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on

TECHNICAL ASSISTANCE PROVIDED TO THE NATIONAL FISHERIES COLLEGE, TO REVIEW THE SMALL FISHING OPERATIONS (SFO) COURSE

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by

William Sokimi
Fisheries Development Officer

and

Lindsay Chapman
Fisheries Development Adviser

Secretariat of the Pacific Community
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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
Email: fishdev@spc.int
http://www.spc.int/coastfish

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SUMMARY

The National Fisheries College (NFC), through the National Fisheries Authority (NFA) of Papua New Guinea, requested technical assistance from the SPC's Fisheries Development Section, to review their Small Fishing Operations (SFO) course following concerns expressed by one of their client groups, the European Union funded Rural Commercial Fishing Development Project (RCFDP). Given the nature of this assignment, it was agreed that the NFC would fund this work through a consultancy, and a Memorandum of Agreement was drawn up and signed to reflect this. The main objectives of this project were: to have an SPC Fisheries Development Officer consult with college staff, members of the local fishing association, students and other stakeholders, to conduct a review of the NFC curriculum for the *Certificate in Small Fishing Operations (SFO) Course*; to propose changes or additions as and where necessary to the curriculum for the *Certificate in SFO Course*; to provide input and advise on the development of a system for nationally acceptable standards in the fishing industry; and to conduct training for NFC tutors and interested fishermen in the practical fishing aspects covered in the *Certificate in SFO Course* to enhance their skills in these methods. Fisheries Development Officer, William Sokimi was assigned to undertake this project from mid-November to mid-December 2004.

In reviewing the SFO course, it was realised that the course itself was still relevant, however the delivery of the course by a previous tutor led to the concerns being expressed by the RCFDP. The course itself also did not cover the training methodology required by the RCFDP for their loan recipients, so this needed to be considered in the review. Following consultations that were held with RCFDP staff and staff of the NFC, it was decided that a separate course needed to be developed to specifically meet the needs of the RCFDP loan recipients. This included more fishing time and elements of the Post Harvest Operations (PHO) course. A three-week integrated SFO/PHO course was developed although this was not an accredited course.

The Fisheries Development Officer also undertook some at-sea training with 12 participants on a PHO course, and three tutors from NFC. Deep-water snapper fishing and night fishing using light attraction were the main methods used. An assessment of the 8.2 m fibreglass inboard diesel-powered skiff being used by the RCFDP for their loan recipients in some locations was also undertaken, with the vessel found to be well suited for the type of fishing operations that were carried out. The RCFDP was also using a 6.2 m Yamaha fibreglass open skiff, or banana boat in some locations, powered by a 30 HP outboard engine. This vessel was much more limited in its fishing capabilities, and the mounting of the handreels horizontally rather than vertically made them more difficult or uncomfortable to use. Two main limiting factors that were identified on both these vessels were the absence of an echo sounder and the absence of a canopy to protect the skipper and crew from the elements.

An initial look at baitfish was also undertaken. This partly flowed on from previous work undertaken at NFC, with the focus now taken on by the Asian Development Bank funded Coastal Fisheries Management and Development Project (CFMDP). An assessment was made of the main bait species caught by local villagers and the areas in which these baitfish were caught. The aim of this was to look at suitable bait species for tuna longlining, to see if a local sustainable and viable baitfish fishery could be developed. This work is ongoing and will incorporate community-based participation by local communities.

RÉSUMÉ

L'Institut d'études halieutiques, par l'entremise du Service national des pêches de Papouasie-Nouvelle-Guinée, a demandé à la Section Développement des pêches de la CPS de l'aider, sur le plan technique, à examiner le cours sur la petite pêche, après que les responsables du Projet de développement de la pêche commerciale en milieu rural financé par l'Union européenne, qui figurent parmi les clients de l'Institut, ont fait part à celui-ci de ses préoccupations. Compte tenu de la nature de cette mission, il a été convenu que l'Institut d'études halieutiques financerait ce travail dans le cadre de services de consultants, et un protocole d'accord a été élaboré et signé à cet effet. Les principaux objectifs de ce projet étaient les suivants : demander au Chargé du développement de s'entretenir avec le personnel enseignant de l'Institut, les membres de l'association locale de pêche, les étudiants et d'autres interlocuteurs, afin de réaliser une étude du programme du Cours sur la petite pêche menant à un certificat. Il s'agira de proposer d'y apporter des modifications en tant que de besoin, de donner des conseils en vue de l'élaboration d'un système de normes acceptables sur le plan national, pour la filière des pêches, et de dispenser une formation en faveur du personnel enseignant de l'Institut et des pêcheurs intéressés sur les aspects pratiques de la pêche traités dans le cadre du cours en question, afin d'améliorer leurs compétences à cet égard. William Sokimi, le Chargé du développement de la pêche à la CPS, a été affecté à cette mission entre la mi-novembre et la mi-décembre 2004.

Lors de la révision de ce programme de cours, on a constaté que le cours lui-même gardait toute sa raison d'être, mais que c'était la manière dont l'un des enseignants l'avait dispensé par le passé qui avait conduit les responsables du Projet de développement de la pêche commerciale en milieu rural à exprimer leurs préoccupations. Ce cours proprement dit ne couvrait pas les méthodes de formation que les responsables du Projet exigeaient d'enseigner à leurs boursiers, aussi fallait-il envisager également ici d'en modifier le contenu. À l'issue de consultations menées avec le personnel affecté au Projet et le personnel de l'Institut, il a été décidé d'élaborer un cours distinct pour répondre précisément aux besoins des boursiers. Il s'agissait notamment de consacrer davantage de temps à l'activité de pêche et d'intégrer les aspects du cours sur les activités post-récolte. Une formation incorporant le contenu du cours sur la petite pêche et celui du cours sur les activités post-récolte, d'une durée de trois semaines, a été mise sur pied, mais elle n'a pas été agréée.

Le Chargé du développement de la pêche de la CPS a également organisé des stages pratiques en mer avec 12 participants et trois enseignants de l'Institut dans le cadre d'un cours sur les activités post-récolte. Les principales méthodes utilisées ont été la pêche profonde du vivaneau et la pêche de nuit au moyen d'un dispositif d'éclairage. On a également commencé à évaluer le canot à moteur de 8,2 m en fibre de verre utilisé pour les boursiers sur certains sites dans le cadre du Projet de développement de la pêche commerciale en milieu rural, et l'on en a conclu que cette embarcation était bien adaptée au type d'opérations de pêche pratiquées. Une embarcation non pontée (du type appelé « banana boat » dans certains endroits) de la marque Yamaha en fibre de verre propulsée par un moteur hors-bord de 30 chevaux était également utilisée dans le cadre de ce Projet. Ce bateau était beaucoup plus limité dans ses capacités de pêche, et le montage des moulinets horizontalement plutôt que verticalement rendait ceux-ci moins maniables. Enfin, l'absence de sondeur et d'un taud pour protéger le capitaine et son équipage des éléments figuraient également au nombre des principaux inconvénients de ces deux embarcations.

On s'est également intéressé aux appâts, dans le prolongement des précédents travaux menés à l'Institut, repris dans le cadre du Projet de gestion et de développement de la pêche côtière, financé par la Banque asiatique de développement. On a évalué les principaux appâts pris par les pêcheurs locaux et les zones où ces appâts sont capturés. Le but était de trouver des appâts qui conviennent pour la pêche thonière à la palangre, et de déterminer si une pêcherie d'appâts locale durable et viable pouvait être développée. Ces travaux sont en cours et les populations locales y seront associées.

CONTENTS

1. INTRODUCTION AND BACKGROUND

1.1 Papua New Guinea

Papua New Guinea is an independent island nation that has a total land area of 462,243 km^2, and is located between the Equator and 12˚S latitude and 141˚ and 160˚E longitude (Figure 1).The exclusive economic zone (EEZ) for Papua New Guinea is around 3,120,000 km^2, with around 20 per cent of this bordering international waters, and the rest bordering four Pacific nations, Indonesia to the west, the Federated States of Micronesia to the north, the Solomon Islands to the east, and Australia to the south (Chapman 2004).

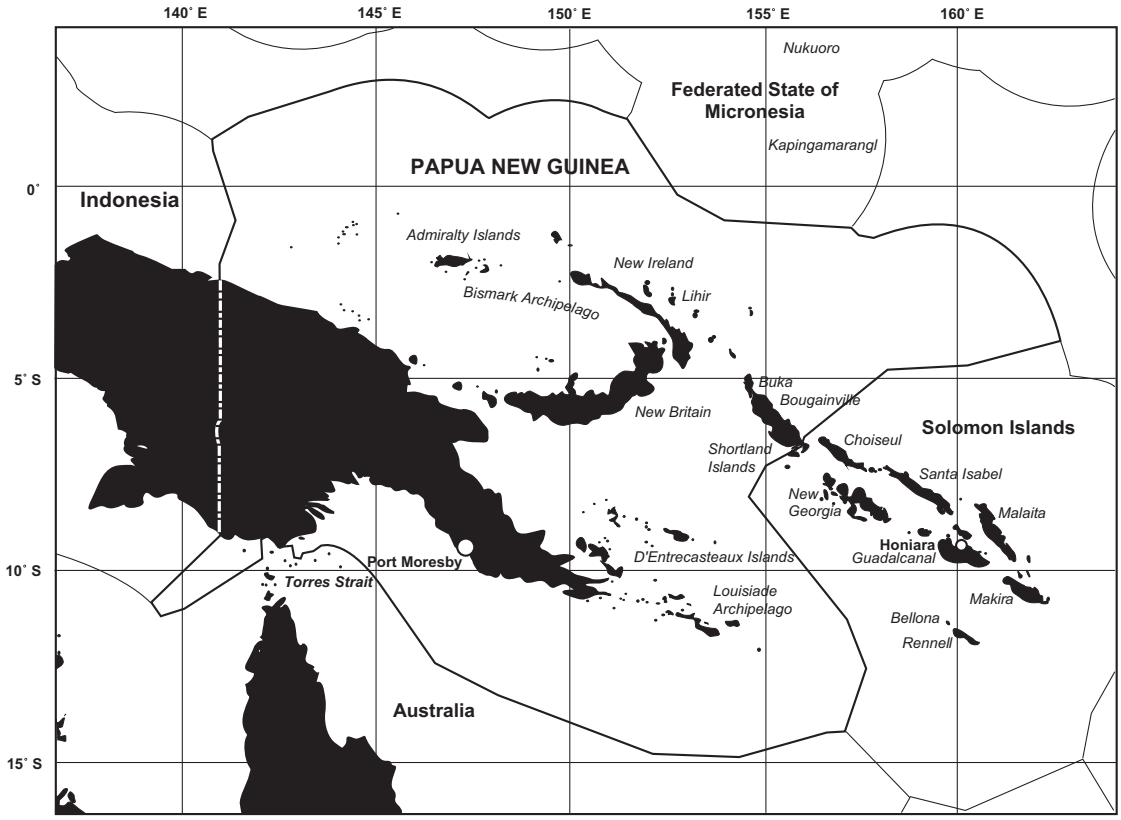

Figure 1: Papua New Guinea, its EEZ and neighbouring countries

The country gained its independence on 16 September 1975 and has a population of approximately 5,420,280 (SPC 2004). The territory consists of 20 provinces which include numerous smaller islands and atolls. The provinces are Bougainville, Central, Chimbu, Eastern Highlands, East New Britain, East Sepik, Enga, Gulf, Madang, Manus, Milne Bay, Morobe, National Capital District, New Ireland, Northern, Sandaun, Southern Highlands, Western, Western Highlands, and West New Britain. The western part of New Guinea is the Indonesian governed territory of Irian Jaya or West Papua.

Papua New Guinea has a generally tropical climate in which November to March is the wet season (NW Monsoon) and April to October is generally dry (SE trades), although occasional rain falls throughout the year. The main island is covered with tropical rain forests consisting of vegetation that is a mixture of Asian and Australian species. The islands are also the habitat for a remarkable variety of exotic birds including all the known species of the birds of Paradise (Anon. 2004).

Papua New Guinea is rich in natural resources, but development of these resources is hampered by the harsh terrain and the high cost of infrastructure. The mass of the population (85%) depends largely on subsistence agriculture, while 72 per cent of the export earnings come from mineral deposits such as oil, copper and gold.

The people of Papua New Guinea can be divided into four ethnic groups. These are the New Guineans from the north of the main island, the Papuans from the south, the Highlanders, and the Islanders. There is a diverse cultural difference across the country and almost 800 indigenous languages. Although English is the official language, Pidgin English is the main spoken language (Anon. 2000).

1.2 New Ireland Province

New Ireland Province is spread over 230,000 km^2 of sea and consists of 149 islands north of New Britain (Figure 2). It has a land area of approximately 9600 km^2 and a population of approximately 86,741 citizens and 258 expatriates. Nineteen distinct languages are spoken throughout the New Ireland Province. The main island is 350 km long and is as narrow as 5 km in some areas, and is widest in the

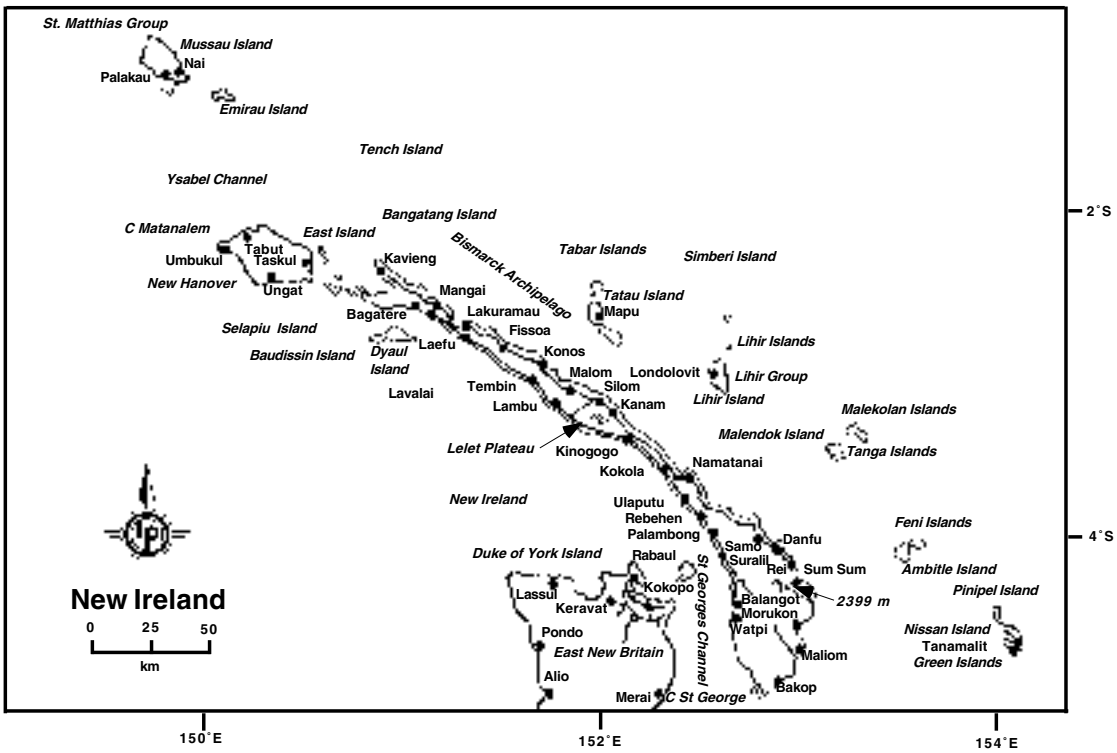

Figure 2: Map of new Ireland

The island groups that make up New Ireland Province constitute Mussau—Emirau (St. Mathias), 16 islands; Lavongai (New Hanover) and east islands, 9 islands; Tabar, 6 islands, Lihir, 5 islands; Tanga, 11 islands and Fendi (Anir), 3 islands (Anon. 2001a).

Most of the flat land and coastal areas of New Ireland Province is covered by coconut plantations. The demand for land to carry out subsistence and commercial gardening and the introduction of the logging industry has seen the rain forests being replaced by secondary growth forests and grasslands. Mangroves and sago palms are still evident in coves along the coasts of most of the islands, and at Balgai Bay near Kavieng. Timber and copra are leading export items for New Ireland Province, with gold and tuna being looked at for further development. Gold is mined at Lihir Island and is also found on nearby islands. Coconuts, cocoa, betelnut, pigs, vegetables, bananas, fruit and fish are among the main sources of income for the villagers (Anon. 2001a; Anon. 1998).

1.3 Previous SPC involvement in PNG's fisheries development

Since 1979, the Secretariat of the Pacific Community has undertaken several fisheries projects in PNG, with these contributing tactical advice as well as technical assistance to the development of artisanal and commercial fishing in the country. The SPC's Deep Sea Fisheries Development Project (DSFDP) assisted PNG four times in the late 1970s and 1980s, with the focus of these activities on developing the deep-water snapper resource in the country.

The first stage of the DSFDP was carried out in the west of New Britain Island in the Kimbe to Cape Gloucester area in 1979 (Fusimalohi and Crossland 1980). The project involved assessment work of fish stocks on the outer reef slopes. Deep-water snapper fishing techniques were refined during the project with the introduction of basic modern fishing gears and materials. The second DSFDP project was conducted in 1982 in Port Moresby, Samarai and Manus and was a continuation of the work done in West New Britain (Chapman and Fusimalohi 1998). The third DSFDP project was conducted in the West New Britain, Manus and Sepik Provinces in 1984 (Chapman 1998). This involved trials with deep-water snapper fishing techniques, trolling for tuna and other pelagic species and deploying a fish aggregating device (FAD) off Wewak in the East Sepik Province. The final DSFDP project was implemented over six months in the Oro Bay area of Northern Province and Rabaul in the East New Britain Province in 1988 (Wellington and Cusack 1998). The development of small-scale artisanal deep-water bottom fishing was promoted and assistance was given to the National Fisheries College in Kavieng, New Ireland, to train students in rigging deep-water bottomfishing gear.

