

■ NEARSHORE FISHERIES DEVELOPMENT AND TRAINING SECTION

Longline assistance project in the Cook Islands

Fisheries Development Officer (FDO), Steve Beverly, spent July and August in the Cook Islands — seven weeks in Rarotonga and one week in Aitutaki — helping the domestic longline fleet.

The Rarotonga-based domestic longline fleet, consisting of five operational vessels at the time of this project, was well established but was experiencing difficulties due to rising operating costs, rising freight rate costs for exporting fish, declining catch rates, crew problems, and problems associated with maintaining a fleet of older vessels in a remote location. The owners needed advice on what to do to ameliorate the situation in the short and long term. The fledgling Aitutaki-based fleet — two small boats — was just getting started and needed assistance on vessel layout, gear design and fishing techniques.

At the time of this project, there were 21 licensed Cook Island vessels (not counting the two smaller boats based in Aitutaki), eight of which were based in Rarotonga. Of these, only five were operational. The others had mechanical or crew problems. SPC's Fisheries Development Officer (FDO) Steve Beverly, worked with four of the five operational boats plus the two smaller Aitutaki-based boats. The boats fishing in the northern group were not considered in this project.

Upon arrival in Rarotonga, the FDO met with the Secretary of the Ministry of Marine Resources, Ian Bertram, and the heads of the

domestic fishing companies, including Cook Islands Fish, Ltd – Josh Taio, Manager (boats F/V *Ana*, F/V *Lady Mary*), and Landholdings, Ltd – Bill Doherty, Manager (boats F/V *Aulola*, F/V *Bounty*, F/V *Gypsy Trader*).

During the first four weeks of the project, the FDO made four regular trips on the Rarotonga-based boats: *Bounty*, *Aulola*, *Ana* and *Lady Mary*, in that order (Fig. 1). Details of the five operational boats can be found in Table 1.

Some generalisations can be made about these five boats: all are small- to medium-sized (<18 m), all are older (average age 32 years), and the average fish hold capacity is just around 4 mt. Because of these physical characteristics these boats share some commonalities. They have a very limited range and very limited fishing and fish hold capacities, so the fishing area in which they operate is small compared with the overall EEZ they are fishing within. The result, is a reduction in the amount of effort, compared with medium-size longline boats (>18 m), which are more typical for the fresh tuna and swordfish fisheries. Also, because they are older, these boats will be plagued by maintenance problems. On the other hand, because they are smaller and older, the initial investment to get into the fishery is not as great as it would be for a



Figure 1. F/V *Bounty*

Table 1: Details of Rarotonga's domestic longline fleet.

Boat	LOA (m)	Beam (m)	Depth (m)	GRT	Hull	Year built	Engine (hp)	Fish capacity	License type
<i>Ana</i>	14.7	4.3	1.7	32.8	steel	1970	270	4 mt ice	6 nm
<i>Aulola</i>	11.8	4	1.4	na	steel	1977	109	4 mt ice	12 nm
<i>Bounty</i>	14.4	3.7	1.7	32.8	steel	1970	180	4 mt ice	12 nm
<i>Gypsy Trader</i>	12.8	3.7	1.8	10	steel	1978	130	4 mt ice	6 nm
<i>Lady Mary</i>	16	4.26	1.26	34.8	fibreglass	1982	370	4 mt chilled sea water (CSW)	12 nm

newer, larger boat. An additional advantage is that annual slipping and maintenance can be done in Rarotonga, rather than in Fiji or Tahiti, as would be the case if the boats were larger.

All five of these boats fished more or less the same way during this project. All had monofilament longline systems with ample gear to set around 1000 to 1200 hooks daily, and all of them did shallow night sets using squid and/or sardines for bait and chemical lightsticks. They fished within sight of Rarotonga, from 10–95 km (6–60 mi) for some boats and from 20–100 km (12–60 mi) for other boats, depending on their license. They usually did five sets on each trip, setting around 3000 to 5000 hooks total. Landholding’s boats (*Aulola*, *Bounty*, and *Gypsy Trader*) returned to port after three sets to offload fish to Ocean Fresh, the local retail market operated by Landholding, where all of Landholding’s fish were sold.

