



Fisheries

Newsletter

Number 96 (January–March 2001)

ISSN 0248-076X

Editorial

The year 2001 has gotten off to a good start and will reach its high point with the 2nd Heads of Fisheries Meeting to be held in Noumea in late July.

In the meantime, staff at the Marine Resources Division have been hard at work. I would particularly like to call your attention to a pamphlet on marine pollution (see article on page 5), which we have produced in collaboration with the South Pacific Regional Environment Programme. The problem is complex, but the message is simple: the ocean is not a trash dump, so don't throw your garbage into it!

I will leave you to reflect on this matter.

Happy reading!

Jean-Paul Gaudechoux
Fisheries Information Adviser
Jeanpaulg@spc.int



Lyn Lambeth

Gillnetting is a popular activity for women in Kosrae (see article on p. 20)

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SECRETARIAT OF THE PACIFIC COMMUNITY

Prepared by the Information Section of the Marine Resources Division and printed with financial assistance from France.

■ COMMUNITY FISHERIES SECTION

Kosrae fisheries workshop

In February 2001 the Community Fisheries Officer travelled to Kosrae to run a one-week workshop for men and women involved in small-scale fisheries activities. The workshop was a follow-up to the survey and report for Kosrae, *An Assessment of the Role of Women in Fisheries in Kosrae, Federated States of Micronesia*.

One of the recommendations of this report was that more training programmes be provided to those involved in subsistence and artisanal fisheries, particularly women. The SPC Community Fisheries Section agreed to assist in running a workshop targeting fish market operators and others involved in small-scale fisheries.

Kosrae requested a workshop that would include separate training for men and women,

with some mixed sessions. However, at the beginning of the workshop many of the participants, both men and women, asked if they could attend all sessions as interest in every topic was high. The workshop was attended by 32 participants: 15 men and 17 women.

Topics included seafood quality control, fish processing and handling, small-scale marketing and business skills, seafood preservation, and fisheries management. During the workshop, participants built and tested a

small fish smoker. The smoked tuna was very popular and formed part of the feast prepared by the participants for the closing ceremony held on the last afternoon of the workshop.

Workshop participants were asked to provide smoked fish for the opening of a marine park in March. Women participants also provided a fish smoking demonstration as part of the activities organised by the Kosrae Women's Affairs Program for International Women's Day in March.



Lyn Lambeth



Lyn Lambeth

Workshop participants prepare a marinade for fish smoking

Maerina demonstrates her filleting technique

American Samoa community fisheries workshop

The Community Fisheries Adviser travelled to American Samoa in March 2001 to facilitate a five-day training workshop for the Department of Marine and Wildlife Resources (DMWR) staff. The workshop,

conducted by experienced Samoan fisheries extension staff, trained new extension personnel at DMWR in the community-based fisheries management process, which was established in Samoa. This workshop

was a result of recommendations from the draft report, *Technical Input into the Community Fisheries Management Project of American Samoa*.



Ueifa Fa'asili

Fatima Sauafea, head of the Community Fisheries Management Programme, conducting a practical exercise

Publications and Information

The report, *An Assessment of the Role of Women in Fisheries in Kosrae, Federated States of Micronesia*, has been printed as a field report and distributed to Kosrae.

These and other publications may be found in pdf format (and html for the *Women in Fisheries* Special Interest Group Information Bulletin) on the Community Fisheries Section homepage at:

<http://www.spc.int/coastfish/Sections/Community/index.html>

The French version of the manual, *Fisheries Management by Communities*, is also available from the Section's homepage. The entire document or select chapters, in French or English, may be downloaded in pdf.

Publications are also available through:

Secretariat of the Pacific Community
BP D5, 98848 Noumea Cedex
New Caledonia
Telephone: +687 262000
Fax: +687 263818
E-mail: Publications@spc.int

Field reports for Chuuk and Yap will be available soon.



Future work

Workshops for women involved in small-scale fisheries activities in Chuuk and Yap, Federated States of Micronesia are scheduled for May. The Forum Fisheries Agency (FFA) is planning to assist Fiji Islands in developing a tuna fishing industry management plan, and

the SPC Community Fisheries Section, in collaboration with the South Pacific Forum Secretariat, is tasked with helping address gender issues in this work.

The third fisheries module for the SPC Community Education

and Training Centre (CETC) is scheduled for publication in the middle of July. The Community Fisheries Section will work with USP's Post Harvest Fisheries Development Project in the delivery of this training module.



■ FISHERIES DEVELOPMENT SECTION

Activities from January to March 2001

Fisheries Development Officer, Steve Beverly worked with the École des Métiers de la Mer (EMM), providing input to a forthcoming course for longline skippers to be held later in 2001. He also helped with the layout of vessel electronics and machinery on EMM's longline training vessel, *F/V Nondoue*.

