been discussed in Section 6.2.2.

There is a significant small-scale tuna troll and pole fishery at each of the atolls in Tokelau. The vessels that make up this fleet have little if any sea safety equipment at present. This needs to change, with the boat owners and operators encouraged or even forced through regulation to purchase and carry sea safety equipment, including life jackets, flares, an EPIRB, hand-held VHF radio etc on their boats. The initial cost of the sea safety equipment will be high for each fisherman, so the government may need to look at ways to implement this, possibly with a soft loan that is paid off over a specified timeframe. The same should apply to any small-scale or medium-scale tuna longline vessels starting to fish in the Tokelau EEZ.

Suggestion 118: That the Fisheries Department encourage local small-scale vessel operators and future medium-scale tuna longline fishermen to purchase sea safety equipment for their vessel, with the government assisting with the provision of a soft loan for the initial purchase of the gear.

Having sea safety equipment on board a small-scale fishing vessel is no good if no one knows how to use it. Therefore the Fisheries Department should run a sea safety awareness campaign including the use of the equipment, for all small-scale fishermen. SPC has materials that could be used as part of the awareness campaign. Coupled with this should be regulations (refer Section 6.2.2) that require sea safety equipment be carried on board the boat at all time; as it is never known when it will be needed.

Suggestion 119: That the Fisheries Division develop or request materials from SPC, and run an awareness campaign on sea safety and the use of safety equipment, for all small-scale fishermen.

A final point on sea safety equipment. Some of these materials, such as flares, have expiry dates, and these need to be changed at the appropriate time. Other appliances such as EPIRBs have batteries that need to be changed by a specified time. Fishermen need to do the appropriate maintenance on their sea safety equipment and keep them up to date — an EPIRB with a flat battery will not help anyone in an emergency.

6.5 Value-adding processes as development options

Tokelau has a wide range of constraints to developing economically-viable fishing and processing operations at any of the three atolls. Without major developments in the basic infrastructure of the country, which have been identified in earlier sections of this report, development options are limited. The exporting of fresh chilled and frozen fish is the first step for Tokelau, and tuna longline fishing trials are proposed to commence in 2004. One of the aims of this planned project is to export the catch to Samoa as discussed in Sections 6.4.6 and 6.4.7. However, the viability of such an operation is yet to be proven.

It is easy to increase the production of fish in Tokelau, 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 create employment and 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 Tokelau.

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 Tokelau, 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.

Suggestion 120: That the Government of Tokelau focus on supporting and encouraging small-scale value-added processes and not large scale processes in the immediate future.

Value-adding has been tried once in Tokelau in the early 1990s, with a tuna jerky facility established on Atafu. The venture failed due to a range of issues including the limited supply of suitable tuna to be processed. However, the facility did produce a good product and they had established some export markets before closing. This shows that value-adding can be done in Tokelau. The issue of fish supply may now be overcome with the potential of byproduct species coming from the planned tuna longline project and future fishing activity. The government should encourage the community on each atoll to look seriously at value-adding as an alternative approach to marketing the catch.

Suggestion 121: That the government encourage and support in what ever way it can, the development of companies or community activities focused on small-scale value-added processes such as producing tuna jerky.

Health standards will need to be closely adhered to in the construction and fitting out of any value-adding processing facility. A HACCP plan will also need to be developed for each facility to ensure

all requirements of the importing country are met. To assist with this process, either SPC or USP could be approached for technical assistance in providing information and training.

Suggestion 122: That any processing facility for value-added products be constructed and fitted out according to health requirements and a HACCP plan developed for each facility.

Suggestion 123: That before any value-adding for export takes place, either SPC or USP be approached to provide information and training.

Salting and drying is an alternative process that can be looked at, and this would also suit the atolls in Tokelau, as it is low cost and has a long shelf-life without refrigeration. However, there will be a high risk of histamine and/or Staph contamination, if the fish is not handled and processed properly. HACCP requirements would also need to be met for the export of this product to be successful.

Suggestion 124: That the government support and encourage the development of small-scale salting and drying projects.