After offloading the fish, they returned to sea for two more sets. Cook Islands Fish’s boats (*Ana* and *Lady Mary*) generally stayed at sea for all five sets and fish were either exported or sold directly to Blue Pacific Foods Ltd, another company in Rarotonga. They returned to port on Saturday morning to meet a Rarotonga–Los Angeles flight that departed each Saturday evening. The catch of all five boats during this project consisted mostly of broadbill swordfish with some bigeye

tuna, yellowfin tuna, albacore, wahoo and mahi mahi. All fish were landed fresh as gilled and gutted (G&G), headed and gutted (H&G), or fully dressed fish. Both companies subscribed to Orbimage remote sensing charts that show sea surface temperature (SST) and sea surface height (SSH) to enhance fish findings. The captains and crew of the five boats were almost entirely Fijian nationals working in the Cook Islands on work permits, or as resident alien workers. Two Filipinos were also working as crew.

The FDO accompanied the captains and crew on four regular swordfish longline trips during which, 15 sets were made. Catch and effort details can be seen on Table 2. In total, 195 fish were caught, including 40 swordfish, 15 bigeye tuna, 49 albacore, 71 mahi mahi, 2 striped marlin, 5 wahoo, 9 short-billed spearfish, 1 sailfish, 1 yellowfin tuna, and 1 opah. Swordfish comprised about 20% of the catch by numbers but about half by weight and much more than half of the value (estimated) of the total catch. Mahi mahi comprised 36% of the catch and albacore about 25% of the catch by numbers. Bigeye tuna comprised 7% of the catch by numbers but they were generally not of exportable size (i.e. were <30 kg). All other species comprised 12% of the catch by numbers.

On the F/V *Ana* a tagged swordfish was caught. On the same trip a loggerhead turtle was also caught, and the crew got first

hand experience in proper turtle handling and release protocols. The loggerhead was released apparently alive and vigorous but with a 3.6 sun Japan tuna hook still lodged in its tongue (Fig. 2). The FDO and crew attempted (without success) to remove the hook and eventually decided that they could do the job but not without killing or seriously injuring the turtle. They also learned about tags. The crew member who first noticed the tag on the swordfish received a certificate and reward from the Commonwealth Scientific and Industrial Research Organisation (CSIRO) in Australia (Fig.3). Some good lessons were learned in responsible fishing.

The FDO made one trip on an Aitutaki boat, Baxter Brothers’ *Mary J* (Fig. 4). Another boat in Aitutaki, Mike Henry’s, *Orongo*, which wasn’t equipped with fishing gear. *Mary J* was equipped with a home-made mini longline reel (made by Clive Baxter) that held enough line for about 200 hooks (Fig. 5). Before departing on *Mary J*, the FDO made floatlines so that a tuna set could be made. The crew had been setting right on the surface, attaching floats directly to the mainline. On the day the FDO arrived in Aitutaki the crew caught 230 kg of mahi mahi on just 180 hooks using this method. They were keen to catch tuna as the local market in Aitutaki was saturated with mahi mahi. One trip was undertaken with the FDO. *Mary J* did one tuna set of 150 hooks just to

Table 2: Catch and effort for 15 observed swordfish sets on Rarotonga-based domestic boats.

Boat	# sets	# hooks	Bait	Number of fish	kg	CPUE (number per 100 hooks)	CPUE (kg per 100 hooks)
<i>Bounty</i>	3	3500	Sardine/squid	31	725	0.9	22.4
<i>Aulola</i>	3	3600	Sardine/squid	33	600	0.9	17.4
<i>Ana</i>	5	4500	squid	81	1850	1.8	41.1
<i>Lady Mary</i>	4	2800	squid	50	1775	1.8	63.4
Total	15	14,400		195	4950	1.35	34.4



the west of Aitutaki. Right as hauling started the boat broke down, taking on water in the engine room. The starter was flooded so the main engine would not start. The captain had to call for help.