In addition, Steve began a longline project with a local company, Navimon, to look for broadbill swordfish in New Caledonian waters. Despite initial problems with vessel breakdowns, bad

weather, and airline flight schedules, two trips have been made so far on *F/V Iaai Pêche*, resulting in a catch of 22 broadbill swordfish caught on five sets (Fig 1). Instruction was given in locating fish, setting and hauling techniques, and in how to properly clean a swordfish for the USA market (see feature article in this newsletter).

Steve also worked with a new longline company in New Caledonia, Pêcheries de Nouvelle-Calédonie in ordering fishing gear and packing mate-

rials for exporting tuna. PNC's first two boats arrived in Koumac (Northern Province) in March (Fig 2). Eight more boats are due to arrive this year after undergoing modifications in New Zealand. All ten boats will be fishing for tuna and swordfish from Koumac, where a new processing plant is being built.

Fisheries Development Officer, William Sokimi, drafted reports for his work in Nauru and Kiribati. Additional work was needed to finalise his Samoa report, following comments



Steve Beverly

Figure 1: Broadbill swordfish caught on *F/V Iaai Pêche*



Steve Beverly

Figure 2: *Pêcherie de Nouvelle-Calédonie's vessel F/V Kahaavha 5*

received from the Samoan Fisheries Department of the financial figures presented in the initial draft report. These figures were corrected; the report finalised, printed and distributed.

William spent March in Auckland, New Zealand, studying hard with other Pacific Island students, converting their skippers tickets from the old 'South Pacific Maritime Code' to the new 'International Maritime Organisation' requirements. William successfully completed the course and now has his Master Class 3 ticket recognised under STCW. His ticket allows him to skipper a fishing vessel of unlimited size.

Fisheries Development Adviser, Lindsay Chapman finalised three Field Reports (Kosrae, Pohnpei, and Tonga), which have been sent out for country

clearance. Lindsay also worked with SPC's Graphic Artist, Jipé Le Bars, in the design and layout of an information brochure on marine debris and derelict fishing gear, in both English and French. Funding for these brochures was provided by the Western Pacific Regional Fisheries Management Council (Hawai'i) and AusAID.

Lindsay travelled to Papua New Guinea in early March, where he met with staff of the National Fisheries Authority (NFA) in Port Moresby. NFA underwent a major change in structure, whereby Management Advisory Committees (MACs) were established for different fisheries. Each MAC has representatives from different stakeholder groups, involving them in the management of the fisheries.

The development of fisheries in PNG has been devolved to the

Provincial Governments, with assistance being provided through NFA's Provincial Liaison Section (PLS). The PLS will act as the conduit between development ideas and donors. The approach is to have development ideas come from the MACs, Fishermen's Associations and possibly Provinces to the PLS, who will assess each proposal. If the proposal is thought to be viable, the PLS will seek an appropriate donor for funding or conduct the development work. Once a donor is matched to a development project, the PLS will pull out and leave matters to the two groups concerned to finalise arrangements and implement the development work.

From Port Moresby, Lindsay went to Kavieng for five days, to set up a technical assistance project with the New Ireland Commercial Fishermen's Association, where he met with the Association's executive officers, to work out a programme for assistance. Gear lists were compiled for both fish aggregating device (FAD) mooring materials and fishing gear, so that orders could be placed with suppliers. Lindsay also drafted a Memorandum of Agreement for this project, which clearly laid out the roles and responsibilities of both the PNG government and SPC. The project was scheduled to commence in mid-April 2001.



THINK don't THROW — a message for all those who head at sea

The Secretariat of the Pacific Community (SPC), the South Pacific Regional Environment Programme (SPREP), the Western Pacific Regional Fisheries Management Council, PACPOL and AusAID have published their new information and

awareness brochure on marine debris and derelict fishing gear. The brochure describes the issue of throwing or discarding plastics and oils from fishing vessels and small-craft at sea, and the problems this can cause to other boats, the marine envi-

ronment and the animals that live in it.

A simple message is portrayed in the brochure, **DON'T throw plastics and oily mixtures into the marine environment**. These should be stored on board each

boat and discharged onshore for proper disposal. By doing this, marine animals such as turtles will not eat the discarded plastic or styrofoam, thinking it is food, or become entangled in lost netting; and there will be less debris washing up on beaches

and reefs around the region, effecting the ecosystem, and boats will have fewer problems with blocked water intakes and tangled propellers.

Everyone who heads to sea will find some useful information in

this brochure. For a copy, please contact the SPC Fisheries Development Adviser (LindsayC@spc.int) or the SPREP Marine Pollution Adviser (StefaniaN@sprep.org.ws)



■ REEF FISHERIES ASSESSMENT AND MANAGEMENT SECTION

The Pacific Regional Marine Ornamental Workshop

From 4 to 9 February 2001, the Live Reef Fish Specialist, Being Yeeting, was invited to attend a Pacific regional workshop on Sustainable Management of the Marine Ornamentals Trade as a resource person. The workshop, organised by SPREP, was held in Nadi, Fiji Islands.