7. CONCLUSIONS

There is good potential for developing domestic tuna longline fishing operations in Tokelau, because the resource is known to frequent the Tokelau EEZ. However, the government needs to provide an enabling environment with basic infrastructure to encourage development in the private sector. This will not be easy with the very limited infrastructure currently in place.

There are a range of infrastructure needs that the government can examine to see which are achievable in the short term. The idea of expanding a passage at each atoll to allow vessels to enter the lagoon needs to be explored more, including environmental impact assessments. Wharves and other shore facilities can also be explored and included in the environmental impact assessment. This would provide safe anchorages for small-scale and medium-scale longline vessels, which hopefully would encourage the private sector to invest in such vessels.

Transport is another limiting factor to development, with only sea freight being an option at present. The use of a seaplane is an option, and a full assessment of the feasibility of such an operation needs to be explored. If it is deemed to be feasible, then a further assessment needs to be made on the size of seaplane that can be used and would be viable for both passenger and cargo use. The other alternative is to have an airfield constructed on one of the three atolls. A previous study has been undertaken on this and sites identified. A decision needs to be made by the Tokelau Government on this and funding identified if this is to proceed.

The Government of Tokelau is going to implement a 5-year FAD programme to assist local subsistence and artisanal fishermen. This will be implemented at all three atolls, with materials purchased including spares, with two or three FADs deployed initially at each atoll. Mid-water fishing techniques can also be introduced through the running of workshops at each atoll, to further assist local fishermen in their fishing operations as well as to cut operating costs.

Coupled with the FAD programme is a planned tuna fishery development project for Tokelau. This will use the existing alia-type vessels in Tokelau. The vessels will be refitted to bring them back into fishing operation. SPC will provide technical assistance in training up the crews of the vessels and conducting fishing trials. The vessels will land their fish to the freezer complexes at Nukunonu and Fakaofu for processing and freezing. The frozen fish, plus some fresh fish on ice in insulated fish boxes, will be transported to Samoa on board F/V *Tokelau* for sale to fish buyers there.

There is also the potential for developing small-scale value-adding to product to reduce freight costs and hopefully increase returns to the country on a per kilo basis. The production of tuna jerky is one option that has been tried in the past, and this could be explored again. Any facility constructed for value-adding though, will need to meet all health requirements and standards, as well as a HACCP

plan developed for each facility. Salting and drying is another value-adding process that can be explored, although marketing prospects may be limited.

Training is the other main area that the government needs to examine, especially in the areas of implementing the tuna development and management plan, surveillance and compliance, observer coverage, and the lack of trained skippers and engineers for developing domestic tuna longline operations. The last point is an important one as there are very few people with skills in hydraulics and refrigeration, which are essential for an engineer working on a medium-scale tuna longline vessel.

People consulted during the study

- Falani Aukuso, Director, Office of the Council of Faipule;
- Mose Pelasio, Senior Policy Advisory Officer, Natural Resources and Environment Unit;
- Kuresa Nasau, Faipule of Atafu and Minister for Fisheries and Natural Resources;
- Pio Tuia, Faipule of Nukunonu;
- Penehe Tulafono, Acting Faipule of Fakaofu;
- Len Rodwell, Manager, Economics and Marketing, FFA;
- Ms Josie Tamate, Project Economist, FFA;
- Ms Aliti Vunisea, Community Fisheries Officer, SPC;
- Thomas Tafia, General Manager of the Tokelau power system;
- Luciano Perez, owner of a 13 m tuna longline vessel and just starting fishing;
- Taupulega of Nukunonu (around 20 people present);
- Men's Group of Nukunonu (14 people present);
- Youth and Sports Groups of Nukunonu combined (20 people present);
- Taupulega of Fakaofu (16 people present);
- Men's, Youth and Sports Groups of Fakaofu combined (11 people present);
- Taupulega of Atafu (22 people present);
- Men's Group of Atafu (13 people present);
- Youth and Sports Groups of Atafu (33 people present);

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