Fortunately, *Mary J* was equipped with a full complement of safety gear, including a 406 EPIRB. It was also fortunate that the EPIRB did not have to be used. After trying to restart the engine unsuccessfully, the captain gave out a distress call (not a mayday but directly to a land station) as the boat was in no immediate danger of sinking. Even though the engine room continued to take on water, the bilge pump was keeping up. The call was patched through to the owner of the only boat on Aitutaki that could have mounted a search and rescue, *Orongo*, which set out immediately and eventually found the *Mary J* and took it under tow just as it was getting dark. During the first four hours of the tow, the captain kept in constant radio contact with *Orongo*, directing them how to steer so that the mainline could be hauled. Three young, strong deckhands pulled the entire line by hand. *Mary J* ended up with 12 fish weighing approximately 150 kg (1 opah, 4 yellowfin tuna, and 7 mahi mahi). The boats arrived back at the wharf at around midnight, safe and sound. *Mary J*, however, was out of service for the short term so the FDO returned to Rarotonga. This sea safety incident highlighted the need for continued vigilance and offered good lessons on why it is important to be prepared for any eventuality. Fortunately, the owners of *Mary J* and *Orongo* were very well prepared.

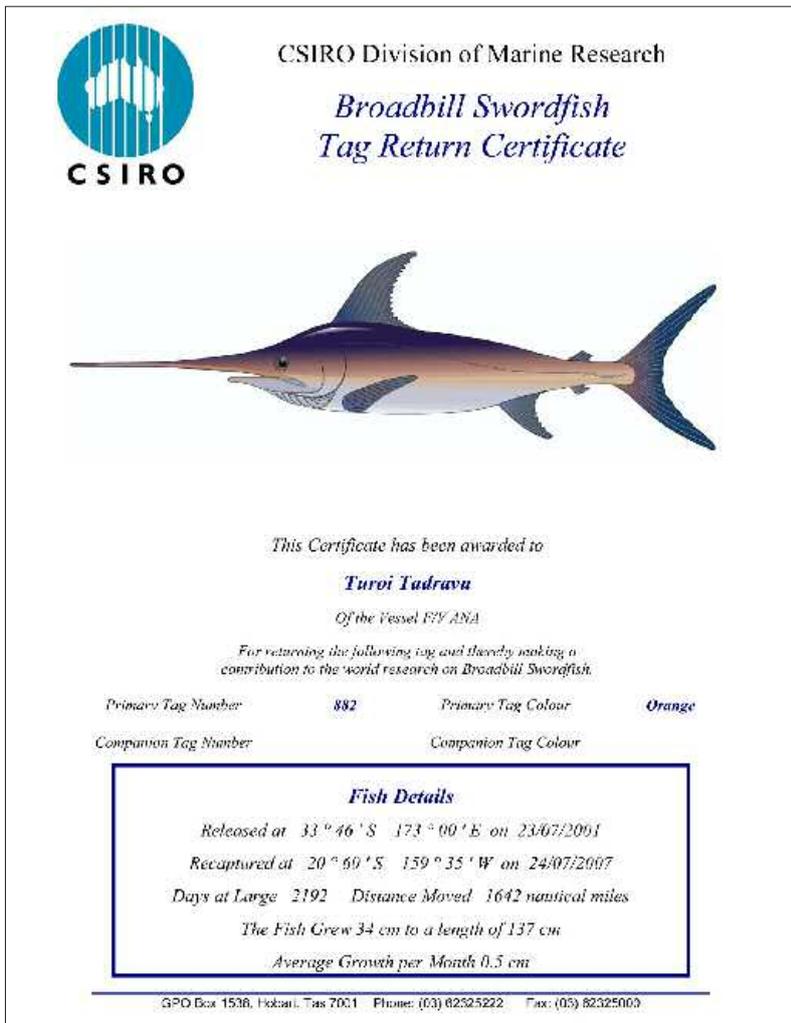


Figure 2 (top): Loggerhead turtle being released alive and well from F/V Ana.