In line with regional fisheries development changes and the growing trend of island nations aspiring to harvest their own offshore fish stock, mainly tuna, the DSFDP section was renamed the Capture Section of SPC in the 1990s, then later in 2000, the Fisheries Development Section. A series of fisheries projects have been undertaken in PNG since the DSFDP. In 1992, assistance was provided to the Fisheries Department in Port Moresby, with two FAD sites surveyed and a FAD deployed 5 nm SSW of Daugo Island (Beverly and Cusack 1993). From 1992 to 1994, a tuna fishing, handling, and marketing project was undertaken in Rabaul and the Duke of York Islands to develop and encourage local entrepreneurs to export top grade tuna to the sashimi markets in Japan and the US (Beverly and Chapman 1996). Technical assistance was again provided in 1998/99 to the National Fisheries College in Kavieng to teach the practical fishing module of the Fishing Cadet Course (Watt 1999). In 2001, assistance was provided to the newly formed New Ireland Commercial Fishing Association (NICFA) to introduce different small-scale offshore fishing techniques to members of the association (Sokimi and Chapman 2001) and in 2002, technical assistance was again provided to the National Fisheries College on implementing and activating a 'Certificate in Small Fishing Operations (SFO) Course' (Sokimi and Chapman 2002).

1.4 National Fisheries College

Fishing is an ancient activity essential to sustain the daily protein requirements for households in coastal communities around PNG. Now fishing has become one of the major sources of income for many subsistence and artisanal fishermen, especially since government took the initiative to encourage private sector development of domestic commercial fishing. This has encouraged many subsistence fishermen to progress into artisanal, then full-time commercial fishing operations to capitalize on exploiting the abundant marine resources around the country's coastal zones.

Demand for fish supplies by the local fish markets as well as overseas fish outlets will increase the rate of exploitation of fisheries resources, while lucrative prices will spur fishermen to produce more than would be good for the sustainability of the resource. Since the fisheries resources of the inshore coastal waters are easier to access, unchecked increased activity in exploiting these resources will lead to overfishing and stock depletion. Proper management policies and enforcement strategies need to be implemented in order to have some measure of control over the exploitation of the country's marine resources. To do this effectively, data needs to be collected and compiled from reliable sources and reliable assessment methods have to be used to identify areas that need special attention to devise means of controlling harvests.

Some measures of effectively developing sustainable fisheries in the country can be achieved by educating subsistence and artisanal fishermen to carry out safe and sustainable fishing practices using approved gear and harvesting methods; diversifying fishing grounds away from inshore waters to offshore waters for pelagic species; encouraging all fishermen and fishing communities, especially those fishing commercially, to maintain accurate fishing records; and developing training strategies for all levels of the fisheries community. With this in mind, fisheries training institutions such as the

National Fisheries College play an important role in producing the necessary manpower to facilitate and effectively manage the country's fisheries development and growth.

The National Fisheries College (NFC) is located along the Bluminsky highway in the New Ireland Province of Papua New Guinea, approximately 3 km from the New Ireland capital town, Kavieng. The college's main campus has hostel rooms to board up to 60 students and facilities such as a recreation room, training rooms, spacious classrooms, a radio training room, safety and fire fighting training room, library, conference, and administration facilities. NFC also has a waterfront site with two training vessels (FTV *Leilani* and FTV *Kavulik*), several fibreglass banana boats, a slipway, wharf, workshop, and fishing gears shed. Also administered by the NFC and under lease to the private sector, is the new processing plant, freezer storage and blast freezing facility, and wharf facilities that were constructed through a joint project between the Australian Agency for International Development (AusAID) and the Asian Development Bank (ADB).

The college was first established in 1977 through financial assistance from the Japanese Government to provide a trained workforce to supplement the increasing demands of the steadily developing domestic fishing industry. Initially, a series of training courses was designed to provide skilled employees for the domestic pole-and-line industry that operated from the early 1970s until 1981, when the industry closed down. Since then, up until the end of 1996, NFC offered a Certificate in Tropical Fisheries (CTF) course to provide training for Fisheries Extension Officers. Increased development of the domestic offshore commercial fishing operations and several reviews made by organisations such as the United Nations Development Programme (UNDP), ADB, and Japanese International Cooperation Agency (JICA) recommended that the college implement an appropriate course to meet the immediate needs of the fishing industry. This resulted in the college developing a Fishing Cadet Course to fulfil the manning requirements of the industry, while complying with competency standards made mandatory by the International Maritime Organisation (IMO) under the 1995 STCW (Standards of Training, Certification and Watch-keeping) Convention.

By the year 2000, the college began to go through an organisational review that was part of the restructuring process of the National Fisheries Authority (NFA). The college restructuring process was facilitated by the AusAID funded, National Fisheries College Strengthening Project (NFCSP). The AusAID team worked with NFC staff to strengthen the college's organisational and administrative system and to plan and implement new courses relevant to the demands of the private sector to partake in commercial fishing.

The courses currently offered by the NFC are the Commercial Fishing Operations (CFO) Courses I and II, to train fishing vessel crew to work as deckhands and watch-keepers on commercial fishing vessels in the industry; the Post Harvest Operations (PHO) Courses I and II, to train personnel in industry-based hygienic seafood processing skills; and a range of short programmes to cover seamanship, boat handling, basic navigation, sea safety, fishing operations, on-board handling and processing, resource management, and small fishing operations management. The College also runs several national and provincial programmes that cover Small-scale Fishing Operations (SFO), Observer Course, Fisheries Officer Training Course, Hazard Analysis and Critical Control Point (HACCP) Course, Vocational Teachers Course—DoVET, and Fisheries Business Course (Anon. 2001b).

1.5 New facilities for fishing and post harvest operations in Kavieng

New onshore facilities were constructed in Kavieng, New Ireland Province as part of the National Fisheries College's development strategies for fisheries development. Construction of the facilities was funded under AusAID and ADB projects to support the development of commercial fishing operations. Construction of the facilities was completed in January 2004 and includes a fish processing plant (Figure 3), ice making machine and wharf area with berthing areas for big commercial tuna longliners (Figure 4) as well as a separate jetty for smaller vessels. Both berths have areas for refuelling and loading fresh water. The fish processing plant was leased to Ailan Seafood Limited (ASL) in April 2004 and is a joint venture arrangement between Emirau Marine Products (EMP) and Ailan Seafood Limited New Zealand (ASLNZ).

Figure 3: New fish processing facility

Figure 4: New wharf facility

Tuna and pelagic fish supplies are provided by five tuna longline vessels of which one vessel is operated by ASL and the other four are owned and operated by Maps Tuna. It is expected that two more longline vessels will be processing their catches at the fish plant in early 2005. Approximately 40–50 t of tuna and byproduct have been processed in the plant each month since the five tuna longline vessels started operating.

In addition to tuna, 8.2 meter inboard diesel engine boats started operating in October 2004 under the EU-funded Rural Coastal Fisheries Development Programme. Since then, an additional 3–4 t of bottomfish per month has been processed at the plant. The fish products are processed, blast frozen then shipped by freezer container to export markets.

1.6 European Union Rural Coastal Fisheries Development Programme (RCFDP)

1.6.1 General

The European Union formally began a fisheries project in Papua New Guinea in mid-2002 to promote fisheries development through private sector initiatives. The project was funded under the 8th European

Development Fund and was marked to run for five years with a starting budget of € 6 million (PGK 25 million). The start up phase was scheduled for October 2002 to March 2003, and the project implementation was expected to be for 3 years in Madang and 2 years in Port Moresby, beginning from April 2003. The completion date for the project is scheduled for July 2008.

The objective of the RCFDP is to improve the welfare of the rural coastal population by facilitating their participation in the harvesting and marketing of their marine resources through credit assistance loans issued under a micro credit loan scheme. The project is spread out among seven sites around Papua New Guinea, being Alotau, Buka, Daru, Lae, Kavieng, Madang and Port Moresby.

1.6.2 Credit assistance loans

The RCFDP loan scheme incorporates several components to facilitate issuing loans and assist loan recipients maintain their commitments to succeed in small fishing enterprises. The loan scheme is categorised under three packages; the Micro Credit Scheme (MCS), the Starter Package Scheme (SPS), and the Major Credit Scheme. The applicants for the loan schemes should be skilled in capture fishing methods and post harvest operations, be an active fisherman, be a member of the fisherman's association, have the support of the private sector partner (PSP), have a viable business plan and be willing to engage in the project as an entrepreneur.

The lowest loan category under the MCS is for PGK 100 to 1000 to be issued for upgrading vessels, purchasing fishing gear and ice boxes, or for acquiring necessary equipment to complement an existing fishing operation.

The SPS was allocated PGK 4.5 million for fishermen interested in purchasing the project design vessels equipped with sufficient gear for deep-water and mid-water fishing operations. The loans for this category are issued free of interest provided the successful recipients have a starting capital of PGK 1000 to cover initial operational costs. The recipient also has to deposit a PGK 500 bond that is forfeited if the vessel is repossessed for non-performance. The premiums collected from repaid loans go into a revolving fund that accumulates capital for other fishermen willing to engage in commercial fishing activities. To be eligible for the SPS the applicant has to be a full-time rural fisherman or fish farmer, be willing to be in an incorporated business entity with PSPs, have a viable business plan, have considerable marine fishing experience, and be willing to engage full-time in fishing activities. There are two types of project vessels (Figure 5) currently being issued under the package. The less costly design is a 6.2 m open banana boat design (Figure 5) constructed of fibreglass and based on the mould of Yamaha banana boats that were previously popular on the local scene. The higher priced design is a modified version of a Yamaha 8.2 m FRP half-cabin fishing vessel (Figure 5) with an inboard 47 HP engine that was initially introduced by ELA Motors.

Figure 5: Two types of vessels being used by the RCFDP

The Major Credit Scheme category is mainly for applicants willing to engage in the role of private sector partners or operators of processing and marketing facilities. Loans are available for this category through a specified local funding institution at interest rate of one to two percent less than the normal commercial interest rates. The applicants for this category need to be a current business operating in the country at RCFDP project sites and be willing to take out a loan under the project to provide support services to the project and its clients.

1.7 Initiation and objectives of the SPC/NFC project

Part of the criteria for the EU-RCFDP project loan recipients requires a training and familiarisation component immediately after receiving their loan package. Being the national institute for providing fisheries training in Papua New Guinea, the NFC was given the task to provide this training. Problems were encountered with the delivery and content of the first few courses, and the staff of the RCFDP questioned the suitability of the course being provided. In response to this, the NFC requested the services of the Secretariat of the Pacific Community's Fisheries Development Section to assist the college conduct a review of the Small Fishing Operations (SFO) course in order to accommodate the concerns and criteria requested by the EU-RCFDP administration.

In response to this request, a Memorandum of Agreement was developed and signed for this project. It was also agreed that the NFC would fund this assistance by paying a consultancy fee for the services provided. The main objectives of this project were to have an SPC Fisheries Development Officer:

- consult with college staff , members of the local fishing association, students and other stakeholders, to conduct a review of the NFC curriculum for the *Certificate in Small Fishing Operations (SFO) Course*;
- propose changes or additions as and where necessary to the curriculum for the *Certificate in SFO Course*;
- provide input and advise on the development of a system for nationally acceptable standards in the fishing industry; and
- conduct training for NFC tutors and interested fishermen in the practical fishing aspects covered in the *Certificate in SFO Course*, to enhance their skills in these methods.

Fisheries Development Officer, William Sokimi, was assigned to undertake this project, and he spent four weeks in PNG, from mid-November to mid-December 2004, mostly at the National Fisheries College in Kavieng. Four days of this time were spent in Madang to consult with the RCFDP team leader and masterfisherman to determine exactly what they required for the training and familiarisation of loan recipients.

2. PROJECT ACTIVITIES—REVIEW OF SFO COURSE

2.1 Consultation with the Coastal Fisheries staff of the NFC

The consultation with NFC, Coastal Fishing Operations (CFO) staff established that the SFO course contents previously delivered to the RCFDP loan recipients did not satisfactorily meet the requirements of the RCFDP team leader and masterfisherman. The RCFDP team was dissatisfied with the SFO course conducted by NFC—CFO staff citing poor course delivery and insufficient real sea-time during the course as areas of discontent. The RCFDP team were also disturbed with the way the NFC staff managed business dealings between the two parties. This arose after a request for a programme outline and costing for an integrated 3 weeks SFO/PHO programme was not expediently dealt with by the NFC staff to the satisfaction of the RCFDP team.

The NFC, CFO staff on the other hand, were confused as to what was being requested of them. Initially they were requested to reduce the SFO course from 12 days to 5 days while still maintaining the core of the subjects, but to include more fishing trips. This, they rightfully stated, was difficult since the 12

day SFO curriculum had already been through an assessment period to arrive at its current implementation duration. If the course duration was to be any shorter, then some topics would have to be forfeited and the course would not be a Small Fishing Operations course, but an unaccredited fishing methods programme tailor-made for RCFDP purposes. To add to the staff's confusion they were then requested to produce a 3 weeks integrated SFO/PHO course that includes most of the SFO subjects as well as more on post harvest operations and more fishing activities with less Safe Operation Plans and basic financial management subjects. The NFC staff stated that to produce a programme outline and costing overnight was not possible as they needed at least a week to put the outline together and get a costing on the programme.

However, the staff admitted that there was cause for the RCFDP team to be concerned about several SFO presentations that were previously carried out. It was acknowledged that a previous staff did not deliver the programme as designed and had done little on the fishing exercises while implementing more theoretical training that did not impress the course participants. Although the SFO course was designed to be implemented in an 'out of classroom' scenario with more picture/caption presentations, this staff delivered most of the SFO course materials indoors and found excuses not to take the fishing trips in order to be onshore for personal activities. This only occurred when the SFO course was conducted away from the NFC campus, and at the site where the recipients were located. The problem has since been dealt with and the staff member concerned is no longer employed by the college. An experienced masterfisherman was recently employed and charged with overseeing the delivery of the SFO course, and measures will be implemented to pay close attention to the SFO course delivery comments that are provided by the participants.

During this consultation it was stressed that the college staff have to realise that the RCFDP is an important high paying customer and their concerns need to be fully addressed in order to generate income through proper customer service.

2.2 Consultation with the EU-RCFDP team

In consultation with the RCFDP masterfisherman and the project team leader, it was confirmed that the SFO course was not what they wanted for their loan recipients. They expressed concern that the training over-emphasised classroom learning and that the fishermen that were issued loans were not academics, but commercial rural fishermen who would be their own bosses and needed to spend most of their training actually fishing. The RCFDP team complained of inadequate management on the part of NFC in handling business affairs between the two parties and indicated that this was an area that needed to be corrected immediately, otherwise the RCFDP would have to seek alternate arrangements with other training institutions within the country to carry out the fisheries training component of their project.

During this discussion the team was informed that the college did not at present have a course to completely cover their request, but a programme could easily be drawn up according to the requirements of the RCFDP. The programme would not be accredited, but could be tailor-made for RCFDP's purposes. This arrangement suited the RCFDP team since their main concern was to have a professional team walk their loan recipients through receiving their package, setting themselves up for the fishing operations, carry out the fishing operations consistently and manage their catch well to provide quality fish for the markets. The RCFDP team wanted their loan recipients to commence real fishing trips immediately after receiving their package and to practise the other SFO components during this time. The RCFDP masterfisherman suggested that the course programme go directly to constructing fishing gears as soon as possible then onto the fishing trips.

The RCFDP requested that a 3 weeks integrated SFO/PHO course outline be drawn up for appraisal before a final curriculum be put in place to train their loan recipients in 2005.

2.3 Review of the curriculum for the SFO course

In reviewing the SFO course curriculum the following observations were noted:

- The SFO course is an accredited course that is a competency based programme approved by the Fisheries Training Advisory Committee and designed to prepare fishermen who *already have some experience* in fishing and handling small crafts to venture on safe fishing trips using Safe Operations Plans.
- The objectives of the course are for participants to enhance their fishing skills; apply safety practices that will make them confident and competent to operate a small fishing boat; know how to carry out basic navigation; maintenance and repair of gear and equipment; and practise proper fish and seafood handling, fishing gear design, sanitation and hygiene.
- The course gives participants the chance to develop skills to successfully run small fishing operations and to manage their small fishing business viably, while being aware of environmental issues, stock impact and sustainable fishing practices.
- The structure of the SFO course is designed for fishermen at all literacy levels that have experience in handling small craft.
- The course was not intended or designed for classroom delivery, but has all the necessary components for developing small fishing operations. Information is delivered as basically as possible to the fishermen and a picture/caption approach is adopted to convey important information. Video tapes and overheads are used to concentrate the fishermen's attention on important issues and to stimulate their imagination on what is expected of them.
- If delivered correctly, the SFO course should be the ideal course to prepare fishermen to get started in their small fishing operations. The programme is based on practical exercises to cover all areas involved in a small craft fishing operation.
- The course is a good elimination or selection process for funding institutions to use when considering loan recipients for small-scale fishing operations. Normally loans for fishing vessels and fishing gears are *issued to recipients who are experienced fishermen* that have the potential to meet the loan commitments. Most islanders who live in coastal settlements know how to fish, so what they should really be covering during familiarisation courses are topics that are new to them or topics that they are not familiar with such as safety, first aid, financial management, safe operation plans and sustainable fishing awareness.
- The SFO course can now be delivered in locations off campus. The advantage in this is that the course can be taken to the participants instead of having to send large groups all the way to NFC in Kavieng. This saves a lot on funding and gives the fisherman the chance to develop in his own environment. Initially the course was only conducted at the NFC campus in Kavieng, but once the course materials were refined it was made mobile for delivery in areas where sufficient participants were interested.