The workshop, funded through CSPOD, was part of the process

of developing the Marine Aquarium Council's Certification Scheme for marine ornamentals.

The idea behind the Certification Scheme is to set standards within the trade that will encourage sustainable practices of collection and handling, and ensure a supply of high quality products to the market. The products

would carry a label that buyers and hobbyists would recognise and associate with the set standards.

The intent of the workshop was to bring representatives from Pacific Island countries, from the industry (operators) around the Pacific, conservation NGOs and scientists to be presented with the Certification Scheme

and the concept behind it and to discuss and scrutinise the Draft Certification system.

A total of eight Pacific Island member countries were represented, by personnel from Fisheries or Environment departments.

Workshop presentations were organised into specific topics focussing on different aspects of the Marine Ornamentals Trade. Topics included: the known status of coral reefs; their values and sustainability in the region; the nature, scale and history of the Marine Ornamentals Trade globally and, particularly, in the Pacific Region; and presentations by country representatives, on current situations, issues and problems, best management practices in terms of monitoring, and commercial operations.

On the last day, the workshop broke out into smaller working groups. Each group devised a list of constraints and opportunities in different countries and noted which types of actions or initiatives were required to

assist each country in managing their Marine Ornamentals Trade sustainably. The more common and important issues mentioned were the lack of: knowledge about existing resources; management plans and regulations; government capacity (funds and staff) to manage the trade; and awareness by the public. All points and ideas raised were recorded to develop a better action strategy for Pacific Island countries.

As part of the workshop, there was a field trip to two facilities: Walt Smith International (WSI) and Ocean 2000. The facilities were quite different with regards to ownership, size and the kind of technology they use.

The foreign-owned WSI is the bigger facility and uses state-of-the-art technology. Ocean 2000 is locally owned, small (compared with WSI) and uses simple systems. Both concentrate on live rock exports. The live rocks currently exported are collected from the wild but this might change in the near future

when the US (the main market) imposes a ban on importing live corals from the wild.

An interesting new WSI project that is moving into the commercial phase is their man-made live rock. After years of research, WSI finally has found the right formula (mix) for a good artificial live rock. These artificial rocks are placed in the sea in marked localities to allow algae and various small marine organisms to settle on. The final product looks very much like a wild live rock. The red color becomes important for distinguishing between artificial live rock and wild live rock.

Visits to facilities were very interesting and helpful to all participants and gave a good visual example of a simple, low-budget operation and a more modern one. It would be interesting if a detailed evaluation and cost-benefit analysis of the two operations could be done. The information could be used for setting and developing sustainable operations.



First course on underwater visual census survey techniques

Due to their comprehensive, exact and non-destructive nature, underwater visual census surveys are among the most widely used and tested reef fishery resource assessment methods. However, implementing them requires a certain number of technical skills. With financial support from the French Government, a two-week training session in underwater visual census survey techniques was held in Noumea from 2 to 13 October 2000. This was the result of numerous requests related to developing local capacities and the need to develop standardised methodological approaches for monitoring reef and lagoon resources.



Jipé Lebars

Data analysis in the SPC Training room

The course primarily targeted Pacific Island fisheries staff. In all, a dozen trainees involved in reef and lagoon resource assessment and management took part in the training session. A total of 11 Pacific Island countries and territories were represented at the training session. The goal of the course was to demonstrate the conditions for using and implementing on-site underwater visual census surveys. More than half the training session revolved around practical exercises in the field. In this way, participants received instruction in:

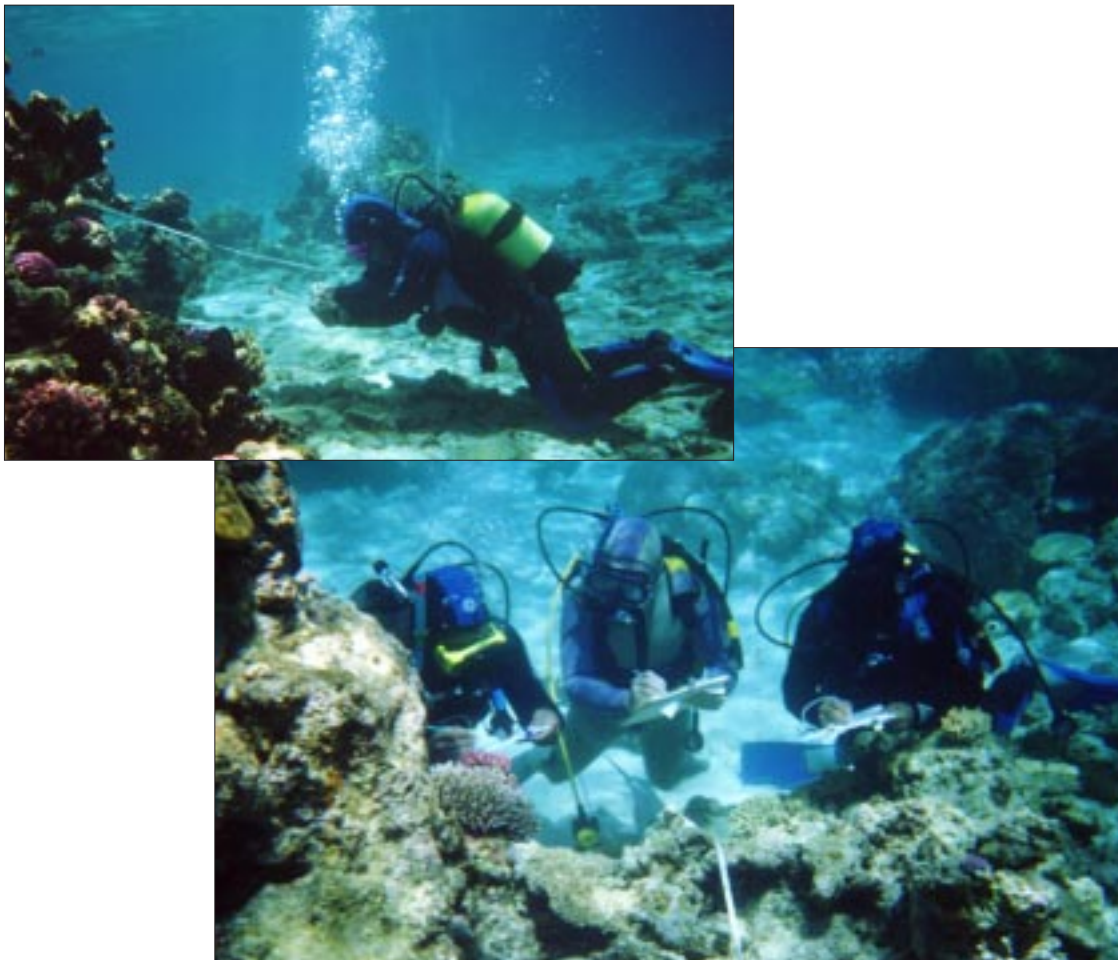
- 1) following ground rules for determining a fish resource sampling and monitoring strategy;

- 2) identifying fish of interest for the live fish market, and, in a more general sense, for marketing and/or consumption;
- 3) implementing underwater visual census sampling techniques in the field;
- 4) organising data and carrying out initial calculations; and
- 5) conducting the initial result analyses.

Instruction was provided by two SPC and two IRD (ex-ORSTOM) research and technical staff: Pierre Labrosse, Reef Fisheries Management Adviser (SPC); Being Yeeting, Reef Fisheries Specialist (SPC);

Michel Kulbicki, Head of Research (IRD); Gérard Mou-Tham, Technician (IRD)

The participants' overall reaction clearly showed that this training session had been very useful and follow-up activities are now underway. A booklet describing the conditions for using and implementing these methods will be published during the first half of 2001. It will be followed by software for entering data and carrying out initial calculations, which will be made available for downloading over the Internet. Given the large number of applications already registered, a second course is planned for some time during the last quarter of 2001.



Underwater visual census training on the barrier reef, New Caledonia

■ AQUACULTURE SECTION

New Aquaculture Adviser takes up position

Ben Ponia from Cook Islands has recently taken up an appointment as Aquaculture Adviser with the SPC Coastal Fisheries Programme. His primary duties are to help design and secure funding for a future SPC aquaculture programme. It is anticipated that the aquaculture activities will focus on providing a service of regional co-ordination and technical assistance. It is hoped that long-term funding to establish this programme will become available within the next few months.

Before taking up this post, Ben was employed at the Cook Islands Ministry of Marine Resources, most recently as the Director of Research, where part of his job involved providing assistance to the local black pearl industry. He has completed a BSc degree in chemistry from Waikato University, New



Jean-Paul Gaudechoux

Zealand, a research fellowship in aquaculture at the University of Hawai'i and a MSc with a

dissertation on pearl culture from James Cook University, Australia.



Assistance to Cook Islands

Ben Ponia, SPC Aquaculture Adviser, visited Cook Islands in November 2000 and February 2001 to provide assistance in relation to the pearl disease outbreak on Manihiki. The cultured black pearl industry, centred on Manihiki Atoll, is a major economic activity for Cook Islands with production worth about NZD 20 million per year.

In November 2000 a pearl disease outbreak on Manihiki caused enormous mortality among adult and juvenile oysters. The purpose of the first

visit to the Cook Islands was to provide assistance in evaluating the cause of the pearl disease and measures for mitigation. It was concluded that a combina-



Cook Island News

A pearl farm on Manihiki Atoll



tion of overcrowded pearl farms and unusual weather conditions contributed to bad water quality leading to a bacterial disease. Measures to contain the disease were put in place. In economic terms, the impact of this disease will cause a loss of production over the next 5 years of NZ\$34 million.