Figure 3 (bottom): Certificate received from CSIRO for returning a tag from a swordfish.

At the conclusion of the project, the FDO presented his findings along with recommendations, in the form of a PowerPoint presentation to MMR and to the vessel owners at a meeting at MMR headquarters.





Figure 4 (left): F/V *Mary J.*

Figure 5 (right): Clive Baxter's home-made mini longline reel.

Faculty of Islands and Oceans offers a new programme in sustainable fisheries

Introduction

The University of the South Pacific's Faculty of Islands and Oceans — through the School of Marine Studies — will be offering a new certificate programme of study in Sustainable Fisheries, beginning the first semester in 2008. The certificate programme is a component of the Sustainable Fisheries Programme, which also includes a diploma and degree in Sustainable Fisheries, which will be offered later. The certificate programme is a full academic year (two semesters) programme, comprising 6 prescribed courses (5 core courses and one elective).

Programme rationale and goals

The programme was initiated subsequent to the approval of the School of Marine Studies' proposal by the regional Head of Fisheries (HOF) meeting in April 2006. The programme was developed in close collaboration and consultation with other faculties and departments of the University of the South Pacific, SPC, national fisheries departments, the Nelson School of Fisheries in New Zealand, and the Commonwealth Secretariat.

The programme was introduced to replace the historical SPC/Nelson Fisheries Officers' course. As such, it is designed to be consistent with the latest SPC/Nelson Fisheries Officers' course programme (2004), which itself was based on recommendations made as part of a comprehensive review of fisheries officers' training needs in the region. The programme will be supported and complemented by a four-week Practical Safety and Fishing course that SPC will continue to run annually. The SPC course may be cross-credited to the certificate in Sustainable Fisheries Programme through the normal USP accreditation procedures.

The programme was developed in recognition of the:

- lack of tertiary training programmes and opportunities in the region for Pacific Island nationals, to enable them to obtain recognised formal tertiary qualifications in the area of sustainable fisheries development and management;
- important role that fisheries play in providing the liveli-

hood and social and economic well being of Pacific Island countries; and

- deteriorating condition of marine resources and the environment in the Pacific Islands, due to the irresponsible use and overexploitation of marine resources, and ineffective management practices.

The School of Marine Studies recognises the need for a long-term solution to national capacity building, and through this programme will:

- promote the concepts and principles of "sustainability" as a basis for fisheries development and management in the region;
- provide appropriate and recognised tertiary training opportunities and qualifications for Pacific Island nationals;
- develop and enhance the capacity of Pacific Island communities or nationals to develop and manage their marine resources and environment in a more responsible and sustainable manner; and

- permit incremental learning, career progression, and professional development in fisheries management.

The principal focus of the programme is the sustainable fisheries or ecosystem approach, which provides a more holistic approach to fisheries development and management in Pacific Island countries. It integrates fisheries, environmental and socioeconomic objectives, and more precautionary approaches in decision-making regarding the use and management of marine resources. In essence, it requires the integration of science and social science, economic, environmental protection and conservation, and national and community participation in decision-making processes relating to the development and management of marine resources.

Programme outcomes

The programme provides students with in-depth knowledge and understanding of:

- The status and challenges of sustainable fisheries development and management in the Pacific Islands;
- The principles of sustainable development and how these can be applied and implemented at the local level to ensure sustainable development and management of marine resources and the environment;
- The marine environment and ecosystem and the important role they play in sustainability of marine resources;
- The role of good governance, communication and extension in sustainable development and management of marine resources;

- The relationship or link between a viable fishing industry, a healthy fish stock, and a healthy environment;
- Fish capture technologies and their impact on marine resources and the environment;
- Aquaculture and post-harvest fisheries and their potential role in sustainable development and management of marine resources; and
- The role of science and social science and their applications in the sustainable development and management of marine resources in the Pacific Islands.