Several observations were noted as areas that could be improved on:

- The course timetable needed to be rescheduled for better delivery flow. A revised timetable guide for the SFO course can be found at Appendix A.
- A proper SFO course manual needs to be compiled to convey information to participants mainly through picture/caption expression.
- While the current structure of the course materials are sufficient for implementation, some of the subjects can be further refined to be brief but effective enough to get the message across.
- The college staff needs to develop a personal interest to familiarise themselves with the fishing methods and fishing gears used during the presentations. This should be done through practice fishing trips during the off-peak times in the college's programme.
- While the use of accessories can be very useful for fishermen to improve their fishing operations, the college staff needs to keep emphasising the basic hook, line, sinker, and knots principle so that the fishermen will be able to still fish confidently whether they have the accessories or not.

2.4 Integrated SFO/PHO programme for the RCFDP

Consultations were carried out with the CFO and the PHO staff of the NFC to determine the best way to proceed with implementing an integrated SFO/PHO programme for the RCFDP. Several points were identified:

- The NFC needs to maintain its integrity to deliver programmes that are significant for the type of activity that it is designed for.
- The integrated SFO/PHO programme must comply with the country's Occupational Health and Safety (OHS) rules for industrial safety (safe for the college staff to implement as well as for the participants).
- The programme must comply with the country's industrial standards for training requirements and be compatible with industrial progress, be ethically correct, and meet the needs of the client.
- The SFO course is an important component for small fishing operations development. The safety components of the SFO course will have to be incorporated into the RCFDP integrated SFO/PHO programme.
- The proposed integrated SFO/PHO programme will not be accredited, but will only be tailor-made for the RCFDP purposes.
- The programme has to be compatible for all literacy levels, therefore picture/caption mediums need to be used for delivery of information.

A draft outline of the RCFDP integrated SFO/PHO programme contents can be found at Appendix B.

3. PROJECT ACTIVITIES—TRAINING AND FISHING

3.1 Fishing trip on the RCFDP 8.2 m dory.

An overnight fishing trip was organised with PHO students working on two of the RCFDP dories. This fishing trip was the final part of a NFC, PHO course undertaken by selected participants who were crew of the RCFDP loan recipient's dories. Initially, four vessels were organised to work as a team during this exercise, but due to religious obligations the crew of two vessels could not participate in this exercise, however, they were willing to undergo this the following week on their own. The SPC Fisheries Development Officer was invited to coordinate the exercise on two vessels between 12 crew and 3 of the college's PHO staff.

Both vessels were equipped according to the normal SFO Safe Operations Plans for deep-bottom fishing exercises and night fishing methods. Although the fishermen were known to have experience in the fishing operation, the Fisheries Development Officer gave them additional tips on how to prepare for a fishing trip by pre-setting all the fishing equipment and bait before departure; checking the weather; choosing fishing grounds using a chart; checking the depth using the vessels engine and one of the fishing handreels or a sounding line and the echo sounder; how to anchor the vessel keeping in mind the direction and strength of the wind; how to ensure that the anchor has caught on before dropping lines; how to drop lines and identify bites and strikes; hauling the line back in; gaffing and boating fish; on-board handling of fish; and hauling the anchor.

Between the two vessels, 11 kg of skipjack tuna (*Katsuwonus pelamis*) and Japanese chub mackerel (*Scomber japonicus*) was caught for bait while trolling on the way to the fishing grounds off Tsoi Island (Figure 6). Travelling time to the fishing grounds, including trolling for bait, was 3 hours. Since both vessels had VHF radios, communications between the two vessels was established and the fishing operation was coordinated effectively. Only one vessel had an echo sounder with an improvised transducer attachment, but this was better than not having an echo sounder at all, which was the way the boats were issued to the loan recipients. The echo sounder was rated to sound up to 300 m but it was found that it could only effectively detect the bottom down to 150 m before the bottom started

fading out. Only when the vessel slowed right down could slight detections over 200 m become visible on the screen. The fishing spots for both vessels were located using this echo sounder but not much time was spent trying to locate the ideal fishing bottom due to the amount of time being wasted having to slow the vessels right down to survey potential spots.

Figure 6: Proceeding to Tsoi fishing ground

3.1.1 Deep-bottom fishing using FAO wooden handreels

The fishing trip was organised mainly for deep-bottom fishing techniques using FAO wooden handreels. The dories were equipped with four standard design sets of wooden handreels of which two were slotted on each side of the vessel (Figure 7), directly opposite each other. Each set of gear consisted of 100 kg test monofilament mainline, 45 kg test trunk line for the terminal rig (Figure 8) with three 3-way swivels one metre apart, 35 kg test branchlines (although some 45 kg test monofilament and wire branchlines were kept as spares), 11/0 and 12/0 circle hooks, and 1 kg waste-metal sinkers.

Figure 7: RCFDP fishermen getting ready to start deep-bottom fishing

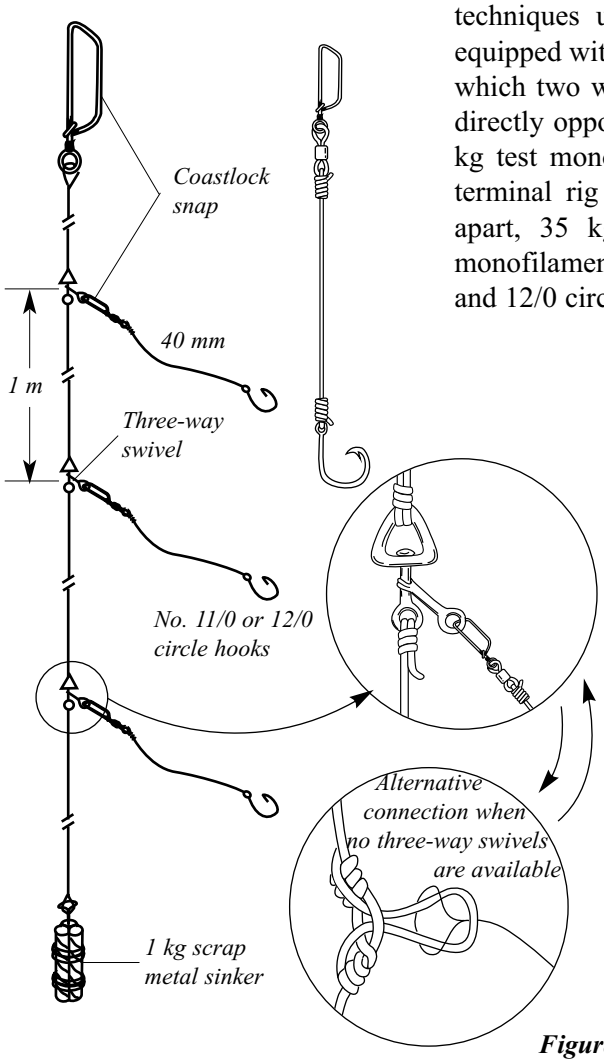

Figure 8: Deep-bottom fishing terminal rig

During the fishing operation, the fishermen demonstrated that they were familiar with the deep-bottom fishing method especially rigging, baiting, deploying and hooking fish. Several minor points were stressed to enhance their fishing skills. These included:

- Positioning and securing the reels for maximum efficiency and comfort. Some of the reel stanchions were wobbly and the reels required several more washers to function smoothly.
- Using only two lines on the leeward side of the vessel when the current was running. Having a third and fourth line down caused tangles that created problems. The crew was informed that if a third set of stanchion slots was fabricated between the present slots, at least three lines could be used when the current runs towards the lee of the vessel.
- Instructing the fishermen on the advantages of using fishing gear accessories such as swivels, snaps, chaffing tubes, crimps, etc; but at the same time they were told not to depend on the additional fishing accessories if they were too expensive for them to procure or if they were not available to them. The fishing gear accessories mainly enhance fishing efficiency when the fish are really biting, but what the fishing operation basically requires is for the fisherman to know his knots and have only his hook, line and sinker. It was observed that some fishermen were reluctant to go fishing without the full set of accessories for their fishing gear.
- Winding the line back slowly and evenly to reduce the chances of having the fish's stomach and eyes puffed out. This will prevent the fish flesh from being aerated and should produce an attractive and quality product for the markets.
- Stressing the proper on-board handling of fish from gaffing, spiking, gilling and gutting to chilling in slurry and storing on ice.
- Stressing personal and on-board hygiene when carrying out the fishing operations.

Despite the echo sounder restrictions and scratchy weather during the second half of the night, this fishing method was productive with a combined catch of 118 kg (54 fish) of mixed species between the two vessels. This included 40 kg of short-tail red snapper (*Etelis carbunculus*—14 fish), 32 kg of rosy jobfish (*Pristipomoides filamentosus*—15 fish), 17 kg of large-eye bream (*Wattsia mossambicus*—10 fish), 15 kg of coral cod (*Cephalopholis miniata*—10 fish), 6.1 kg of small-toothed jobfish (*Aphareus rutilans*—2 fish), 5.9 kg of green jobfish (*Aprion virescens*—2 fish), and 2 kg of emperor (*Lethrinus lentjan*—1 fish). Several other smaller fish of mixed species were also caught but these were not weighed or recorded.

3.1.2 Using lights to attract baitfish for live bait

The secondary purpose of the trip was to encourage the fishermen to practise night fishing using an overhead lantern and underwater light to catch kingfish (Spanish mackerel—*Scomberomorus commerson*) or other pelagics by first attracting and catching bait species such as squid and scad to use as live bait. This is especially important in times of bad weather when the fisherman can not fish out in the open seas. He can then anchor in sheltered waters and continue to fish for kingfish or other pelagics that have reasonable prices on the market.

Most of the fishermen were already familiar with using pressure kerosene lanterns to attract baitfish to the vessel to jig for live bait. Few have tried using an underwater light to aggregate them in smaller concentrated schools to make jigging easier and to bring the larger pelagics closer to the vessel.

During the trials, the moon was full, but the main glare was covered by an overcast sky. It would have been preferable if the light fishing method was done during the 'no-moon' period. Unfortunately due to time constraints, the light fishing method had to be demonstrated during this fishing trip since this was the last trip before the participants went back to their normal fishing operations. Although sufficient bait was attracted to the vessel to demonstrate the method, a bigger catch would have been achieved had it been a completely dark night. Five small underwater light units (Figure 9) were trialled as soon as darkness set in. These units were operated by two AA batteries and each unit had a different colour; white, blue, green, orange, and red. The kerosene pressure lamp was used as the main light

Figure 9: Underwater light units used

attractor since this was much brighter than the battery lights. Once it was determined that sufficient baitfish had aggregated around the vessel the illumination of the kerosene pressure lamp was reduced to a normal yellow lantern glow while the white underwater light was lowered first to a depth of approximately 3 m to draw the fish closer to the vessel and into an organised rotating pattern. The blue light was then lowered and the white light retrieved. This drew the bait closer to the vessel. The light changes were followed by the green, orange and red. When the red light was lowered the bait collected very close to the light causing the bigger fish to dart in and disturb the rotating pattern. The green light was returned to the water and this was found to be effective in aggregating the bait close enough for jigging while at the same time keeping the bait rotation around the light organised. Figure 10 depicts this fishing operation. Sabiki jigging rigs (Figure 11) and baited hooks with tinned fish flavoured flour dough were used to catch live scad bait.

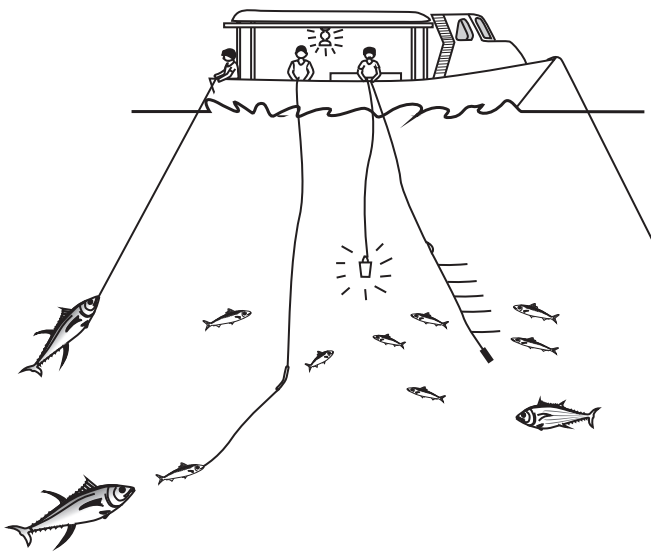

Figure 10: Jigging for bait using a kerosene pressure lamp and an underwater light

Figure 11: Sabiki jigging rig for scad bait

Approximately, 5 kg (50 pieces) of yellowtail scad (*Alepes mate*) and bigeye scad (*Selar crumenophthalmus*) were caught. Several of these were used as live bait resulting in a catch of 8 kingfish weighing 52 kg, 2 barracuda (*Sphyraena barracuda*) weighing 15 kg and a trevally (*Caranx sexfasciatus*) weighing 7 kg.

3.1.3 General observation of the 8.2 m dories issued to loan recipients under the RCFDP

The RCFDP has taken positive steps to enhance the chances of small-scale fishermen to progress in small fishing businesses by improving the design of the fishing vessels to be used in the fishing operations. The diesel powered RCFDP dories (refer Figures 5 and 6) are an improved version of a Yamaha SPD 27 design that was unsuccessfully promoted around PNG in the 1990's. The Yamaha SPD 27 was produced as an all-purpose vessel that could be used as a pleasure craft for leisure weekend fishing trips, game fishing ventures, inshore reef fishing, deep-bottom and mid-water fishing, fish carriage vessel, or as a carriage vessel to link coastal villages with the closest main trading centres. Its failure to become popular was probably due to several reasons. At the time the vessel was introduced to PNG, there were not any major fisheries projects focussed on developing artisanal fishermen to become full-time commercial fishermen. Funding to own such vessels was unavailable to rural fishermen who had little or no collateral that would impress a commercial bank to grant them loans, and the cost of purchasing such a vessel could only be met by established companies or cooperatives that had the backing of commercial banks.

The design of the RCFDP dory capitalises on the Yamaha SPD 27 hull design through efficient space management by shifting the half-cabin from the centre of the vessel to the forward part of the vessel, installing a fixed 1.4 m^3 fish hold in the centre of the vessel and the engine room towards the aft part of the vessel. This produced a bigger aft deck working area that is ideal for deep-bottom fishing and mid-water fishing operations. The fish hold has a removable fore and aft baffle that can be slotted in to prevent free-surface effect if the fish hold is used for ice slurry, or create two sections within the fish hold to manage fish storage. However if bigger fish are caught the baffle can be removed to create space to store the fish.

The dories are constructed from fibreglass and were built at Samarai Plastics in Milne Bay. They are 8.2 m in length and powered by a single 47 HP Yamaha inboard diesel engine. These vessels are equipped with a compass, VHF radio, a first aid pack, lifejackets and flares as well as fishing gear that includes four FAO wooden handreels on vertical stanchions, fishing accessories such as hooks, monofilament line, snaps, crimps, etc; two 500 m droplines; 400 m of 9 mm anchor rope with a grapnel anchor; and trolling lines with lures. The complete 'starter package' for these vessels comes to PGK 133, 000 (approximately USD $40,000 to $45,000). The loan is issued to fishermen who comply with the criteria laid down by the RCFDP management team.

Not withstanding individual preferences, this vessel based on its design and size can make an ideal deep-bottom and mid-water fishing vessel. However, some improvements to make this a better vessel would include:

- Installing an echo sounder or fish finder with suitable sea-bottom detecting capabilities up to at least 400 m.
- Installing a durable aft working deck shelter with 'roll down' sides. The cover can be made to be retractable and removable when preferred.
- Modifying the position of the handreels. There are four FAO wooden handreels directly opposite each other, two on each side of the vessel. When the current is running it would be practical to fish only the two lines on the lee of the current, otherwise there would be tangles if more lines were used. However, if the positioning of these lines were staggered or intermittent, at least three lines can be fished—four if the current is not too strong. With the present set up, two additional reel slots can be fabricated in the centre part of the vessel, one slot on each side. This will enable a third line to be slotted between the two lee lines when required.
- Acquiring a GPS at some stage for navigation and safety.
- Installing an outlet for hydraulic power at some stage—if and when this is practicable or suitable for the crew and operations of the vessel.

The above suggestions may have been initially omitted from the present construction to minimise the final costs of the vessel, but if anything, at least the deck shelter and echo sounder should be included and the 'cut back' done elsewhere.

3.2 RCFDP fibreglass banana boats

The RCFDP banana boat is a converted version of the 6.2 m Yamaha banana boat. These boats are powered by single 30 HP Yamaha two-stroke outboard engines and have an inbuilt slot (Figure 12) to fit a removable ice box that is part of the boat's equipment. When fitted into the slot, the ice box (Figure 13) is secured for travelling. The ice box can hold up to 100 kg of ice and fish and is ideal for storing fish caught through mid-water fishing techniques as well as

Figure 12: Inbuilt slot for the ice box in a RCFDP banana boat

deep-bottom fish. The ice box is sufficiently insulated and has a removable longitudinal partition to store fish in separate slots or for bigger single-spaced storage.