In February 2001, Ben returned to Manihiki to assess how well the pearl oysters had recuperated from the disease. It was

found that amongst the surviving pearl oysters the disease was no longer prevalent and infected oysters had recovered from the disease. Based on the findings of the survey, the local government allowed pearl farming, which had been stopped when the disease outbreak occurred, to resume. SPC is assisting Cook Islands government to establish a lagoon monitoring and farm management plan to protect against disease outbreaks.

Other organisations involved during the visits included the Cook Islands Ministry of Marine Resources, the Manihiki Island Council, National Institute of Water and Atmosphere (NIWA) in New Zealand and the South Pacific Geoscience Commission (SOPAC) in Fiji Islands.



Cook Islands Ministry of Marine Resources



Inner shell of a healthy pearl oyster

Cook Islands Ministry of Marine Resources



Inner shell of a diseased pearl oyster (Notice brown stain on the outer edges).

■ TRAINING SECTION

Fish cutting workshop in Samoa

For the second time, the SPC Fisheries Training Section conducted a national workshop on fish cutting to demonstrate quarter-loining of albacore tuna. The first workshop was held in Fiji Islands during July 1999 and was reported in *Fisheries Newsletter # 90* with photographs to give some idea of what's involved in quarter-loining an albacore tuna.

Peter Watt, Commercial Fisheries Extension Adviser of the AusAID Fisheries Project in Samoa, requested the workshop

after Samoa fish exporters expressed interest in having one. Peter, with the assistance of Malama Siamomua from the Fisheries Division, worked on the planning and organisation of the workshops while SPC organised the participation of Frédéric Chung Shing, a professional fish cutter from Tahiti, as a resource person. SPC Fisheries Training Specialist, Terihauroa Luciani was in Samoa to supervise the implementation of the workshop and to provide translation services. Concerning the organisation, Peter and Malama

arranged three one-day workshop sessions.

A total of 26 participants, from C.J. Exports & Imports, Albacorp Enterprise Ltd., and Tradewinds & Apia Exports Fish Packers, attended the workshops. After Frédéric gave a demonstration, he trained several workshop participants in how to properly quarter-loin an albacore. While most participants were beginners at quarter-loining tuna, there was also a participant who had been cutting fish for over six years with

very good yields. Most participants and managers found the workshop worthwhile and very useful. One of the companies already processing tuna into

quarter-loins for export markets was surprised by the difference in yields between the two methods. The company was grateful for the assistance in training

their staff to get greater yields, thereby increasing profitability of their fish processing activities.



Terihauroa Luciani



Unique in Tahiti, the fish is hung by the tail for the initial cuts that remove the head and the half-loins from the frame

Coco shows a workshop participant how to do it



Terihauroa Luciani

Terihauroa Luciani



The skinned half-loin is separated into two quarter-loins using a skinning knife

A new approach to vessel and crew safety – the Safety Management Systems

A Safety Management System (SMS) is an active and documented process aimed at reducing the risk of accidents for the crew, the ship and the marine environment while increasing the profitability and quality of the shipping (fishing) operation.

An SMS includes a series of written procedures and records (contained in the ship's Safety Management Manual) and regular inspections or audits by the authority monitoring the system. Worldwide, SMSs are replacing the 'old annual survey system'. The introduction of SMS in the Pacific was the theme of a regional workshop held in Nadi on 29–30 March, and coordinated by staff of the Fisheries Training Section.

The International Safety Management (ISM) Code of the International Maritime Organization (IMO) requires, for countries that are parties to the SOLAS Convention, that all cargo and passenger vessels of more than 500 GT adopt an SMS. The deadline set by the IMO for countries to include the ISM Code in their legislation and for shipping companies to introduce SMSs on their vessels is 1 July 2002. While non-convention

vessels (cargo and passenger vessels of less than 500 GT and fishing vessels) are not required to have an SMS, many countries are making those systems mandatory for all vessel classes.

In New Zealand, for instance, all commercial vessels, irrespective of their size, are required to have an SMS. Vessels under 500 GT use a Safe Ship Management System (SSMS).

This system, monitored by private companies, is quite detailed, and is very similar to the SMS required for SOLAS vessels. Commercial vessels under 6 m have a Safe Operational Plan, a scaled-down version of the SSMS (less complex) which is monitored by 'authorised persons' accredited by the New Zealand Maritime Safety Authority.

So far, those systems are working very well in New Zealand and companies are happy with the increased safety (fewer injuries and accidents) and profitability, despite the costs of the system, of shipping/fishing operations. Having such systems in place also makes it easier and cheaper for companies to insure their vessels.