Graduates of this programme should be able to find jobs in the fisheries, maritime, environment and tourism sectors, as well as in nongovernmental organisations and community-based institutions, which are involved in marine resources development, management and conservation.

Programme outline

Level/year: Certificate programme (6 courses only)

Core courses:

- MS112: Introduction to sustainable fisheries;
- MS207: Natural Resources Governance & Extension Tech;
- MS111: Introduction to Marine Science;
- EC 100: Introduction to Economics; and
- BI108: Animal Biology

One of the following:

- MS206: Maritime Techniques;
- MS204: Tropical Seafood;
- IS100: Computing fundamentals;
- GE108: Geographical Techniques;
- MA102: Mathematic for science;

- BI102: Plant Biology

(Or other Courses required Science/Arts perquisites with approval of Head of School)

Scholarship awards

The Commonwealth Secretariat, through USP, will be funding a number of scholarships to enable Commonwealth member countries' candidates to pursue a certificate programme in Sustainable Fisheries at USP. An advertisement on these scholarship awards will be available soon through various Commonwealth Secretariat and USP points of contacts.

Information contact

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Detailed programme information can also be accessed on USP's School of Marine Studies website:

<http://www.usp.ac.fj/marine/>



DevFish session on tuna fisheries statistics at SPC Heads of Planning and Statistics Meeting

Heads of Statistics and Planning offices from Pacific Island countries and territories, plus representatives of regional and donor agencies, discussed tuna fisheries statistics issues at a special session within the Heads of Planning and Statistics meeting in Noumea, New Caledonia on 21 September 2007.

The Regional Heads of Planning and Heads of Statistics Meeting (HOPS) is organised triennially by SPC. This year's theme was "Future directions for evidence-based decision-making in the Pacific", with particular emphasis on strategic directions for meeting statistical needs and capacity development.

The special fisheries session within the 2007 HOPS meeting was organised by the SPC/DevFish project.

The session included presentations by the staff of the Pacific Islands Forum Fisheries Agency (FFA) and SPC, and experts in fisheries and economic statistics. These presentations covered:

- recent developments in the fisheries industry;
- the importance of adjusting to change in the collection of economic and trade statistics;
- review of the last full regional study on fisheries contributions (by Gillett and Lightfoot in 1999) to gross domestic product (GDP);
- recent DevFish studies on long line and purse seine economics; and
- case studies in statistical compilation from Micronesia.

Participants noted the importance of fisheries in their country's economies, and emphasised the importance of comprehensive data on the economic contribution of fisheries for planning and decision-making, and the need for assistance in generating these data. The smaller countries in particular often struggle to develop and maintain economic statistics in general, and encounter specific difficulties for the fisheries sector.

The meeting welcomed recent efforts by FFA towards developing a set of annual economic indicators and the DevFish studies on purse seine and long-line economics. However, considerably more work is needed to achieve data of sufficient comprehensiveness and quality. Also, it is important that such statistics are updated on an ongoing and timely basis, and not limited to intermittent or one-off studies.

The meeting also noted the potential value of a regionally coordinated approach to fishery economic statistics, including contributions to GDP, exports and other economic data. The benefits of a regional approach could include better use of the SPC/FFA databases on catch volumes as a basis for the economic data series; improvements through accessing the industry knowledge in the regional fisheries organisations; and all countries benefiting from improvements in estimation methods. It could also provide a forum for resolving technical issues, such as determining the economic residency of vessels, and the coverage of fish exports statistics, and help ensure that the fisheries statistics developed are consistent across the region.