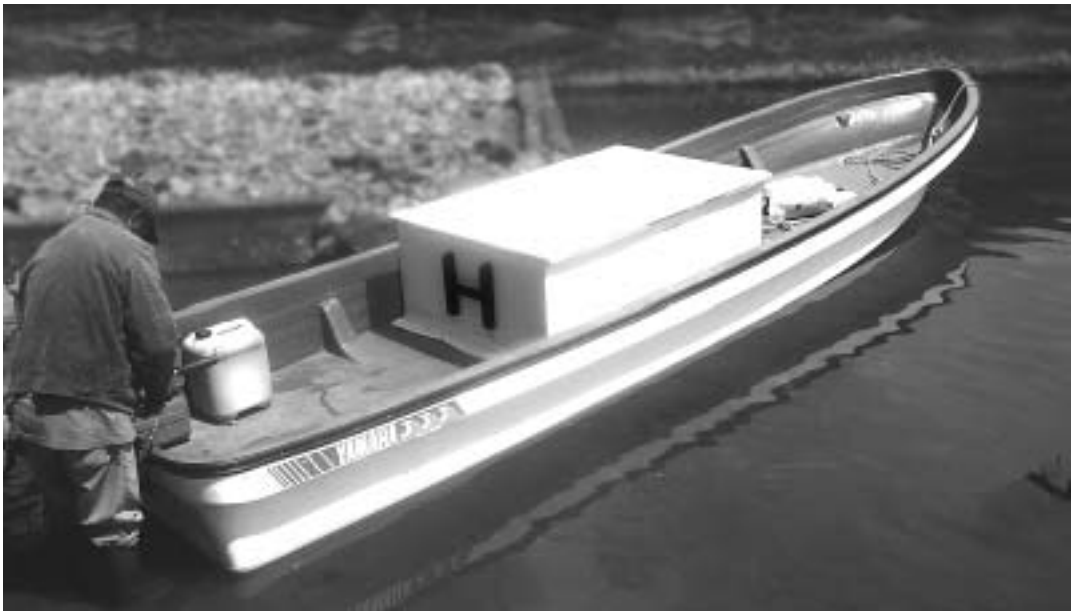

Figure 13: RCFDP banana boat with ice box in place

The RCFDP banana boats have a double bottom to act as a flotation device to keep the boat floating in case of accidents. These boats are equipped with sufficient fishing gear for deep-bottom and mid-water fishing methods including 3 customised wooden handreels based on the FAO mechanism design, but configured differently. The stanchion post of the normal FAO design is replaced by a wooden chassis that lies across the boat's beam and sits on the gunwales. However, the reel itself lies horizontal to the chassis instead of vertical. Several fishermen who have used this design stated that they would have preferred to have the reel in a vertical position. While the chassis is useful to them as a seat, they tend to get backaches after prolonged use of the horizontal positioning of the reel on the chassis.

3.3 Observations of the RCFDP loan recipient's fishing operations

Even though the fishermen in Kavieng now have proper boats to conduct better fishing activities, several issues need to be refined in order to ensure that the project concludes successfully, and that it becomes a sustainable platform for small-scale fisheries development in PNG. Right now the future looks futile for the fishermen in Kavieng. After perusing several fishermen's records for the month of October/November 2004 (Appendix C) it can be construed that the fishermen will need to work really hard to consistently get above average catches to meet the burdens of loan repayment and running costs. The prices offered for fish are insufficient to meet expenses as well as loan repayments using income from an average catch.

Cost of diesel fuel is PGK 2.04/litre. The vessels fuel tank can hold up to 250 litres of fuel, but the fishermen usually bunker 150 litres per trip. Ice is PGK 0.30/kg or PGK 15.00 per 50 kg bag. The fishermen normally load around 8 bags per trip. Skipjack, mackerel or low grade yellowfin tuna bait is PGK 4.00/kg. Around 20 kg are initially taken for the full weeks fishing and extra bait is trolled for when bait runs out. The fishermen only buy bait when they are late to get to the fishing grounds or if circumstances prevent them from trolling for their own bait. Victuals usually come to around PGK 100/trip, and loan repayment is set at PGK 2300/month after an initial grace period. Therefore, provided four trips are made each month, the loan repayments are set at PGK 575/trip. The crew usually share a minimum of PGK 150/trip and a bonus when a good catch is achieved. The boat owner works his living around the remainder of the cash—if he's lucky enough to have anything left. He has to put aside money for future maintenance and insurance if he can afford it. At the moment none of the fishermen are considering insurance because they can not afford it although they would like to

contribute to an insurance scheme if it was reasonable. The total amount to be paid back for the vessels and fishing gear is PGK 136 000. Before the vessels were delivered to the fishermen they had to deposit PGK 500 as security. They were then given 40 litres of diesel and two months grace period to get their fishing operations organised to run up capital for consistent operations. After the two months grace period they had to repay their loan at PGK 563 for the first month, PGK 900 for the second month, then PGK 2300/month until the loan is fully repaid.

The average expenses for a fishing trip normally come to around PGK 1330. Therefore, at least 222 kg of premium fish needs to be caught to breakeven. However, on any normal fishing trip, mixed fish are always encountered and the premium grade fish are normally below half the total catch. In reality, the fishermen need to catch around 400 kg of mixed fish per trip to breakeven if the average price for fish is paid at the current rate of PGK 3.33/kg.

The current fish prices are:

Purplecheek jobfish (*Pristipomoides multidens*), goldband jobfish (*Pristipomoides zonatus*) and other deep-water jobfish—PGK 3.50/kg (These fish are sold for PGK 5.00/kg on the local market by fishermen not attached to the RCFDP).

Longtail red snapper (*Etelis coruscans*), short-tailed red snapper (*Etelis carbunculus*), Spanish mackerel (*Scomberomorus commerson*), wahoo (*Acanthocybium solandri*)—PGK 4.00/kg (sold for PGK 5.00/kg on the local market by fishermen not attached to the RCFDP).

Mixed reef fish—local sales PGK 3.00/kg (sold for PGK 4.00/kg on the local market by fishermen not attached to the RCFDP).

Bigeye tuna (*Thunnus obesus*) > 20 kg—PGK 6.00/kg
Bigeye tuna < 20 kg—PGK 2.00/kg

Yellowfin tuna (*Thunnus albacares*)—PGK 2.00/kg (sold for PGK 3.00 on the local market by fishermen not attached to the RCFDP).

Skipjack tuna—PGK 1.50/kg (if the fishermen buys this back from the processing plant for bait they pay PGK 4.00/kg).

Aside from managing their fishing business well, there are three major options that may bail the fishermen out of their present predicament. They need to consistently return with more than 400 kg of fish each week. Just one slip-up can put the fishermen back several months, so they need to catch as much as they can above 400 kg each week. Premium grade fish should be the main target. In reality, the fishermen will find this hard to do given that their vessels are not equipped with an echo sounder. Another reality factor is that the deep-bottom fish stocks are not as readily accessible or replaceable as one would like to expect. Initially, once the fishermen have established good deep-bottom fishing grounds, impressive catches can be caught for several seasons but this will eventually dwindle. Experiences from deep-bottom fishing around the region have shown that deep-bottom catches decline after a deep-bottom fishery has started in a particular area, so the fishermen need to extend their fishing techniques to diversify their target species and fishing grounds. Pelagics should be targeted as well as the demersal species. Proper management plans need to be put in place to manage fishing zones within small craft range of the fishbase so that a sufficient number of boats can operate viably.

The second major option is to increase the buying price of fish from the fishermen, but this also depends on several factors. The main factor is the price offered by the markets. The return from sales has to cover the cost and be worth the risk of preparing, packing and sending the fish to its destination. Secondly it will depend on the percentage that the exporter/fish buyer uses for their profit margin. If this is set at a high percentage then the fishermen will have to be the one to make adjustments in his operations costs, which at the moment for the RCFDP fishermen is stretched to its limit.

The third option can be to reduce the fixed loan repayment premiums or set repayment at a reduced percentage of the net returns after fish sales and trip expenses. This will ease the load tremendously for the fishermen. At the moment the loan repayment is approximately 43 per cent of the fisherman's commitments for the week.

Whatever solution is decided on, the fishermen need some kind of boost to get them back on line and to maintain their enthusiasm in continuing with the project that they have undertaken.

3.4 Overview and requirements for small-scale commercial fishing vessels for PNG

3.4.1 General overview

The domestic offshore commercial fishery in PNG has progressed steadily over the years to become one of the countries potential areas for industry development and job opportunities. Small-scale offshore fishing operations are now an important subsidiary to the bigger commercial offshore fishing enterprises as it involves a broader spectrum of coastal community involvement that contributes to the advancement of the offshoot industries supporting commercial fishing.

The demand for deep-bottom and pelagic fish species on the local market and especially the overseas markets in countries such as Japan and the US prompted suburban and rural entrepreneurs in coastal communities to find a niche in the fishing industry running small-scale fishing operations. Reef fish were readily sold on the local market, but the higher priced offshore deep-bottom species and pelagics such as bigeye and yellowfin tuna became the target. The inevitable globalisation of commercial activities and the dependence on hard cash to keep up with modern demands contributed to strengthening the development of small-scale offshore commercial fishing through increased transition of artisanal fishermen into semi-commercial fishing activities. This was further coaxed by fishing rights owners denying free open-access to their fishing grounds and government's recognition of the need to capitalise on harvesting the countries fisheries resources at all levels. While the progress of the bigger offshore fishing operations, dominated by government and major fishing industry enterprises, received much development support, the advancement of small-scale fishing operations went unheeded for sometime.

However, small-scale commercial offshore fishing operations are not as straight forward as inshore or sheltered water fishing. The vessels, equipment and skills required to perform these fishing operations are more expensive to acquire and operate and the fishing methods require more input. Safety issues and basic business management knowledge is a necessity for consistent and sustainable small-scale fishing operations, but the success of the whole operation can depend on the type of vessel that is used.

3.4.2 Basic fishing vessel requirements for small-scale commercial fishing operations

The transition from dugout canoes to modern vessel designs became necessary to meet the demands of modern tasks. Traditional crafts performed all the water transportation functions of daily living as well as subsistence and artisanal fishing for the household's protein supply. These vessels were mainly dugout canoes and bamboo rafts. Fishermen using these crafts did not have to stay out the whole day or night, but returned home as soon as sufficient fish was caught for the day's meal or when the mood suited them. Only on special occasions such as functions for births, deaths and marriages do they spend longer than normal periods out at sea to get sufficient fish to feed the masses, so the scope for these vessels to deal with modern commercial fishing demands is limited.

Regionally, Pacific Island countries and territories (PICTs) have tested many designs in a quest to ascertain the ideal fishing vessel to satisfy local preferences. Some PICTs base the designs on modifications of their traditional craft while others have opted for adaptations of foreign small craft designs. Fishermen's design preferences vary greatly and what one considers ideal may seem trivial or inconsequential to another, but whatever the choice, several basic criteria are essential when designing proficient small-scale commercial fishing vessels in the region, especially for rural encouragement and participation. Some of these criteria are:

- The production of these designs should be affordable to rural fishermen yet durable.
- Be constructed of material that is serviceable in the region it was built for e.g. locally available wood, fibreglass, aluminium or marine ply.
- The vessel should be economic to run so the engine horsepower should be adequate to carry the vessel efficiently at full load displacement.
- It would be appropriate if a durable cost effective alternative to two stroke outboard engines are used for propulsion. The cost of petrol has risen considerably over the years and is becoming unreasonable as a fuel for fishing operations, especially since most fishing grounds are a fair distance from fisheries centres and home bases. The fishermen also need to alternate fishing grounds in order to maintain sustainable fishing practices so a fuel-efficient engine will encourage them to locate new grounds.
- The vessel should have good stability between full load displacement and light load displacement and should be able to remain upright in reasonably rough seas common to the region.
- Backup flotation abilities should be incorporated into the design in case of accidents.
- To comply with national sea safety standards and for the fisherman's own safety, the standard safety and first aid equipment should be incorporated into the gears list for vessels of this size.
- Appropriately, the minimum size for offshore small-scale fishing vessels should be between 6 m (mainly outboard-powered) and 10 m (definitely diesel inboard) in length and the layout should be organised for ease of fishing operations as well as for ease of movement around the vessel and stretch space for rest.
- An adequate size insulated fish box should be installed to ensure the vessel returns with a good payload; be able to stow the bigger sized pelagics such as wahoo, bigeye and yellowfin tuna without bending the fish; and contribute to space management, fuel efficiency and good stability.
- Overhead protection should be erected over the working deck and 'roll-down' side curtains fitted where convenient. One of the biggest deterrents to effective commercial fishing is exposure to the elements. This exposes fishermen to sunburns, cold, wet and miserable conditions that can result in an aborted fishing trip. For artisanal purposes the fishermen fish until they are satisfied or feel like it. However, for commercial purposes they have to stay out there whether they like it or not until they get a sufficient payload to warrant a return to base. In order to facilitate this, every bit of reasonable comfort should be afforded to the fishermen to encourage them to see the fishing operation through.
  Note: The absence of this simple structure has contributed towards many failed fishing operations and negative reflections on fishing vessel designs.
- Consistent, successful and sustainable fishing operations are dependant on the equipment installed on the fishing vessels, the fisherman's skills, and his knowledge of the fishing grounds and target species. For commercial deep-bottom fishing, it is a necessity to install an echo sounder or fish finder that can operate effectively, at least up to 400 m depth, on board the vessel to enhance the chances of getting a good catch. For added impact, a hand held GPS would be good. The echo sounder will enable the fisherman to easily find fishing spots, move with the fish, and vary his fishing grounds thus enhancing his chances of catching fish and contributing to sustainable fishing practices.

3.5 Baitfish fishing around Kavieng

3.5.1 The Coastal Fisheries Management and Development Project

A second major coastal fisheries management and development project is currently being run in PNG independent of the RCFDP, but complementary to fisheries development strategies in the country. The Coastal Fisheries Management and Development Project (CFMDP) based in Kavieng, is funded by the ADB. The programme supports community-based management (CBM) activities that involve coastal

communities in the fisheries management decision-making process. Part of the development strategy on the agenda is to identify alternative fisheries resources that will supplement the income of rural coastal communities and at the same time divert catch effort away from the existing heavily exploited inshore fisheries resources that are demanded by the markets. The rural coastal communities need to be made aware of conservation and sustainable resources management practises, but the necessity to earn an income over-rides the sense to cooperate in sustainable management practises unless an alternative and accessible fisheries resource is identified for harvest. The CFMDP plans to investigate the development of a local bait fishery to supply the tuna longline vessels that are based in Kavieng. If the potential exists the CBM programme plans to train fishermen working with the programme in various fishing methods to capture the bait species. The programme also plans to deploy several inshore FADs in locations that are strategic to local fishing communities. The inshore FADs should give the local fishermen alternative products to earn good income from. The fisheries resources that can be made available through the presence of FADs are bait species such as sardines and scads; and pelagics such as Spanish mackerel, barracudas, trevally, rainbow runner, mackerel, etc.

3.5.2 Previous baitfishing trials in Kavieng and possible bait species

In 2000 and 2001 (Sokimi and Chapman 2001), offhand attempts were made to catch 80 to 100 gram sized school-fish bait to be used in tuna longline training exercises conducted by the SPC Fisheries Development Officer during a previous project in Kavieng. The bait catching exercise transpired because imported bait for tuna longlining was not immediately available. Several species were identified in Kavieng as potential bait for tuna longline operations. There was an abundance of scad and sardines aggregated around the underwater light attractor. The scads were identified as mainly *Selar crumenophthalmus*, *Selar boops* and *Alepes mate.* Although sardines were caught, they were not retained for identification at the time but two potential species were noted. During recent interviews with local fishermen, the hairback herring (*Nematalosa come*) was identified as another potential bait species (Figure 14).

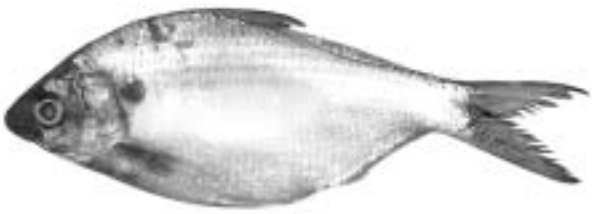

Figure 14: Hairback herring (*Nematalosa come*)

Several baitfishing methods were trialled including handlining at night using underwater lights and an overhead lantern, beach seine, bouke-ami and nylon gillnet. As these trials were only supplementary exercises to the NFC training programme, conducted in the Fisheries Development Officer's spare time, the fishing gears were not as effective as they could have been since they were not fabricated with the proper materials or to proper specifications. The proper materials for the bait catching methods were not available at the time and improvised equipment that was available at the NFC was used. Catches from the bouke-ami net, for example, were relatively small due to the lack of a proper light dimmer to attract the bait closer to the light before closing the net. However, observations of baitfish schools during the trials indicated that there is an abundant resource.

3.5.3 Field trip

A field trip was conducted along part of the east coast of New Ireland to determine possible sites where baitfish aggregate. These sites were selected from information gathered from local fishermen. The sites visited were Putput, Nono Plantation, Lossuk, Mangop, Kafkaf and Bol. The field trip was conducted to determine the type of species, location and season that the baitfish were fished. Initial information indicated that the fishermen targeted scads (*Selar crumenophthalmus, Selar boops and Alepes mate*) and blue-backed sprat (*Spratelloides delicatulus*) in the shallow inshore waters along the coast. While the blue-backed sprat, (known locally as 'talai' or generally as sardine) was plentiful, the larger scad species were the better bait potential for tuna longlining. The blue-backed sprat was too small in size for longline bait.

During the field trip it was observed that every known baitfish site had a fresh water river or creek that flowed onto the reef creating a passage where baitfish could enter from the open ocean into inshore protected waters. Blue-backed sprat was located in all but one of the sites visited and these accounted for the majority of the catch by the local fishermen this year. The blue-backed sprat were either netted to be sun dried, smoked or fried; or jigged to be used as live bait for larger species such as trevally, barracuda or reef fish.

The fishermen along the coast stated that scads aggregated in known spots inside the fringing reefs throughout the year, but this year their absence in all the regular spots was a worrying sign, which could be attributed to overfishing by the locals or through aggravation by fishing activities. They observed this to be a normal pattern when the schools are disturbed too frequently or the size of the schools get reduced from fishing pressure. Normally, scad aggregate inside the fringing reefs several times throughout the year and do not follow set patterns like specific time or moon phase to aggregate.

The local fishermen along the coast indicated that there was an abundant baitfish resource along the coastline of New Ireland, not only scad species, but several sardine and herring species as well. Baitfishing trials could be conducted along the coast to determine the full potential to supply tuna longliners with locally-caught bait. Other post harvest processing for the bait species should be researched as an alternative for supplementing income for the rural coastal fishing community. While several fishing methods can be used during the baitfishing trials, caution should be implemented right from the beginning to identify fishing methods or management principles that would guarantee sustainable harvesting of the bait species if a viable potential exists for commercial development of the activity.