The Nadi workshop on SMS was part of the 6th regional maritime meeting organised by the SPC Maritime Programme. Its purpose was twofold.

Firstly, it provided representatives of regional maritime authorities and training institutions with an explanation of the ISM Code and how it should be implemented.

Secondly, the workshop considered a range of SMSs that may be appropriate for non-convention vessels in the Pacific. Guest speakers from the New Zealand School of Fisheries, the New Zealand Maritime Safety Authority and the Cook Islands Ports Authority talked about their experience of SMS and presented the different systems used in their country.

While the implementation process for the ISM is well documented and seems straightforward, there is total flexibility concerning non-convention vessels. Some countries may wish to make SMSs mandatory for all or certain classes of vessels (in which case a range of options exist for the type of system they can use); in other countries that are not interested in this approach individual companies may decide to use a SMS voluntarily.

After the workshop presentations by guest speakers, group discussions took place to assess the relevancy of SMSs in the Pacific. Interestingly, the three local ship owners that had been invited to the workshop pushed strongly for the introduction of SMSs in the region. The results of group discussions were combined in a series of resolutions as follows:



That SPC develops:

- ◆ a generic SMS legislation for non-convention vessels for those countries that require it;
- ◆ an information package on SMS for crew, companies and maritime authorities;
- ◆ generic Safety Management Manuals, possibly in the form of software; and
- ◆ a training package for maritime training institutions.'

Participants agreed on another series of resolutions for SPC to assist with the implementation (mandatory for SOLAS vessels) of the ISM Code in the region.

The Nadi workshop seems to have achieved its objectives.

Participants are now well aware of the ISM Code and how to implement it by July next year. They also took home lots of reference materials describing a range of SMSs for non-convention vessels, including a very simple checklist system used in Cook Islands and a model Safe Operational Plan developed by the Section for outboard-powered commercial vessels. The workshop resolutions will result in a collaborative effort from the SPC Maritime and Fisheries Programmes to prepare the ground for the introduction of SMS, with the ultimate goal of increasing the safety of maritime and fishing operations in the Pacific region.

At the time of writing this report, correspondence between the SPC Regional Maritime

Programme (RMP) and the Fisheries Training Section (FTS) was taking place to decide "who will do what". FTS's position is that RMP should focus on the ISM resolutions while FTS should have a leading role in the followup to the SSM resolutions.

Because of the Training Section's previous involvement and experience in the promotion of vessel safety, our network of fishing vessel companies, and the fact that most non-convention ships in the region are fishing vessels, I believe the Section can respond efficiently to the meeting resolutions, in close collaboration with RMP.



In brief

- ◆ James Uan, Fisheries Training Officer at the Kiribati Fisheries Division, will be attached to the SPC Fisheries Training Section from June to August this year. During his time at SPC, James will be exposed to the work programme of the Coastal Fisheries Programme and will take an active role in the implementation of the practical fishing module of the 2001 SPC/Nelson course. James will work with staff of the CFP to develop a training strategy and resource materials for upgrading the scientific skills of fisheries extension officers in Kiribati.
- ◆ A boatbuilding project in Santo, Vanuatu, will be coordinated by the Section in May. This project, funded by France, will consist of an attachment to the boatbuilding instructor of New Caledonia School of Fisheries to the Santo boatyard for a peri-

od of two weeks. The New Caledonian instructor will apply the WEST SYSTEM® building technique to the construction of a 5.7-meter fishing vessel. The purpose of the project is to train staff of the Santo boatyard in the WEST SYSTEM® technique, increase the range of vessels available to the small-scale fishing sector in Vanuatu and provide the Vanuatu Maritime College with an additional training vessel.

- ◆ Two skippers from the company Alatini Fisheries in Tonga have been sponsored by the Section to attend a Class 5 Master course at the Australian Fisheries Academy in Adelaide. The two trainees successfully sat the end-of-course exams after five weeks of hectic studies.
- ◆ The SPC Regional Media Center (RMC) in Suva is producing a video on loining

albacore tunas. The footage was taken during a workshop at the fishing company Celtrock Holdings at Suva in July 1999. Staff of RMC will finalise the video script and edit the footage for the 13th 'SPC Fisheries Training' video.

- ◆ A two week study tour of New Zealand fisheries institutions is being organised by the Section and the New Zealand School of Fisheries. This pilot project, funded by NZODA, will enable six Pacific Island fisheries managers to observe New Zealand's approach to fisheries management. Of particular interest is the interaction between the NZ Ministry of Fisheries and the fishing industry and the development of co-management models.



■ OCEANIC FISHERIES PROGRAMME

It has been nearly a year since Deirdre Brogan decided to wind-up her five and a half years as a Scientific Observer and take up the newly created Fishery Monitoring Supervisor's position. This new position, funded by the United Nations under its Global Environment Facility, hopes to strengthen the capacity of Pacific Islanders to manage their own National Observer Programmes.