The meeting also discussed the best way for this to happen and proposed that an initiative by the DevFish programme to create awareness could be furthered by taking leadership for the potential remedial measure in the immediate future. This proposal was incorporated as a resolution in the final meeting report.

The DevFish project will discuss these suggestions from the HOPS in its next technical planning discussion in November 2007.



Cetacean depredation on commercial tuna longline fishing operations in Fiji

Following a joint in-country request from Fiji's industries and fisheries, the EU-funded DevFish project is commissioning a study to 1) determine which whales are involved in depredation activities with longline vessels, and 2) identify or develop appropriate mitigation measures.

The Fiji longline industry expressed concern about the critical impacts caused by the high incidence of cetacean depredation on fish catches. This same concern was also registered by industry across the region. Preliminary indication by the industry suggests loss of

6–7% of catches in Fijian waters. Logsheet data analysis in Samoa indicates 3–6% of all sets are affected by depredation, with up to 100% of hooked fish removed or damaged beyond saleable quality.

The project is collaborating with the researcher who undertook a similar study in Samoa. The researcher is assisted by a USP student as part of their master's degree programme, and who is under a DevFish scholarship. Fiji fisheries observers are also participating in the project to expand the range of data set collection during their routine trip coverage and also from historical data. Solander Fiji is participating as the industry partner on this research activity and will provide cruises for researchers and access to their company logsheets.

A roundtable meeting for all participants was held at the Fiji Fisheries office on 4-5 October 2007 in Suva. The research process was introduced which guided the formulation of a work programme that identified responsibilities to various party(s). All parties confirmed their general willingness to participate. Fiji observers' participation would basically be through their normal duties and using the current observer forms, which provides for cetacean/depredation recordings.

A DVD showing cetaceans at sea, was used for cetacean ID training and was well received by observers, who noted that the DVD was a very appropriate tool because it showed the movements of cetaceans at sea. This was considered to value add to the SPC ID manual.

This project activity is up and running and we can look forward to a productive research programme over the next 21 months.



"Start Your Fishing Business" training in the Cook Islands, Tonga, Samoa and Kiribati – an update

As you are probably aware from reading our previous articles, SPC, with financial assistance from the Commonwealth Secretariat, is assisting the region with the establishment of a pool of certified trainers in small fishing business planning and management (Start Your Fishing Business programme). This project aims to increase private sector participation in the development of coastal fisheries in PICTs by improving the entrepreneurial skills of existing or prospective small business owners.

The Start Your Fishing Business (SYFB) course and materials, based on the International Labour Organization (ILO) "Start Your Business" model, were initially tailor-made to suit the specific needs of the Papua New Guinea (PNG) artisanal fisheries sector and have been successfully delivered in PNG since 2003. The SYFB training concept was then exported to Solomon Islands and Vanuatu where nationals have been trained to become certified trainers who now deliver these courses to small fisheries business owners.

This year, SPC, the Commonwealth Secretariat, and their counterpart institutions in PNG have worked on expanding the network of competent SYFB trainers in four other countries: Cook Islands, Tonga, Samoa and Kiribati. A similar gradual training methodology was used and the initial phase of the project was the delivery of a sub-regional training of trainers (TOT) SYFB course for 12 participants in Apia, Samoa in April 2007 (see SPC Fisheries Newsletter #121). After attending the TOT course, and in order to become accredited by ILO as SYFB trainers, the apprentice-trainers are required to deliver one SYFB course to their target audience, under the supervision of master trainers.

As part of the TOT course, participants produced an action plan for the subsequent phases of the project. From mid-July to August

2007, participants to the initial TOT course, except the participant from Kiribati, successfully ran their trial courses in their respective countries. In-country training of entrepreneurs (TOE) workshops were organised as shown on the table below.

This capacity building programme was successfully completed by making possible the accreditation of 11 Pacific Islanders as ILO/SYFB trainers by their supervisors, the PNG-SBDC master trainers.