The baitfishing trials should include deploying FADs in inshore areas or in strategic areas outside the fringing reef that is accessible to the rural coastal fishing community that do not interfere with local boat traffic and likely to aggregate bait. Fishing methods can include aggregating bait using light attraction with kerosene pressure lamps as well as underwater lights and jigging bait using handlines. Efficient methods can be developed for sustainable fishing from small-scale vessels such as banana boats or the RCFDP dories. These methods can include a small-scale purse seine of 150m x 15m, bouke-ami lift net (Figure 15), cone lift net (Figure 16), or the Philippine Basig lift net (Figure 17) that is lowered between two boats set up in a catamaran fashion.

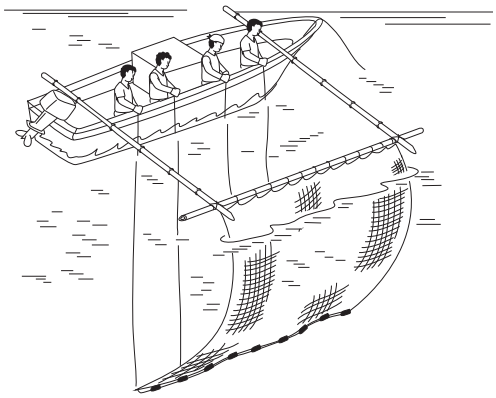

Figure 15: Bouke-ami lift net

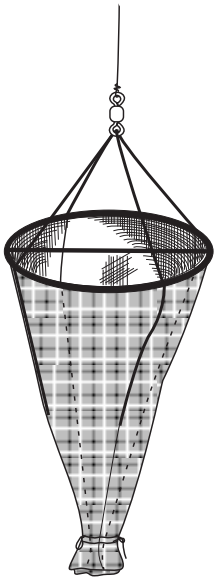

Figure 16: Cone lift net

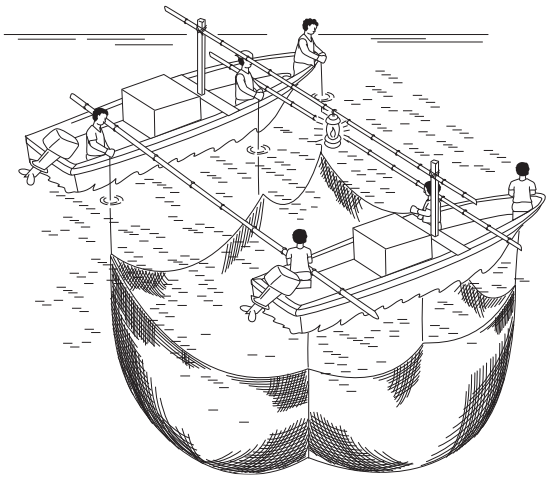

Figure 17: Philippine Basig lift net

3.6 Lamp fishing familiarisation trips for NFC/CFO Staff

Two fishing trips were carried out to give the NFC/CFO staff sufficient practise to brush up their knowledge of the fishing techniques that would be used for small-scale fisheries development, especially the fishing techniques that would be used during the SFO course. The fishing methods concentrated on fishing with kerosene pressure lamps and battery underwater lights, jigging for live bait, fishing with live bait to catch pelagic fish, and fishing for bottom fish (refer Figure 10).

Both fishing trips were carried out from dusk to midnight. The first fishing trip resulted in a catch of 30.3 kg of mixed species and 1.0 kg of scad for bait. The mixed species included three blue tailed groupers (*Epinephelus microdon*) weighing 9.5 kg, three Spanish mackerel weighing 10.5 kg, and two golden trevally (*Gnathanodon speciosus*) weighing 10.3 kg. The second fishing trip resulted in a catch of 28.8 kg and 1.0 kg scad bait. The catch comprised of one large brown spot grouper (*Epinephelus chlorostigma*) weighing 7.4 kg, two Spanish mackerel weighing 8.4 kg, one golden trevally weighing 5.3 kg and two dark finned barracuda (*Sphyraena qenie*) weighing 7.7 kg.

4. DISCUSSIONS AND CONCLUSIONS

4.1 SFO course review

The request for reviewing the SFO course stemmed from complaints by the RCFDP management that the course was not beneficial for their loan recipients since it involved too much theory work and less practical fishing time. However, the findings from the review of the SFO course depicts the course to be a suitable platform for selecting loan recipients for small fishing operations to train fishermen to conduct safe fishing operations, and the course should be used in the fashion. The 11 days SFO course is an accredited course that is concise but focussed on delivering the right message to the fishermen provided the course is delivered as designed, by a presenter who is an experienced masterfisherman. NFC should consider implementing check measures to prevent future abuse of course presentation off-campus. For instance, an independent counterpart should be assigned to assist the masterfisherman when the course is presented off-campus. The current form of presentation appraisal is to give the course participants a questionnaire to fill out voluntarily and confidentially, but this is open to deception and will only be good for presenters who are genuinely keen on improving performance unless the questionnaires are made compulsory and forwarded to NFA via the attachment counterpart.

There is still room for improvement when delivering the SFO course. The scheduling of the course presentation should be presented to flow with events. The timetable at Appendix A should be used as a base to be improved on. Previously, a similar timetable was set but this was altered during some of the SFO course to suit the presenter's situation resulting in uncoordinated delivery of information that frustrated the participants. The SFO course content should be revised and modified from time to time to ensure it continues to meet the needs of the fishing industry and small-scale fishermen in the future. The focus of the information in the contents and material must be delivered to ensure that the fishermen walks away with additional fishing methods knowledge, be able to conduct his operations according to Safe Operation Plans, be aware of the impact of commercial fishing on the environment, run sustainable fishing operations, and know basic economics on how to manage his small fishing operations.

4.2 RCFDP integrated SFO/PHO programme

The main concern of the RCFDP management is to get their fishermen out fishing and making their loan repayments as soon as possible by conducting real fishing trips even during their initiation period. The closest that the NFC has to offer to cover the RCFDP request for training is the SFO course, but this course was not sufficient to fully cover the RCFDP requirements for their loan recipients.

Since the RCFDP is a paying customer that finds the SFO course insufficient for their loan recipients, NFC needs to implement a programme to cover the requirements of the RCFDP management, but in doing so the college should ensure that the programme is conducive to the college's principles and aligned with OHS and fisheries industrial development strategies. The programme requested by the

RCFDP requires more fishing time and more emphasis on PHO. Therefore, the integrated SFO/PHO course has been developed and the timetable and content is at Appendix B. The course content should be revised and modified from time to time to ensure it continue to meet the needs of the RCFDP and their load recipients in the future. Even though this programme will be unaccredited, NFC should maintain the guidelines applied to developing the SFO course and implement as much of the SFO material in the programme as possible.

4.3 RCFDP boat equipment and design

The absence of an echo sounder on the 8.2 m dories was one of the noticeable omissions of the fishing equipment supplied to the fishermen. Deep-bottom fishing is dependant on finding fish schools or the proper seabed to conduct fishing operations. Echo sounders are the most economic and efficient means of achieving this function. Installing an echo sounder that can detect depths up to at least 400 m would make it easier for the fishermen to operate more focussed fishing operations and would cut out down-time in search of better fishing grounds. This is one of the bigger deterrents for deep-bottom fishermen, having to shift fishing grounds when the selected fishing ground does not produce the target species or enough fish to make the operation viable. Without an echo sounder the search for a better ground becomes laborious and open to trial and error. In considering the cost of the 8.2 m dories, the cost of an echo sounder for deep-bottom fishing is relatively small, especially when this will enhance the chances of the fishermen catching, not necessarily more fish, but better quality fish for the export markets.

Two more factors can improve the working conditions on board the 8.2 m dories. A proper overhead shelter should be rigged to protect the fishermen at all times from the elements. The shelter should be constructed to be retractable or removable when circumstances require these to be done. The shelter will increase the crew's tolerance level and lead to better chances of a successful fishing trip.

As observed during the fishing operations, only two reels were effective when the current ran towards the leeward side of the vessel. If there were two extra slots between the existing four slots for the FAO handreels, at least another reel could have been slotted in to increase fishing efficiency in these situations.

One of the complaints from the banana boat fishermen is that the horizontal winding system on the chassis version of the FAO handreels tends to cause backaches and frustration during hauling. This system should be converted to the stanchion hauling system or to an upright (vertical) hauling position on the horizontal chassis.

More thought should be given to encouraging the use of four-stroke outboard engines or other means of propulsion for the banana boats for fishing operations. Sustainable fishing practices require fishermen to spread their fishing grounds far apart in order to maintain sufficient stocks for harvest. It should be acknowledged that only a calculated amount of vessels can operate out of a fishbase to keep sustainable fish stocks in the fishing grounds within range of the vessels operating from the base. Since the cost of petrol has gone beyond reasonable prices, it is no longer viable to use two-stroke outboard motors as transportation modes to and from fishing grounds, even if the fishing grounds are close to the fish bases. Eventually the fishermen will need to travel further for his fishing operations and while outboard engines can get him to and from the fishing grounds quickly, the cost of doing so overrides the economics of running a profitable small-scale fishing business.

4.4 RCFDP fishing operations

While the Fisheries Development Officer was in Madang there was not enough time to get sufficient details on the banana boat fishermen's operations, but a quick study of the fishing grounds suggested that the fishermen had a fair way to travel, if not from his home base to the fishing grounds then from the fish centre to the fishing grounds or the fish centre to his home base. In any case, the cost of fuel will be the fisherman's main expense aside from the loan repayment premiums. This is much the same for the fishermen on the 8.2 m dories. The market prices for fish offered by the private sector partner

can only benefit the fishermen if he returns with an extravagant catch each trip. If the fishermen need to catch a minimum of 222 kg of premium fish each week to break even then they have their work cut out for them because in reality this would be around 400 kg of mixed fish at the average price being offered for all species.

The RCFDP should reconsider the reality of how viable the current situation is and put in place measures that would make these fishing operations sustainable when the project finally closes down. The areas to look closely at are the average catch rate that calculations are being worked from for loan repayments, price of fish, cost of fishing gear, cost of fuel, and the fishermen's contractual allegiance to private sector partners (PSPs). While the bond to the PSPs strengthens the shore base facilities it does not necessarily work the same way for the fishermen. This bond should be reassessed and a better contract be implemented to give the fishermen a more flexible control over his own vessel operations. The PSPs should retain the fishermen within their operations by being competitive and not by obligation because the fishermen have been given loans by the same organisation that supports the PSPs.

4.5 Proposed bait catching activity and inshore FAD's

The proposed bait catching activity and the deployment of inshore FADs to aggregate baitfish and pelagics has a lot of possibilities. Not only will this provide a diversion from the heavily fished inshore fish stocks, but if successful, can become a major income earner for the rural coastal communities. However, if the potential exists for a baitfish fishery, meticulously planned management schemes and harvest methods should be researched and implemented right from the beginning to encourage sustainability of the resources.

Bait for tuna longliners is a multi-million dollar industry for countries that have the resources to supply abundant bait for the industry. During the pole-and-line era it was common knowledge that an abundant supply of sardines, scads and herrings existed but these were not the ideal bait for pole-and-line fishing, so these were discarded or released in favour of the smaller cardinal fish, anchovies and sprats. If the potential exists for a baitfish fishery in PNG to supply a fraction of the requirements for their locally based tuna longliners, then that alone would be an income earning activity as well as a contribution to the countries economic growth.

If properly planned and managed, research into the potential for a baitfish fishery in PNG can only bring benefits to the people and the country. If the research has negative connotations because of sustainability or fish stocks, then at least a survey was done and innovative use can be developed for the species that are available.

Inshore FADs can benefit the local community by aggregating fish in strategic locations that are beneficial for the community. This will encourage them to diversify their fishing operations and save fuel from having to travel to fishing grounds far from their base.

5. RECOMMENDATIONS

5.1 SFO course review

The following recommendations are based on the outcomes of the review for the SFO course:

(a) NFC—CFO staff should get together to identify practical check methods to ensure that the SFO course is presented as designed. The check system should include feedback on the course presenter's conduct and professionalism, course delivery, course materials, and course contents;

(b) Funding institutions should consider the SFO course a base requirement for selecting suitable loan recipients;

(c) The timetable in Appendix A should be used as the base guideline for scheduling the SFO course. This timetable should be adjusted appropriately to ensure that information is delivered to coordinate the flow of events during the course; and

(d) The SFO course contents and materials should be a living curriculum that is modified appropriately to suit the progress of the fishing industry and the small scale fishermen's needs.

5.2 RCFDP integrated SFO/PHO programme

During discussions for the development of an integrated SFO/PHO programme for the RCFDP, the following tasks are recommended:

(a) The RCFDP integrated SFO/PHO programme needs to conform to the NFC course implementation guidelines as well as to OHS and industrial training principles;

(b) The programme outline and contents must include all the topics covered in the SFO course as well as the additional PHO requirements and extra fishing trips requested by the RCFDP management; and

(c) Given the additional fishing trips and PHO requirements, the programme has to be scheduled to be conducted over three weeks.

5.3 RCFDP fishing operations and boat designs

The following recommendations are based on observations of the fishing operation that was conducted with the RCFDP fishermen:

(a) Install an echo sounder on the 8.2 m dories that can clearly detect depths down to at least 400 m;

(b) Construct a removable or retractable rigging for an overhead cover over the aft working deck of the 8.2 m dories and the working deck of the RCFDP banana boats;

(c) Fabricate two extra slots in between the existing four FAO handreel slots to allow for better positioning of active reels when the current runs towards the leeward side;

(d) Fabricate slots for installing the stanchion type FAO wooden handreels on the RCFDP banana boats or convert the horizontal winding system on the chassis to a vertical winding system; and

(e) If banana boats are used for small-scale fishing operations, four-stoke outboards or other modes of propulsion power should be researched to make the cost of running the vessel profitable.

5.4 RCFDP fishing operations

The following recommendations are based on interviews with the RCFDP fishermen and on observations of their fishing records:

(a) The price of fish should be reassessed to ensure that the fishermen's catches are profitable enough to meet loan repayments and maintain a sustainable operation;

(b) The calculations for loan repayment should be reassessed to be based on fish catches that are currently being landed or change the loan repayment system to be less of a burden on the fishermen. The system could be changed to be a percentage of the catch rather than a fixed figure or after evaluation the fixed sum repayment should be reduced; and

(c) The contractual bind between the fishermen and the PSPs should be reassessed to be less burdensome on the fishermen. If the current arrangement is maintained, then some form of adjustable fish price structuring should be implemented so that the fishermen are paid a fair share of the end market price after all expenses are accounted for.

5.5 Proposed bait catching activity and inshore FADs

In considering the potential for baiting research, the following recommendations are suggested:

(a) Plans for implementing and carrying out the research should be thoroughly laid out before the project gets underway. This includes the locations that the surveys will be conducted in, the locations where the FADs will be deployed, the type of harvest methods that will be used to catch bait, the type of FADs that will be deployed, the organisations that will be involved in the project, etc.;

(b) The methods for catching bait should be appropriately selected so that it does not encourage unsustainable practises in the future; and

(c) A draft management plan should be developed at an early stage in anticipation of a baitfish fishery. This should at least cover harvest methods, starting volume for fishing licenses and areas of harvest.

6. REFERENCES

Anon. 1998. Papua New Guinea Online—Provinces (1 page), retrieved 05 January 2005 from the web: http://www.niugini.com/pngonline/provinces/nip.HTM

Anon. 2000. Papua New Guinea—An introduction to Papua New Guinea for the serious adventure traveler (2 pages) retrieved 05 January 2005 from the web: http://www.interknowledge. com/ papua%2Dnewguinea

Anon. 2001a. Papua New Guinea profile online (9 pages), retrieved 7 August 2001 from the web: http://www.niugini.com/pngonline/profile/index.html.

Anon. 2001b. National Fisheries College. General NFC course and programme information pamphlet. 2 p.

Anon. 2004. CIA—The World Factbook 2000—Papua New Guinea (11 pages) retrieved 05 January 2005 from the web: http://www.cia.gov/cia/publications/factbook/geos/pp.html

Beverly, S. and L. Chapman. 1996. Capture Section report on tuna fisheries development, East New Britain, Papua New Guinea: Phase I, FAD deployment project (15 November 1992 to 31 May 1993), and Phase II, pilot tuna longline project (1 June 1993 to 15 September 1994). South Pacific Commission, Noumea New Caledonia. 81 p.

Beverly, S. and P. Cusack. 1993. Report of a pilot fish aggregating device (FAD) deployment off Port Moresby, Papua New Guinea (27 June to 8 August 1992). South Pacific Commission, Noumea, New Caledonia. 29 p.

Chapman, L. 2004. Nearshore domestic fisheries development in Pacific island countries and territories. Information Paper No. 8, Fourth Heads of Fisheries Meeting (Noumea, 30 August to 3 September 2004), Secretariat of the Pacific Community, Noumea, New Caledonia. 244 p.

Chapman, L. 1998. Report on third visit to Papua New Guinea (14 January to 10 July 1994). Capture Section, Unpublished Report No. 20. South Pacific Commission, Noumea, New Caledonia. 44 p.

Chapman, L. and T. Fusimalohi. 1998. Report on second visit to three locations in Papua New Guinea (23 January to 2 May 1982). Capture Section Unpublished Report No.19. South Pacific Commission, Noumea, New Caledonia. 23 p.

Fusimalohi, T. and J. Crossland. 1980. Report on the Deep Sea Fisheries Development Project in West New Britain, Papua New Guinea (5 September to 14 December 1979). South Pacific Commission, Noumea, New Caledonia. 14 p.

Sokimi, W. and L. Chapman. 2001. Field Report No. 12 on The Fisheries Development Section's technical assistance to the New Ireland Commercial Fishing Association, Kavieng, Papua New Guinea (20 April to 12 July 2001). Secretariat of the Pacific Community, Noumea, New Caledonia. 63 p.