Over the last six years, Oceanic Fisheries has laid most of the groundwork for the observer programmes in the region: training observers in conjunction with FFA, modifying and strengthening the regional data collection forms and database,

producing training and resource material, and documenting the various fishing and discarding practices on-board different fleets. Now with the prospect of increased observer coverage under MHLC, there is a need to build on this work and reinforce the ability of the National programmes to benefit from the employment opportunities available.

The scope of the Fishery Monitoring Supervisor's (FMS) job is broad but will mostly focus on helping the National Coordinators deal with the day-to-day running of their programmes. An important aspect of the job will be to act as an intermediary between the National Programmes and the

scientists at OFP, keeping both the data and any requested biological samples flowing from one to the other, and ensuring the quality and continuity of such work. By working closely with National Programmes it will be easy for the FMS to identify problems as they arise and subsequently help overcome them with either more training or new resource material as appropriate. It is hoped that an Observer Trainer and another Observer Coordinator will be recruited by the end of the year, with European funds, and the three members of staff will work closely together supporting and building the National Observer Programmes of the region.



Jean-Paul Gaudetoux



■ ADB COMPLETES FISHERIES PROJECT IN FSM

The Asian Development Bank (ADB) has recently completed a fisheries management project in the Federated States of Micronesia (FSM).

The Micronesian Maritime Authority was created in 1979 to monitor and control tuna fisheries in FSM's EEZ. In October 2000 the President of the FSM signed Public Law No. 11-57, changing the name of the Micronesian Maritime Authority to Micronesian Fisheries Authority (MFA).

Tuna is important to FSM, as demonstrated by the following.

- ◆ During the years 1991-99, an estimated 1,250,300 tonnes of tuna were caught in FSM's Exclusive Economic Zone. This is more than 10 tonnes for each resident of the country.
- ◆ FSM has received over USD 170 million in EEZ access fees since 1979 from operators of foreign fishing vessels for the rights to fish for tuna.

- ◆ In 1999, access fees represented an estimated 39% of non-tax revenue and 22% of total domestic revenue for the national government.

- ◆ Tuna is the top export from the country.

The main goal of the ADB/FSM fisheries project was to improve tuna management in FSM through the enhancement of the Micronesian Fisheries Authority.

To do this, there were 36 person-months of input by consultants in the fields of oceanic fisheries management, fisheries institution building, fisheries legislation, training, enterprise privatisation, surveillance, and communication. The work was carried out by the consultant firm Gillett Preston and Associates. The main outcomes:

- ◆ a review of the structure and functions of the MFA;
- ◆ the production of a tuna management plan;

- ◆ re-drafting of the national fisheries law and subsidiary legislation;

- ◆ organisation of a coastal fisheries meeting in December 2000;

- ◆ a review of the National Aquaculture Center;

- ◆ a review of the human resource situation in the management of FSM fisheries;

- ◆ a study of the economic importance of tuna in FSM;

- ◆ the production of an office manual for MFA;

- ◆ an analysis of the current access regime and options for the future;

- ◆ an analysis of the information produced by the observer programme; and

- ◆ production of 80 technical reference documents

(Source: Bob Gillett)



Bob Gillett

Tuna is very important for the Federated States of Micronesia

■ SCUBA FISHING CAUSES PROBLEMS TO REEFS IN AMERICAN SAMOA

In the past, Samoans living on Tutuila Island relied heavily on the animals of the reef and ocean for their food. The situation today is different because of imported foods, damage to the reefs, and fewer fish. Changes in fishing methods have also been shown to affect fish populations in American Samoa. In particular, the use of scuba for fishing has been especially hard on some reef resources.



Fishing gear has changed over the years. Outboard motors have replaced sails and paddles, monofilament has replaced vegetable fibers in nets and lines, and the **tao mata tolu** now has

three iron points. Flash-lights are now made for underwater use, which makes spearing sleeping fish (such as the parrotfish) much easier.

For many years humans were unable to breath underwater, so fish were able to swim deeper to avoid getting speared. Now gear allows scuba fishermen to catch fish at greater depths.

Commercial scuba fishing in American Samoa started around 1994. The Department of Marine and Wildlife Resources (DMWR) conducted an 18-month-long study of **fuga** (parrotfish) in the territory, and discovered that parrotfish catch by weight was as much as fifteen times greater in pre-scuba times, than it is today.

In 1997, almost nine-tenths of the fuga catch was by scuba spearfishing. It was also found that some species of **fuga** had decreased in size over time, a warning sign that scuba fishing was having a serious impact on parrotfish populations. Even more concerning was the fact that many **fuga** species were being taken before they were large enough to reproduce. As a result of these findings, the DMWR fuga study suggested that "scuba fishing should cease as soon as possible. Free diving should be allowed to continue..."