SPC is keen to further export the SYFB training concept to its other Pacific Island countries. It is envisaged that SPC will continue to seek the Commonwealth Secretariat's financial support for the further extension of the SYFB trainer network in the region.



Country	Workshops	Master Trainers	Date
Tonga	Ha'apai	Brenda Sainol	16-27 July 2007
Tonga	Vava'u	Brenda Sainol	1-14 August 2007
Samoa	Apia	Peter Piawu	16-27 July 2007
Cooks	Cook Islands	Brenda Sainol	20-31 August 2007
Kiribati	Tarawa	Peter Piawu	Postponed to December 2007

Vanuatu Maritime College to host the next SPC "Practical Safety and Fishing course for fisheries officers"

In July 2007, SPC invited applications for participants to the SPC Practical Safety and Fishing Course for fisheries officers, at the Vanuatu Maritime College (VMC) in Santo, Vanuatu. Eleven fisheries officers from nine regional countries (Cook Islands, Nauru, Niue, Palau, PNG, Samoa, Solomon Islands, Tonga, and Wallis and Futuna) will benefit from this training opportunity. Course duration will be four weeks, starting 1 October 2007.

The objective of this course is to provide hands-on training in environmentally and economically sustainable fishing methods to Pacific Island fisheries officers. The training will enable them to assist fishing communi-

ties and fishing enterprises in developing sustainable and profitable fishing operations. Areas covered include:

- tuna catching methods (especially small-scale pelagic longlining and mid-water fishing methods),
- basic navigation and seamanship,
- vessel operations and management,
- vessel and crew safety,
- onboard handling and preservation of catch to export standards,

- information on bycatch mitigation,
- small-scale bait fishing gear and methods, and
- deep-water snapper fishing gear and methods.

This course is organised in cooperation with the Vanuatu Maritime College and SPC's Nearshore Fisheries Development and Training Section. During the four-week course, SPC Fisheries Development Officer, William Sokimi, will be in Santo to act as a resource person.



■ AQUACULTURE SECTION

Vietnam aquaculture study tour 9-11 August 2007

SPC's Aquaculture Adviser was approached by the New Caledonian government to organise a study tour of Vietnam for a delegation from the New Caledonian shrimp farming industry attending the World Aquaculture Society (WAS) Asia-Pacific Aquaculture Conference. The Vietnamese government kindly agreed to this request and a short study tour was organised after the WAS conference. SPC's Aquaculture Adviser and 10 people from New Caledonia participated in the tour.

The main tour organiser was the Vietnam Ministry of Fisheries, Research Institute Aquaculture No 1 (RIA.1). Staff from RIA.1 were seconded to the study tour to act as field guides, drivers and translators.

The tour began outside of Hanoi city at RIA.1 headquarters with a presentation from the institute's director. RIA.1 has 360 staff, of which more than 50 are university graduates who speak English. The institute has a large area with fish ponds and hatcheries for crustaceans and fish, and there is also a feed mill onsite.

Nearby, is the well equipped and staffed Centre for Environment and Disease Monitoring in Aquaculture (CEMA). The centre carries out research and monitoring programmes in water quality, animal health, diseases and genetics. There is also a breeding programme of endemic species that are threatened by extinction.

North of Hanoi in Hai Doung Province, we visited inland freshwater fish and prawn

farms. The farms ranged from highly commercialised operations to small household units. Aquaculture is a common livelihood and sufficiently large that some farmers focus only on specific niche opportunities. For example, one entrepreneur who hosted us concentrates on raising fry that he provides to other farmers and this has become a very profitable venture. We also saw village cooperatives with small aquaculture ponds that were integrated with rice paddy fields with a shared irrigation system. Most ponds were farming Nile tilapia but some also had carp species and those farmers who could afford it farmed *Macrobrachium* prawns. One of the village projects we viewed was a small processing facility for smoked tilapia. The smoking provides value-added marketability while improving