Sokimi, W. and L. Chapman. 2002. Field Report No. 17 on Technical assistance to the National Fisheries College, Kavieng, Papua New Guinea on implementing and activating the Certificate in Small Fishing Operations Course (10 June to 3 August 2002). Secretariat of the Pacific Community, Noumea, New Caledonia. 33p.

SPC. 2004. Population statistics provided by the Demography Section of the Secretariat of the Pacific Community, Noumea, New Caledonia.

Watt, P. 1999. Capture Section Report of assistance to the National Fisheries College, Kavieng, New Ireland Province, Papua New Guinea (15 June 1998 to 29 January 1999). Secretariat of the Pacific Community, Noumea, New Caledonia. 49p.

Wellington, P. and P. Cusack. 1998. Report on fourth visit to Papua New Guinea (31 March to 23 September 1988). Capture Section Unpublished Report No. 14. South Pacific Commission, Noumea, New Caledonia. 37p.

Appendix A

Proposed timetable for the SFO course

Timetable for SFO Course Week 1						
TIME	**MONDAY**	**TUESDAY**	**WEDNESDAY**	**THURSDAY**	**FRIDAY**	**SATURDAY**
0800–1000	Registration, introduction and programme outline	Outboards (theory)	Seafood handling	Outboard—trouble shooting	Construct vertical longline	Deep-bottom fishing
1000–1015	Break	Break	Break	Break	Break	Break
1015–1200	Boat safety—outline and video viewing	Fishing gear briefing: hook, line and sinker	Economics—cost of fishing operations	Basic navigation and safety, including radio and signals	Construct deep-bottom reel fishing gear	Deep-bottom fishing
1200–1300	Lunch break	Lunch break	Lunch break	Lunch break	Lunch break	Lunch break
1300–1500	Introduction to fishing methods—brief outline and video viewing	Outboard (practical)	Video viewing on fish handling and fish markets	Preparation of bait fishing gear	SOP—preparation for fishing trip	Return to base
1500–1515	Break	Break	Break	Break	Break	Break
1515–1630	Introduction to fishing gear components	Outboard (practical)	Fish cleaning, icing and storage, markets and export	Preparation of bait fishing gear	SOP—preparation for fishing trip/depart for deep-bottom fishing trip	Offload catch and follow up on shoreside PHO

Timetable for SFO Course Week 1						
TIME	**MONDAY**	**TUESDAY**	**WEDNESDAY**	**THURSDAY**	**FRIDAY**	**SATURDAY**
0800–1000	Seafood handling: practical PHO	Seafood handling—tuna/video viewing	Construct gear for mid-water vertical longline/light fishing/jigging	SOP/prepare for mid-water fishing trip/depart for fishing grounds	PHO: Clean working area and processing tools	Certificate presentation/BBQ
1000–1015	Break	Break	Break	Break	Break	
1015–1200	Boat safety—outline and video viewing	Review—SOPs and course to date/assessment/evaluation	Construct gear for mid-water vertical longline/light fishing/jigging	Mid-water fishing	Stow away all fishing gear/assessments and evaluation	
1200–1300	Lunch break	Lunch break	Lunch break	Lunch break	Lunch break	
1300–1500	Introduction to fishing methods—brief outline and video viewing	Introduction to basic small diesel engines operations and maintenance	SOP/prepare for mid-water fishing trip	Mid-water fishing	Basic small fishing operations economics	
1500–1515	Break	Break	Break	Break	Break	
1515–1630	Introduction to fishing gear components	Construct gear for mid-water vertical longline/light fishing/jigging	SOP/prepare for mid-water fishing trip/depart for fishing grounds	Mid-water fishing/return to base/onshore PHO	Assessments and evaluation	

Appendix B

Proposed programme outline for the integrated SFO/PHO course

NATIONAL FISHERIES COLLEGE

PO Box 239, Kavieng, New Ireland Province, Papua New Guinea

EU INTEGRATED SFO/PHO PROGRAMME

INTEGRATED SMALL FISHING OPERATIONS/POST HARVEST PROGRAMME FOR THE EUROPEAN UNION LOAN RECIPIENTS

PROGRAMME OUTLINE

DRAFT

(Guideline for further development)

(A programme to assist the EU loan recipients to settle into viable and sustainable fishing operations immediately after acquiring their fishing assets covered under the loan scheme incorporating methods of managing and carrying out an effective small fishing operation; prepare, deploy, retrieve and maintain fishing gear; apply correct fish handling/post harvest methods to ensure quality product for the markets; and run an economically viable small fishing business).

CONTENTS

1. Introduction

The development of commercial offshore hook/line fisheries in Papua New Guinea has progressed effectively over the years to stimulate the aspirations of artisanal and small scale fishermen to partake in the fishery for economic gain. In recognition of this and in providing focused aid assistance to Papua New Guinea, the European Union (EU) set up a project with the objective to improve the welfare of the rural coastal population and training them in the harvesting and marketing of their commercial marine resources.
The EU project covers activities that provide fiscal assistance in the form of a credit assistance loan scheme issued under set criteria. To facilitate the loan recipients to settle into viable and sustainable fishing operations immediately after acquiring their fishing assets, the EU project management requested the assistance of the National Fisheries College (NFC) to run a programme to assist the recipients during this stage.

2. Programme outline

The NFC currently has an accredited competency based SFO 1 and SFO 2 Course that is focussed on skill development for small-scale commercial and artisanal fishermen. The SFO 1&2 course is targeted at fishermen who already have experiences in fishing and operating small vessels and directs these experiences to enable these fishermen to manage fishing operations that are safe, profitable, consistent and sustainable.

The EU programme is an extension of the SFO 1&2 course where the NFC is required to provide experienced staff, a Masterfisherman and technician, to guide the loan recipients through the full stages of organising and running their small fishing operations. The programme stages begins with the recipients acquiring their fishing assets, setting up their vessels for fishing operations and undertaking several fishing trips to build their confidence in maintaining sustainable and economically viable fishing operations.

This programme is focussed on conducting **real** fishing trips from which the fishermen have to return with profitable catches. All expenses for the fishing trips are to be met by the boat owners. The NFC staff is there to assist them set up their vessels and depict several strategies from which to base their fishing operations.

The programme is implemented over 17 days by which time the participant is expected to professionally utilise the assets issued to him under the EU loan scheme and be able to make successful fishing trips in order to repay the loan and meet commitments.

3. Programme objectives

On the basis of the above rationale the objectives of this programme are:

1. To give participants practise on basic fishing skills and safety knowledge that will make them capable of confidently and safely undertaking fishing operations on small fishing vessels and how to manage their catch to return with quality fish for the markets. They are made aware of small boat safety, safe operations, maintenance of gear and equipment, sanitation and hygiene, and financial and resource management. The EU SFO/PHO integrated programme prepares participants to fully understand the necessity of working according to Safe Operation Plans (SOP) to ensure that they initially organize their vessels to venture on safe fishing trips and to also be able to deal with emergency situations at sea. The participants are made aware of hazards in the workplace and the need to conform to safe working habits.

2. The participants are given the opportunity to enhance their knowledge on deep-bottom and mid-water fishing techniques to enable them to target the offshore pelagic species in demand by the export markets. This involves practical construction of gears and extended fishing

exercises. The main fishing methods to be utilised during the programme are: Deep-bottom reel fishing, deep-bottom longline/dropline, deep-bottom vertical longline, trolling, mid-water vertical longline, small scale horizontal longline using the vertical longline mainline, night fishing methods using lights (squid and bait jigging, light attraction methods, pelagic fish jigging) and palu-ahi (chum fishing for pelagic fish).

3. On-board handling and storage of fish on ice. The participants are shown proper methods of gaffing, boating, bleeding, spiking, gutting, and chilling the fish immediately after being caught. Proper sanitation and hygienic practices will be stressed under PHO introduction.

4. Onshore processing techniques and training to enable the fishers to maximise on their returns. This will be covered under PHO introduction and PHO 1.

5. Environmental issues and controlled fishing practises are stressed for the protection of marine life and coastline preservation to lay a basis for a sustainable fishery.

6. The programme concludes with basic economics understanding and basic small craft management methods, including the observance of maintaining the EU logbook and vessel costs and returns details.

7. The EU integrated SFO/PHO programme provides an appropriate platform for the recipients of the EU loan scheme to confidently settle in and progress their fishing operations/business.

4. Entry Requirements

This programme is specifically for participants selected by the EU project management as recipients of the EU project loan scheme. It would be appropriate if participants are selected with the following criteria:

- Experience in small boat operations
- Physically fit and healthy
- Reasonable understanding of spoken or written English (an advantage but not essential)

5. Programme methodology

The participants will be subjected to a continuous and intensive work programme over 17 days. The programme is designed to benefit small craft operators at all literacy levels, emphasis will be on extensive practical work to prepare the fishing gears and fishing vessels for actual fishing trips. During the programme actual commercial fishing trips will be undertaken where the fisherman will be responsible for the expenses of the fishing trip and has to return with a profitable catch. Where appropriate, information will be relayed to the participants through spoken explanations, accompanied by drawings, diagrams and by hands-on practical demonstration. Videos and photos will be used wherever possible and picture/caption materials will be utilised as much as possible and where appropriate. Classroom scenarios will be avoided as much as possible.

At the completion of this programme the participant is expected to have acquired the necessary skills and confidence to continue with managing his fishing operations successfully.

6. EU integrated SFO/PHO programme requirements

Introduction /outline of course

Safe Operations Plan (SOP)/safety checklist/gears checklist

Understanding of PHO requirements: hygienic and safety requirements/clean work area

Distribution of gear/gear components

Construction of reel fishing gear for deep-bottom fishing, deep-bottom vertical longline, deep-bottom longline/dropline, mid-water vertical longline, mid-water horizontal longline, night fishing methods using lights (squid and bait jigging, light attraction methods, pelagic fish jigging) and palu-ahi (chum fishing for pelagic fish).

Operate and maintain outboard motors and small diesel engines

Set up the vessel for efficient fishing operations

Manage work effectively in a small fishing operation

Prepare, deploy, retrieve and maintain fishing gear

On-board handling and storage of fish on ice

Financial awareness/management/sustainable operation/planning ahead

7. EU integrated SFO/PHO programme timetable

WEEK ONE						
Time	**Day 1**	**Day 2**	**Day 3**	**Day 4**	**Day 5**	**Day 6**
0800–0900–1000	Registration/introduction/programme outline	PHO introduction (1hr) Construction of deep-bottom reel fishing gear /knots	PHO introduction (1 hr) Construction of deep-bottom reel fishing gear/knots	PHO introduction (1hr) Construction of deep-bottom longline gear/knots	PHO introduction (1hr) Construction of deep-bottom longline gear/knots	Video—Better safe than sorry/Kiribati tale. Safe operation plan/safety gear checklist/fishing gear checklist/first aid
1000–1015	Break	Break	Break	Break	Break	
1015–1200	Introduction of fishing gears and fishing methods to be covered during the programme	Construct deep-bottom reel fishing gear	Complete construction of deep-bottom reel fishing gear	Construction of deep-bottom longline gear	Complete construction of vertical longline	Briefing on GPS/VHF/basic navigation/read compass
1200–1300	Lunch	Lunch	Lunch	Lunch	Lunch	
1300–1500	Distribution of fishing gear and construction of deep-bottom reel fishing gear	Construct deep-bottom reel fishing gear	Commence construction of deep-bottom longline gear	Complete construction of deep-bottom longline gear	Commence construction of night fishing methods gear	Operate and maintain outboard motors and small diesel engines
1500–1515	Break	Break	Break	Break	Break	
1515–1700	Construction of deep-bottom reel gear	Construction of deep-bottom reel fishing gear	Construction of deep-bottom longline gear	Commence construction of mid-water fishing gear—vertical longline	Construction of night fishing methods gear	Operate and maintain outboard motors and small diesel engines

WEEK TWO DEEP-BOTTOM REEL FISHING/VERTICAL LONGLINE					
DAY 1	**DAY 2**	**DAY 3**	**DAY 4**	**DAY 5**	**DAY 6**
0800–1200 Load gear on vessels in preparation for deep-bottom reel fishing trip and night fishing methods	**0000–200** Continue with deep-bottom reel fishing/ on-board handling and storage of fish	**0800–1000** PHO 1	**0500–1500** Depart for fishing grounds at 0500hrs/set vertical longline/carry out deep-bottom longline fishing/ continue deep-bottom/vertical longline fishing	**0800–1000** PHO 1	**0500–1500** Depart for fishing grounds at 0500hrs/set vertical longline/carry out deep-bottom fishing/ continue deep-bottom/vertical longline fishing
		1000–1015 Break		**1000–015** Break	
		1015–1200 Outboard and diesel engine maintenance		**1015–1200** Logbook records/SYB	
	1200–1700 Return to base /offload catch/PHO practical/catch records and sales details	**1200–1300** Lunch break		**1200–1300** Lunch break	
1200–2400 Depart for fishing grounds/commence deep-bottom reel and night fishing operations/on-board handling and storage of fish		**1300–1700** Repair fishing gears and prepare vessel for fishing trip—early morning departure	**1500** Return to base/offload catch/PHO practical/catch records and sales details	**1300–1700** Repair fishing gears and prepare vessel for fishing trip—early morning departure	**1500** Return to base/offload catch/PHO practical/catch records and sales details

WEEK THREE DEEP-BOTTOM REEL FISHING/DEEP-BOTTOM LONGLINE/MID-WATER LONGLINE				
DAY 1	**DAY 2**	**DAY 3**	**DAY 4**	**DAY 5**
0800–1200 Load gear on vessels in preparation for deep-bottom fishing trip and night fishing methods	**1000–1200** Continue with deep-bottom reel and deep-bottom longline fishing	**0800–1000** PHO 1	**0500–1500** Depart for fishing grounds at 0500hrs/set vertical longline/carry out deep-bottom longline fishing/ continue deep-bottom/vertical longline fishing	**0800–1000** Repair fishing gears and secure vessels and fishing gears
		1000–1015 Break		**1000–1015** Break
		1015–200 Logbook records/SYB		**1015–1200** Complete PHO
	1200–1700 Return to base/ offload catch/PHO practical/catch records and sales details	**1200–1300** Lunch break		**1200–1300** Lunch break
1200–2400 Depart for fishing grounds/commence deep-bottom longline/deep-bottom reel and night fishing operations		**1300–1700** Repair fishing gears and prepare vessel for fishing trip—early morning departure	**1500** Return to base/offload catch/PHO practical/catch records and sales details	**1300–1500** Outboard and diesel engine operations/maintenance
				1500–515 Break
				1515–1700 Outboard and diesel engine operations/maintenance

8. Session contents

COURSE: EU Integrated Small Fishing Operation (SFO)/Post Harvest Operation (PHO) programme

DELIVERY DATE: WEEK 1 – DAY 1

TIME: 0800–1000

SUBJECT/SESSION CONTENT: Introduction/programme outline/registration/and familiarisation.

EXPECTED OUTCOME: The participants are required to familiarise themselves with the requirements of the programme and to understand their role and responsibilities during the programme.

RESOURCES REQUIRED: 1. Hand book—Small Fishing Operations Course Notes
2. Registration forms 3. Programme timetable 4. Whiteboard with pens

SESSION PLAN:

0800–0900
- Formal welcoming of participants
- Exchange of introductions—tutors/participants
- Registration and recording formalities

0900–1000
- Introductory briefing on the programme outline including:
  - programme timetable
  - the expectations for the outcome of the programme,
  - types of fishing methods to be carried out,
  - type of equipment that will be used,
  - clarify the responsibility of the fishermen/EU management/NFC staff.
- Clarify the financial responsibility between the fishermen/EU management/NFC staff.

TIME: 1015–1200

SUBJECT/SESSION CONTENT: Introduction of fishing gears and fishing methods. Display of fishing gears and explanation on the function of each component/discuss the types of fishing methods that will be conducted during the programme.

EXPECTED OUTCOME: This session should give the participants a focussed approach to what should be done during the programme and also give them an understanding of the equipment that they will be using and which gear goes with a particular fishing method.

RESOURCES REQUIRED: 1.Hand book—Small Fishing Operations Course Notes
2. Checklist for fishing gears 3. Fishing accessories listed on the checklist
4. Whiteboard with pens 5. Tools for constructing fishing gears
6. Samples of ready constructed gear

SESSION PLAN:

1015–1100
- Display the various fishing gear components and accessories for the different fishing methods and explain the purpose and strategic use of each component.
- Stress to the fishermen that accessories should only be used if funds are available and if they are seen to make a difference in the catch rate for different species. It has to be stressed that as long as the appropriate hook and line is available, fishing operations should proceed. Accessories are used if there is a need for quick turn around fishing and for convenience.
- Display and explain the tools that are required for constructing the gears for the different fishing methods.

1100–1200
- Explain the different methods that will be used during the programme and the strategic times and target species that is associated with each fishing method.
- Get a feedback from each of the fisherman on their familiarity of each fishing method.
- Give details on the advantages and disadvantages associated with each fishing method.
- Encourage participation and feedback from the participants.

TIME: 1300–1500

SUBJECT/SESSION CONTENT: Distribution of fishing gear and construction of deep-bottom reel fishing gear.

EXPECTED OUTCOME: The participants should take stock of the equipment issued to them under the EU loan scheme. With this in hand they should gain an insight into preparing the necessary tools and fishing accessories to construct deep-bottom reel gear and how to go about constructing the gear.

RESOURCES REQUIRED:
1. Hand book—Small Fishing Operations Course Notes
2. Checklist for fishing gears
3. Fishing accessories listed on the checklist
4. Whiteboard with pens
5. Tools for constructing fishing gears
6. Samples of ready constructed gear

SESSION PLAN:

1300–1400
- Distribute the fishing gears among the course participants as listed in the allocations list.
- Get each participant to check his gear and sign for receipt of gear. Each participant is to be held responsible for the gear allocated to him as this will be his own equipment as covered under the loan scheme.
- Select the appropriate accessories required for deep-bottom reel fishing and separate from the other fishing gear.
- Pack away fishing accessories that will not be used during the construction of the deep-bottom fishing gear.

1400–1500
- Demonstrate the unwinding of the mainline from its coiled state and wind this onto a wooden FAO handreel.
- Demonstrate the construction of sinkers using river stones/building rebars/suitable sinker material.
- Stress the advantages of using inner rubber tubes for binding the rebars, or nets for holding the river stones. Try to get the message across that whenever possible, use materials that are available to facilitate constructing fishing gears. Try to use the most cheapest but efficient method for constructing effective fishing gear.
- Demonstrate the construction of a trunk line for the deep-bottom gear.
- Demonstrate the construction of branchlines using only hook and line and using accessories. Stress again the advantages and disadvantages of whether or not to use accessories so that the participants will be able to use this knowledge to their advantage.
- Construct a gaff for boarding fish.
- Piece the different components together to show the complete unit for deep-bottom reel fishing.

TIME: 1515–1700

SUBJECT/SESSION CONTENT: Construction of deep-bottom reel gear

EXPECTED OUTCOME: The participants begin hands-on work on constructing their own fishing gear that will be used during their fishing operations.

RESOURCES REQUIRED:
1. Checklist for fishing gears
2. Fishing accessories listed on the checklist for deep-bottom rig
3. Tools for constructing fishing gears
4. Inner tubes
5. Samples of ready constructed gear

SESSION PLAN:

1515–1600
- Wind the mainline onto the FAO wooden handreels.
- Construct at least 6 sets of sinkers using rebars or other appropriate material.

1600–1700
- Construct 6 sets of trunk lines

DELIVERY DATE: WEEK 1 – DAY 2

TIME: 0800–0900

SUBJECT/SESSION CONTENT: PHO introduction.

EXPECTED OUTCOME: Know the importance of food safety and good product handling.

RESOURCES REQUIRED:
1. Introductory PHO notes: Picture/caption based
2. Tools to be used during PHO: Knives, sharpening stone, gloves, brooms, mops, scrub brushes, detergents, etc.

SESSION PLAN:

0800–0900
- Brief the participants on the importance of food safety and good product handling.
- Identify the types of hazards such as biological, physical and chemical hazards.
- Identify how to control these hazards.

TIME: 0900–1700

SUBJECT/SESSION CONTENT: Construction of deep-bottom reel fishing gear/knots.

EXPECTED OUTCOME: The participant should now know how to unwind and load the mainline onto the FAO reel, know how to construct sinkers for deep-bottom fishing, know how to construct trunk lines, and how to construct branchlines. Know how to rig a fisherman's knot, marlin hitch and figure of eight.

RESOURCES REQUIRED:
1. Sample of constructed gear
2. Tools for constructing fishing gear
3. Inner tubes
4. 1 m cords for knots practice.

SESSION PLAN:

0900–0930
- Demonstrate how to rig a fisherman's knot, marlin hitch and figure of eight.

0930–1700
- Continue constructing trunk-lines and branchlines.

DELIVERY DATE: WEEK 1 – DAY 3

TIME: 0800–0900

SUBJECT/SESSION CONTENT: PHO introduction.

EXPECTED OUTCOME: Know the importance of maintaining a cold chain when handling fish, and details on fish spoilage factors and controls.

RESOURCES REQUIRED: 1. Picture/caption notes on PHO introduction

SESSION PLAN:

0800–0900 • Stress the importance of maintaining the cold chain through out fish handling, from boarding the fish to the buyer. Identify the fish spoilage factors and stress again the controls that can be implemented to reduce deterioration.
• Discuss how to avoid cross contamination, minimising physical damage, and maintaining the cold chain at all times.

TIME: 0900–1200

SUBJECT/SESSION CONTENT: Construction of deep-bottom reel fishing gear.

EXPECTED OUTCOME: The participant should by now have the confidence and knowledge to construct his own deep-bottom reel fishing gear and be able to secure this on his fishing vessel for maximum functioning ability.

RESOURCES REQUIRED: 1. Sample of constructed gear
2. Tools for constructing fishing gear
3. Inner tubes

SESSION PLAN:

0900–1200 • Complete construction of the deep-bottom reel gear and install the reels on the fishing vessel making sure that the reel fits securely and the gears are satisfactorily functional.

TIME: 1300–1700

SUBJECT/SESSION CONTENT: Commence construction of deep-bottom **longline** gear/knots.

EXPECTED OUTCOME: Obtain knowledge on constructing deep-bottom longline gear and the ideal locations for setting this gear.

RESOURCES REQUIRED: 1. Fishing components for deep-bottom longline construction.
2. Tools for constructing deep-bottom longline gear.
3. Inner tube
4. 1 m cords for practising knots

SESSION PLAN:

1300–1400 • Demonstrate round turn and two half hitches, timber hitch, carrick bend and anchor hitch.
• Demonstrate how to back splice 3-strand rope.
• Demonstrate the construction of a deep-bottom longline gear and explain the procedures and the method of deployment.

1400–1700 • Get the participants to construct their own deep-bottom mainline and store this on a reel.

DELIVERY DATE: WEEK 1 – DAY 4

TIME: 0800–0900

SUBJECT/SESSION CONTENT: PHO introduction.

EXPECTED OUTCOME: Know the importance and the types of tools and equipment that are generally used for PHO purposes on-board and during shore processing; and the importance of a clean work area especially on fishing vessels, processing areas, etc.

RESOURCES REQUIRED:
1. Picture/caption introductory notes on PHO
2. Tools for onboard processing such as knives, sharpening stone, brush, spike, etc.
3. Tools for shore processing.

SESSION PLAN:

0800–0900 • Run the participants through the full procedures for cleaning and preparing fish handling and processing tools and the advantages of setting up an organised working area to facilitate the handling of fish.—again stress the importance of cleanliness.

TIME: 0900–1500

SUBJECT/SESSION CONTENT: Construction of deep-bottom longline gear/knots

EXPECTED OUTCOME: Gain proficiency in constructing deep-bottom longline gear.

RESOURCES REQUIRED:
1. Fishing components for deep-bottom longline construction.
2. Tools for constructing deep-bottom longline gear.
3. Inner tube
4. 1m cords for practising knots

SESSION PLAN:

0900–1000 • Continue with constructing the deep bottom longline and complete this by the end of this session.

1000–1500 • Demonstrate clove hitch, rolling hitch, sheet bend, double sheet bend and bowline.
• Demonstrate how to join splice 3-strand rope.
• Construct branchlines for the deep-bottom longline.

TIME: 1500–1700

SUBJECT/SESSION CONTENT: Commence constructing mid-water fishing gear.

EXPECTED OUTCOME: The participants should be given an insight into what mid-water fishing methods involve and how to construct a mid-water vertical longline.

RESOURCES REQUIRED:
1. Tools for constructing mid-water gear.
2. Materials for constructing a mid-water vertical longline.
3. Programme notes on SFO.

SESSION PLAN:

1500–1600 • Brief the participants on the different mid-water fishing methods that would be undertaken during the programme and demonstrate to them the construction of a mid-water vertical longline.

1600–1700 • Get the participants to commence constructing their own mid-water vertical longline. Lay out the gear and cut the necessary components for the mainline.

DELIVERY DATE: WEEK 1 – DAY 5

TIME: 0800–0900

SUBJECT/SESSION CONTENT: PHO introduction—cleaning, gilling and gutting deep-bottom and reef fish/ice slurry/storage on ice.

EXPECTED OUTCOME: The participants should now have an insight into gilling, gutting and cleaning deep-bottom and reef fish, how to make up an ice-slurry, and how to store fish on ice.

RESOURCES REQUIRED:
1. Tools for gilling, gutting and cleaning fish.
2. Two ice bins with ice.
3. Fish for demonstration and practise.
4. Notes on PHO introduction.

SESSION PLAN:

0800–0900
- Explain the reasons for gilling and gutting fish.
- Explain the parts of the fish that is required to be removed.
- Demonstrate gilling and gutting procedures on a deep-bottom or reef fish.
- Demonstrate how to loin deep-bottom and reef fish for the overseas markets.

0900–1000
- Divide the participants into four groups and get them to practise all the above on specimens of deep-bottom or reef fish.

TIME: 1015–1200

SUBJECT/SESSION CONTENT: Complete construction of mid-water vertical longline/knots

EXPECTED OUTCOME: The participant should have his mid-water vertical longline gear ready constructed by the end of the session.

RESOURCES REQUIRED:
1. Tools for constructing mid-water gear.
2. Materials for constructing a mid-water vertical longline.
3. Programme notes on SFO. 4. 1 m cords for practising knots.

SESSION PLAN:

1015–1100
- Join up the necessary components for the mainline and wind these onto reels.
- Prepare/cut the necessary components for the branchlines.
- Demonstrate how to eye splice 3 strand rope.

1100–1200
- Join up the necessary components of the branchlines and store these in bins/baskets.

TIME: 1300–1700

SUBJECT/SESSION CONTENT: Briefing on night fishing methods using light attraction/knots.

EXPECTED OUTCOME: Obtain knowledge on the principles of night fishing methods and the type of gears that will be used during the programme.

RESOURCES REQUIRED:
1. Tools for constructing gear for night fishing methods.
2. Fishing gear components for constructing night fishing methods gear.
3. SFO notes.

SESSION PLAN:

1300–1400
- Brief the participants on the type of fishing methods that will be carried out using light attraction methods. These should include catching bait by squid jigging and scad jigging; mid-water jigging for pelagic species using live bait; inshore bottom fishing using lights lowered to the bottom.
- Display the types of lights available or that can be used for this operation.

1400–1500
- Construct squid and scad jigging lines using the required lures.
- Construct live bait mainlines for pelagic species.

1500–1700
- Demonstrate several monofilament knots for joining lines and tying lines onto hooks.
- Construct and prepare overhead lanterns and underwater lights for each vessel.

DELIVERY DATE: WEEK 1 – DAY 6

TIME: 0800–1000

SUBJECT/SESSION CONTENT: Safe Operation Plans—SOP's

EXPECTED OUTCOME: Gain knowledge of how to prepare and execute basic SOP's and the importance of running a safe fishing operation compared to haphazard operations.

RESOURCES REQUIRED: 1. Video: Better safe than sorry/Kiribati tale. 2. Video deck TV screen. 3. Checklists for fishing gear; safety gear, engine operations, trip requirements, and first aid.

SESSION PLAN:

0800–0900 • Video viewing of 'Better safe than sorry—Kiribati tale'. Review of the video and briefing on safe boat practises.

0900–1000 • Brief the participants on the compilation and utilisation of checklists for each function of their operations, i.e. safe boat operations (including first aid), fishing requirements, and engine operations.
• Stress the importance of running their operations strictly to SOP's. This will not only contribute to consistent and sustainable operations but enhances their safety while out on fishing operations and in the work place.

TIME: 1015–1200

SUBJECT/SESSION CONTENT: Basic knowledge on GPS/VHF/navigation/compass reading

EXPECTED OUTCOME: Acquire basic knowledge on the use of GPS and how to properly utilise the VHF radio. Also acquire basic navigation knowledge in using landmarks and how to read a compass for direction and bearings.

RESOURCES REQUIRED: 1. Handheld GPS, a VHF radio or Walkie-Talkie, a handheld compass and a chart.

SESSION PLAN: • Brief the participants on the functions of the GPS. If practicable, assist them to know how to mark fishing spots and how to return to these spots using waypoints.

• Show the participants how to read a compass and take bearings by the compass.
• Show the participants how to mark fishing spots using transits.
• Brief the participants on how to use the angle of the sun and celestial bodies as direction indicators for returning to base.

TIME: 1300–1700

SUBJECT/SESSION CONTENT: Operate and maintain outboard motors and small diesel engines

EXPECTED OUTCOME: Gain knowledge on the basic operations and maintenance requirements for outboard engines and small diesel engines.

RESOURCES REQUIRED: 1. SFO Notes on basic operations and maintenance procedures for outboard engines and small diesel engines.
2. Open demo model of outboard engine and diesel engine.
3. Operational outboard engine and diesel engine.
4. Tools required for servicing outboard and diesel engines.

SESSION PLAN:

1300–1400 • Overview on the operations and maintenance of outboard engines and an insight to engine parts using the demo model.

1400–1500 • Overview on the operations and maintenance of small diesel engines and an insight into engine parts using the demo model.

1515–1600 • Operate an outboard motor and run through the common problems and problem solving exercise.

1600–1700 • Operate a small diesel engine and run through the common problems and problem solving exercise.

DELIVERY DATE: WEEK 2 – DAY 1

TIME: 0800–2400

SUBJECT/SESSION CONTENT: Deep-bottom and night fishing trip.

EXPECTED OUTCOME: Practical knowledge on preparing a vessel for a deep-bottom and night fishing trip and carrying out the practical fishing exercise.

RESOURCES REQUIRED:
1. Deep-bottom fishing gear and night fishing methods gear.
2. All gear listed on the SOP list
3. Fishing vessel, engine and accessories.
4. Bait and Ice.

SESSION PLAN:

0800–1200
- Load the fishing vessel(s) with the appropriate fishing gears for deep-bottom reel and night fishing methods and ensure that all the necessary equipment for safety, fishing and onboard requirements are checked off according to the SOP.
- Load bait and ice.
- Position all the fishing reels and adjust them for maximum fishing efficiency.

1300–1500
- Travel to fishing ground.
- Organise equipment onboard and start hooking up the gears for instant use on arrival at the fishing ground.
- Prepare bait—thaw out if necessary.

1500–2400
- Carry out practical fishing operations and apply onboard handling and PHO methods to fish caught.
- Note the position of the vessel.
- Note the weather conditions/wind direction/moon phase/and depth of bottom.

DELIVERY DATE: WEEK 2 – DAY 2

TIME: 0000–1200

SUBJECT/SESSION CONTENT: Practical basic navigation and use of VHF/practical deep-bottom and night fishing operation.

EXPECTED OUTCOME: Practise fishing skills and PHO method.

RESOURCES REQUIRED:
1. Deep-bottom fishing gear and night fishing methods gear.
2. All gear listed on the SOP list
3. Fishing vessel, engine and accessories.
4. Bait and ice.

SESSION PLAN:

0000–1200
- Continue with deep-bottom reel fishing, on-board handling and storage of fish on ice.
- Practise PHO as much as possible and identify areas of improvement.

TIME: 1200–1700

SUBJECT/SESSION CONTENT: Practical Basic navigation/PHO practical—on-board and ashore.

EXPECTED OUTCOME: Develop basic navigation skills and know the PHO requirements for on-board post fishing duties, storing fish for the return journey and discharging fish.

RESOURCES REQUIRED:
1. Cleaning tools and detergent
2. Transfer bin
3. Transport vehicle
4. Weighing scale
5. Logbook/record book/receipt book

SESSION PLAN:

1200–1400
- Haul up the anchor by trailing a float roved to the anchor rope.
- Return to base
- Practise steering by the compass and landmarks.
- Clean, de-sectionalise and stow away all fishing gear.
- Scrub down work area.
- Stow fish on ice according to onboard PHO practice.

1400–1530
- Discharge, weigh and record fish.
- Maintain PHO practises during this stage.
- Ensure that the procedures for financial transactions are followed.

1530–1700
- Thoroughly clean the vessel and all gear.
- Clean engine/engine room.
- Stow away all equipment as required by SOP shore security plans.
- Arrange night watchman.
- Retire the crew after settling payment arrangements.

DELIVERY DATE: WEEK 2 – DAY 3

TIME: 0800–1000

SUBJECT/SESSION CONTENT: PHO 1—apply basic food safety and handling practises

EXPECTED OUTCOME: The participant should be able to identify workplace hazards, identify risks of contaminating fish, know hygiene standards, procedures and practices in the work area, and how to handle and store fish. Obtain practical post harvest skills in hygienic handling and processing fish.

RESOURCES REQUIRED: 1. Post harvest training room 2. Fish for processing and demonstration. 3. Processing tools—knives, sharpening stone, etc. 4. PHO notes

SESSION PLAN:

0800–1000
- Brief the participants on what would be expected of them during this session.
- Apply basic food safety and handling practises. Stressing the types of hazards in the workplace, proper hygiene standards and the procedures and practises of keeping a hygienic and safe work environment, and how to handle and store fish.
- Identify the practical effects of how enzymes spoil fish and describe how to control enzymes.
- Identify rigor mortis, how it spoils fish and how to control rigor mortis.
- Demonstrate rough handling, how it spoils fish and how to control rough handling.
- Explain what shelf life is and the shelf life of fish.

TIME: 1015–1200

SUBJECT/SESSION CONTENT: Start your business—financial management.

EXPECTED OUTCOME: Gain basic knowledge of how a small fishing business can be operated for financial gain.

RESOURCES REQUIRED: 1. SYB notes

SESSION PLAN:

1015–1100:
- Explain in simple terms what a business is.
- Explain what commercial fishing is.
- Discuss what is needed to be a successful commercial fishing owner.

1100–1200:
- Explain what it means to manage a small fishing business.
- Explain what financial management of a small fishing business means.
- Discuss the operational cost of a small commercial fishing boat.

TIME: 1300–1700

SUBJECT/SESSION CONTENT: Repair fishing gear and prepare for fishing trip.

EXPECTED OUTCOME: Practise repairing fishing gear and preparing the boat for another fishing trip.

RESOURCES REQUIRED: 1. Mid-water fishing gear, deep-bottom longline and night fishing methods gear.
2. All gear listed on the SOP list
3. Fishing vessel, engine and accessories. 4. Bait and ice.

SESSION PLAN:

1300–1400:
- Repair fishing gear damaged from the previous trip.

1400–1700:
- Load the fishing vessel(s) with the appropriate fishing gears for mid-water fishing, deep-bottom longline and night fishing methods and ensure that all the necessary equipment for safety, fishing and on-board requirements are checked off according to the SOP.
- Load bait and ice.
- Position all the fishing reels and adjust them for maximum fishing efficiency.

DELIVERY DATE: WEEK 2 – DAY 4

TIME: 0500–1500

SUBJECT/SESSION CONTENT: Practical fishing trip

EXPECTED OUTCOME: Know how to deploy deep-bottom longline, carryout vertical longline and practise jigging for bait and for pelagic species.

SESSION PLAN:

0500–0700
- Travel to fishing ground.
- Organise equipment on-board and start hooking up the gears for instant use on arrival at the fishing ground.
- Prepare bait—thaw out if necessary.

0700–1500
- Carry out practical fishing operations and apply on-board handling and PHO methods to fish caught.
- Note the position of the vessel.
- Note the weather conditions/wind direction/moon phase/and depth of bottom.

1500–1700
- Return to base
- Practise steering by the compass and landmarks.
- Clean, de-sectionalise and stow away all fishing gear.
- Scrub down work area.
- Stow fish on ice according to on-board PHO practice.

1700–1800:
- Discharge, weigh and record fish.
- Maintain PHO practises during this stage.
- Ensure that the procedures for financial transactions are followed.

1800–1900:
- Thoroughly clean the vessel and all gear.
- Clean engine/engine room.
- Stow away all equipment as required by SOP shore security plans.
- Arrange night watchman.
- Retire the crew after settling payment arrangements.

DELIVERY DATE: WEEK 2 – DAY 5

TIME: 0800–1000

SUBJECT/SESSION CONTENT: PHO 1—identify characteristics of seafood quality

EXPECTED OUTCOME: Know what seafood quality is; how the quality of fresh, chilled fish changes as it ages; how to use a score sheet to grade fresh whole fish.

RESOURCES REQUIRED:
1. PHO notes
2. Fresh fish for demonstration
3. PHO tools

SESSION PLAN:

0800–1000
- Discuss what 'quality' and 'fish quality' means.
- Explain the changes in the eating quality of fish.
- Explain 'look', 'feel', 'smell' and 'taste' sensory evaluation

TIME: 1015–1200

SUBJECT/SESSION CONTENT: SYB—markets

EXPECTED OUTCOME: Understand the importance of market preferences and demand.

RESOURCES REQUIRED:
1. SYB Notes
2. EU Logbook

SESSION PLAN:

1015–1200
- Explain what markets are.
- Explain how the marketing of fish can assist profit.
- Demonstrate how to fill in the EU logbook and its link to financial management.

TIME: 1300–1700

SUBJECT/SESSION CONTENT: Repair fishing gear and prepare for fishing trip.

EXPECTED OUTCOME: Practise repairing fishing gear and preparing the boat for another fishing trip.

RESOURCES REQUIRED:
1. Mid-water fishing gear, deep-bottom longline and night fishing methods gear.
2. All gear listed on the SOP list
3. Fishing vessel, engine and accessories.
4. Bait and ice.

SESSION PLAN:

1300–1400
- Repair fishing gear damaged from the previous trip.

1400–1700
- Load the fishing vessel(s) with the appropriate fishing gears for mid-water fishing, deep-bottom longline and night fishing methods and ensure that all the necessary equipment for safety, fishing and on-board requirements are checked off according to the SOP.
- Load bait and ice.
- Position all the fishing reels and adjust them for maximum fishing efficiency.

DELIVERY DATE: WEEK 2 – DAY 6

TIME: 0500–1500

SUBJECT/SESSION CONTENT: Practical fishing trip

EXPECTED OUTCOME: Know how to deploy deep-bottom longline, carryout vertical longline and practise jigging for bait and for pelagic species.

SESSION PLAN:

0500–0700
- Travel to fishing ground.
- Organise equipment on-board and start hooking up the gears for instant use on arrival at the fishing ground.
- Prepare bait—thaw out if necessary.

0700–1500
- Carry out practical fishing operations and apply on-board handling and PHO methods to fish caught.
- Note the position of the vessel.
- Note the weather conditions/wind direction/moon phase/and depth of bottom.

1500–1700
- Return to base
- Practise steering by the compass and landmarks.
- Clean, de-sectionalise and stow away all fishing gear.
- Scrub down work area.
- Stow fish on ice according to on-board PHO practice.

1700–1800:
- Discharge, weigh and record fish.
- Maintain PHO practises during this stage.
- Ensure that the procedures for financial transactions are followed.

1800–1900:
- Thoroughly clean the vessel and all gear.
- Clean engine/engine room.
- Stow away all equipment as required by SOP shore security plans.
- Arrange night watchman.
- Retire the crew after settling payment arrangements.

DELIVERY DATE: WEEK 3 – DAY 1

TIME: 0800–2400

SUBJECT/SESSION CONTENT: Deep-bottom and night fishing trip.

EXPECTED OUTCOME: Practical knowledge on preparing a vessel for a deep-bottom and night fishing trip and carrying out the practical fishing exercise.

RESOURCES REQUIRED:
1. Deep-bottom fishing gear and night fishing methods gear.
2. All gear listed on the SOP list
3. Fishing vessel, engine and accessories.
4. Bait and ice.

SESSION PLAN:

0800–1200
- Load the fishing vessel(s) with the appropriate fishing gears for deep-bottom reel and night fishing methods and ensure that all the necessary equipment for safety, fishing and on-board requirements are checked off according to the SOP.
- Load bait and ice.
- Position all the fishing reels and adjust them for maximum fishing efficiency.

1300–1500
- Travel to fishing ground.
- Organise equipment on-board and start hooking up the gears for instant use on arrival at the fishing ground.
- Prepare bait—thaw out if necessary.

1500–2400
- Carry out practical fishing operations and apply on-board handling and PHO methods to fish caught.
- Note the position of the vessel.
- Note the weather conditions/wind direction/moon phase/and depth of bottom.
- Arrange night watchman.
- Retire the crew after settling payment arrangements.

DELIVERY DATE: WEEK 3 – DAY 2

TIME: 0000–1200

SUBJECT/SESSION CONTENT: Practical basic navigation and use of VHF/practical deep-bottom and night fishing operation.

EXPECTED OUTCOME: Practise fishing skills and PHO method.

RESOURCES REQUIRED:
1. Deep-bottom fishing gear and night fishing methods gear.
2. All gear listed on the SOP list
3. Fishing vessel, engine and accessories.
4. Bait and ice.

SESSION PLAN:

0000–1200
- Continue with deep-bottom reel fishing, on-board handling and storage of fish on ice.
- Practise PHO as much as possible and identify areas of improvement.

TIME: 1200–1700

SUBJECT/SESSION CONTENT: Practical basic navigation/PHO practical—on-board and ashore.

EXPECTED OUTCOME: Develop basic navigation skills and know the PHO requirements for on-board post fishing duties, storing fish for the return journey and discharging fish.

RESOURCES REQUIRED:
1. Cleaning tools and detergent
2. Transfer bin
3. Transport vehicle
4. Weighing scale
5. Logbook/record book/receipt book

SESSION PLAN:

1200–1400
- Haul up the anchor by trailing a float roved to the anchor rope.
- Return to base
- Practise steering by the compass and landmarks.
- Clean, de-sectionalise and stow away all fishing gear.
- Scrub down work area.
- Stow fish on ice according to onboard PHO practice.

1400–1530
- Discharge, weigh and record fish.
- Maintain PHO practises during this stage.
- Ensure that the procedures for financial transactions are followed.

1530–1700
- Thoroughly clean the vessel and all gear.
- Clean engine/engine room.
- Stow away all equipment as required by SOP shore security plans.
- Arrange night watchman.
- Retire the crew after settling payment arrangements.

DELIVERY DATE: WEEK 3 – DAY 3

TIME: 0800–1000

SUBJECT/SESSION CONTENT: PHO 1—onshore practise on cleaning/gilling and gutting mid-water fish, especially tuna/maintain temperature of seafood.

EXPECTED OUTCOME: Be able to confidently clean, gill and gut mid-water fish and tuna; chill fish in ice slurry and preserve fish on ice. Know how to prepare and store fish for the sashimi markets in Japan and the US.

RESOURCES REQUIRED:
1. PHO processing tools
2. PHO room
3. Mid-water fish and tuna for demonstration and practise
4. cleaning agents/detergent

SESSION PLAN:

0800–0900
- Demonstrate the methods of gilling and gutting mid-water fish such as wahoo, mahi mahi (dolphin fish), barracuda, etc.
- Demonstrate the gilling, gutting and preparation of yellowfin and bigeye tuna as required for the sashimi market in Japan and the US.
- Demonstrate how to loin all deep-water fish for overseas markets.

0900–1000
- Get the participants to practice all the above on mid-water and tuna specimen.

TIME: 1015–1200

SUBJECT/SESSION CONTENT: SYB—completion

EXPECTED OUTCOME: Know all the components of managing a small fishing operation and the reality of commercial fishing, financial management, marketing and record keeping.

RESOURCES REQUIRED: 1. EU logbook 2. SYB notes 3. Catch details for previous trips

SESSION PLAN:

1015–1200
- Run through the EU logbook on entries made by the fishermen in their previous fishing trip during this programme.
- Using the catch details and transactions records for the previous trips during this programme, connect the different components of financial management and explain to the fishermen the reality of commercial fishing and how proper financial management can lead to success while poor financial management can lead to failure.

TIME: 1300–1700

SUBJECT/SESSION CONTENT: Repair fishing gears and prepare vessel for fishing trip – early morning departure.

EXPECTED OUTCOME: Practise repairing fishing gear and preparing the boat for another fishing trip.

RESOURCES REQUIRED:
1. Mid-water fishing gear, deep-bottom longline and night fishing methods gear.
2. All gear listed on the SOP list
3. Fishing vessel, engine and accessories.
4. Bait and ice.

SESSION PLAN:

1300–1400
- Repair fishing gear damaged from the previous trip.

1400–1700
- Load the fishing vessel(s) with the appropriate fishing gears for mid-water fishing, deep-bottom longline and night fishing methods and ensure that all the necessary equipment for safety, fishing and on-board requirements are checked off according to the SOP.
- Load bait and ice.
- Position all the fishing reels and adjust them for maximum fishing efficiency.

DELIVERY DATE: WEEK 3 – DAY 4

TIME: 0500–1500

SUBJECT/SESSION CONTENT: Practical fishing trip

EXPECTED OUTCOME: Know how to deploy deep-bottom longline, carryout vertical longline and practise jigging for bait and for pelagic species.

SESSION PLAN:

0500–0700
- Travel to fishing ground.
- Organise equipment on-board and start hooking up the gears for instant use on arrival at the fishing ground.
- Prepare bait—thaw out if necessary.

0700–1500
- Carry out practical fishing operations and apply on-board handling and PHO methods to fish caught.
- Note the position of the vessel.
- Note the weather conditions/wind direction/moon phase/and depth of bottom.

1500–1700
- Return to base
- Practise steering by the compass and landmarks.
- Clean, de-sectionalise and stow away all fishing gear.
- Scrub down work area.
- Stow fish on ice according to on-board PHO practice.

1700–1800:
- Discharge, weigh and record fish.
- Maintain PHO practises during this stage.
- Ensure that the procedures for financial transactions are followed.

1800–1900:
- Thoroughly clean the vessel and all gear.
- Clean engine/engine room.
- Stow away all equipment as required by SOP shore security plans.
- Arrange night watchman.
- Retire the crew after settling payment arrangements.

DELIVERY DATE: WEEK 3 – DAY 5

TIME: 0800–1000

SUBJECT/SESSION CONTENT: End of programme/repair fishing gear and prepare the vessels for ongoing fishing operations.

EXPECTED OUTCOME: The participants should now be ready to take on commercial fishing operations on their own and to manage their small fishing operations effectively.

RESOURCES REQUIRED:
1. Tools required for repairing and constructing fishing gears
2. Cleaning equipment and the required solvents

SESSION PLAN:

0800–1000
- Repair all fishing gears that needs to be repaired.
- Clean out the vessels thoroughly using detergents and bleach. Make sure that the vessels are washed down thoroughly.
- Re-stow all the equipment on board and organise them neatly.
- Leave the vessels well organised and spruced up for the fishermen to commence their own fishing operations when they are ready.

TIME: 1015–1200

SUBJECT/SESSION CONTENT: Completion of PHO

EXPECTED OUTCOME: Complete understanding of the PHO requirements for small commercial fishing operations using small vessels.

RESOURCES REQUIRED: 1. PHO notes

SESSION PLAN:

1015–1100 • Wrap up PHO requirements for small fishing operations.
1100–1200 • Question and Answer session to clarify or address situations of doubt.

TIME: 1300–1700

SUBJECT/SESSION CONTENT: Outboard and diesel engines trouble shooting.

EXPECTED OUTCOME: Better understand trouble shooting procedures when handling outboards or small diesel engines.

RESOURCES REQUIRED:
1. Outboard cut model and diesel engine cut model.
2. Functional outboard and small diesel engine.
3. Tools for use on outboard and small diesel engines.
4. SFO notes on outboard and small diesel engines.

SESSION PLAN:

1300–1400
- Run through as many possible scenarios of problems on outboard engines and the trouble shooting procedures required to trace these problems.
- Demonstrate how to solve the problems.

1400–1500
- Run through as many possible scenarios of problems on small diesel engines and the trouble shooting procedures required to trace these problems.
- Demonstrate how to solve the problems.

1515–1600 • Hands on trouble shooting and problem solving on outboard engines.
1600–1700 • Hands on trouble shooting and problem solving on small diesel engine.

Appendix C

Records of several RCFDP fishermen's operating costs and catches for Nov/Dec 2004

RURAL COASTAL FISHERIES DEVELOPMENT PROJECT PROJECT No. EUB # 1 SALES AND EXPENDITURE TABLE FOR OCT. 2004—APR. 2005			
INCOME	**OCT**	**NOV**	**TOTALS**
Sales to Ailan Seafood Ltd			
Other sales	4421.5	2537	6958.5
Other funds			
TOTAL SALES	**4421.5**	**2537**	**6958.5**
EXPENSES			
Wages, bonus and allowances			
Fuel & oil	600	700	1300
Bait Ice	1081.2	169.6	1250.8
Fishing gears			
Other expenses	223.5	15	238.5
TOTAL EXPENSES	**1904.7**	**884.6**	**2789.3**
SURPLUS/DEFICIT BEFORE LOAN	2516.8	1652.4	4169.2
RCFDP Loan repayments	0	1477	1477
NET PROFIT	**2516.8**	**3129.4**	**2692.2**
Number of kilos caught (kg)	1208.5	805	2013.5
Litre of fuel used	530	210	740
Kg of ice used	745	200	945
Kilos of bait used			

Note: Advances obtained for the ASL, have been treated/counted on as wages, bonues, etc.

RURAL COASTAL FISHERIES DEVELOPMENT PROJECT
PROJECT No. EUB # 2
SALES AND EXPENDITURE TABLE FOR OCT. 2004—APR. 2005

INCOME	OCT	NOV	TOTALS
Sales to Ailan Seafood Ltd	1984.5	2416.1	4400.6
Other sales			
Other funds			
TOTAL SALES	**1984.5**	**2416.1**	**4400.6**
EXPENSES			
Wages, bonus and allowances		300	300
Fuel & oil	867	819.33	1686.33
Bait	96		
ice	249	330	
Fishing gears			0
Other expenses	50	400	
TOTAL EXPENSES	**1262**	**1849.33**	**3111.33**
SURPLUS/DEFICIT BEFORE LOAN	722.5	566.77	1289.27
RCFDP Loan repayments	0	568	568
NET PROFIT	**722.5**	**1134.77**	**721.27**
Number of kilos caught (kg)	566	757.2	1323.2
Litre of fuel used	425	370.01	795.01
Kg of ice used	690	1100	1790
Kilos of bait used	16		16

Note: Advances obtained for the ASL, have been treated/counted on as wages, bonues, etc.

RURAL COASTAL FISHERIES DEVELOPMENT PROJECT
PROJECT No. EUB # 3
SALES AND EXPENDITURE TABLE FOR OCT. 2004—APR. 2005

INCOME	OCT	NOV	TOTALS
Sales to Ailan Seafood Ltd	3675.4	3401	7076.4
Other sales			
Other funds			
TOTAL SALES	**3675.4**	**3401**	**7076.4**
EXPENSES			
Wages, bonus and allowances	860		860
Fuel & oil	867	824	1691
Bait			
Ice	270	270	540
Fishing gears	120		120
Other expenses	200	1140	1340
TOTAL EXPENSES	**2317**	**2234**	**4551**
SURPLUS/DEFICIT BEFORE LOAN	1358.4	1167	2525.4
RCFDP Loan repayments	0	1000	1000
NET PROFIT	**1358.4**	**2167**	**1525.4**
Number of kilos caught (kg)	1043	933	1976
Litre of fuel used	425	400	825
Kg of ice used	900	900	1800
Kilos of bait used			

Note: Advances obtained for the ASL, have been treated/counted on as wages, bonues, etc.

RURAL COASTAL FISHERIES DEVELOPMENT PROJECT
PROJECT No. EUB # 3
SALES AND EXPENDITURE TABLE FOR OCT. 2004—APR. 2005

INCOME	OCT	NOV	TOTALS
Sales to Ailan Seafood Ltd	2073.2	1822	3895.2
Other sales			
Other funds			
TOTAL SALES	**2073.2**	**1822**	**3895.2**
EXPENSES			
Wages, bonus and allowances		1000	1000
Fuel & oil	934.32	244.8	1179.12
Bait	76		76
Ice	258	240	498
Fishing gears			0
Other expenses	325	150	475
TOTAL EXPENSES	**1593.32**	**1634.8**	**3228.12**
SURPLUS/DEFICIT BEFORE LOAN	479.88	187.2	667.08
RCFDP Loan repayments	0	568	568
NET PROFIT	**479.88**	**755.2**	**99.08**
Number of kilos caught (kg)	566.4	483	1049.4
Litre of fuel used	458	120	578
Kg of ice used	860	800	1660
Kilos of bait used	19		19

Note: Advances obtained for the ASL, have been treated/counted on as wages, bonues, etc.