Other countries in the Pacific have taken steps to ban or restrict scuba fishing. The first Heads of Fisheries meeting at SPC included a short discussion on scuba fishing. Countries that totally ban scuba fishing include Fiji Islands, Tonga, Marshall Islands, Solomon Islands, Palau, Niue, French Polynesia and New Caledonia. Many other country representatives at this meeting were interested in laws and steps to get scuba fishing banned in their countries.

There is also support for banning scuba fishing locally. In March through June of last year, DMWR surveyed people from 11 villages in the territory about fishing problems on their village reefs. When asked about ways to improve the fishing on their reefs, over 10% came up with the idea that banning scuba fishing from their reefs would improve fishing.

It is clear that not doing anything about scuba fishing will have a negative impact on many reef fish, especially **fuga** species. Changes in DMWR regulations regarding the use of scuba in fishing would be welcomed by many people (and fish) in American Samoa.

(Adapted from *Samoa News*,
Wednesday, 14 March 2001)



■ COS SAMOA PACKING IS NOW FULLY OWNED BY THAI COMPANY

Chicken of the Sea (COS) Samoa Packing's mother company is now solely owned by Thai Union International of Bangkok, Thailand, which bought out its two partners Tri-Marine International of San Pedro, California and Edmund Gann, a

San Diego-based owner-operator of a tuna-fishing fleet.

The sale was announced in December 2000 in San Diego and the price has been pegged at USD 38.5 million, according to a San Diego newspaper. Each

of the sell-out partners owned about 25 per cent of Chicken of the Sea International while Thai Union owned the other 50 per cent. The buy-out will give Thai Union 100 per cent ownership of the company. Partners since 1996 in the canned tuna busi-

ness, Thai Union, Tri-Marine and Gann purchased the assets of Van Camp Seafood Co., Inc. in 1997, which included the "Chicken of the Sea" brand of tuna.

"You could not have asked for better partners," Gann reflected in a press release. "Thai Union will be an extremely effective steward of Chicken of the Sea".

"We are thankful to Tri-Marine and Edmund Gann for the wonderful and gratifying experience we have enjoyed since becoming partners with them in the Chicken of the Sea", said Thai Union president Thiraphong Chansiri in a press release.

"This is an exciting development in the growth of Thai Union," he pointed out.

"Chicken of the Sea is a valuable consumer brand and we look forward to its continued success."

"We are grateful for the success that we were able to achieve with Chicken of the Sea," said Tri-Marine International's President Renato Curto.

According to the company's press release, Chicken of the Sea "presently has a 17.6 share of the US retail canned market."

"This divestiture means that Tri-Marine can return to its traditional role as an independent strategic supplier of raw material to the global tuna industry," Curto explained.

"The tuna industry is changing for the better," Curto continued.

"I am confident that Chicken of the Sea is committed to increasing the value of its tuna products. This has been my long personal goal."

COS Samoa Packing general manager Herman Gebauer told Samoa news that the change in ownership will not have an immediate impact on local cannery.

However it is hard to tell what effect the buy-out will have on the cannery in the long run," he added.

(Source: *Samoa News*, Thursday, 29 December 2000)



■ ONAGA

Scientists hope cultivated red snapper will boost wild populations and end up on dinner tables.

Consumers eventually may find more red snapper available in restaurants and markets because of technology being developed at the Oceanic Institute to produce the fish. Scientists at the Windward Oahu facility are trying to cultivate red snapper in captivity for restocking of declining populations in the Gulf of Mexico. In several significant breakthroughs, they achieved the first recorded spawns of red snapper in captivity and the first spawn-

ing outside the red snapper's natural reproductive season.

The Oceanic Institute is leading development of the culture technology in a consortium of research organizations. Partners include the University of Southern Mississippi's Institute of Marine Sciences and the Mote Marine Laboratory in Florida.

Oceanic Institute reproductive specialist Charles Laidley is working on spawning issues, and larval physiologist Robin Shields is wrestling with challenges of raising the larvae.

They said methods developed to raise red snapper also could be applied to **opakapaka** and other Hawaiian snappers and ornamental fish species.

Laidley said the red snapper project "has become a very large national issue, directly funded through Congress, because this species is the No.1 commercial and probably the No.1 sports fish in all of the Gulf of Mexico.

Thomas Farewell, Oceanic president and chief executive officer, said the institute's success with moi, mullet, Pacific threadfin and mahimahi "makes it uniquely qualified to make the breakthroughs necessary to culture snappers, ornamentals and other important issues."

He said the red snapper program is a high priority for the Oceanic Institute in a mission to address seafood shortages and environmental preservation.



Onaga

Brian White, OI spokesman said red snapper juveniles and fingerlings from the Mississippi are flown here and put in "double quarantine" in laboratory tanks, since they are not native to Hawaii.

The spawning occurred over six days in later November, producing eggs that were up to 78 percent fertile, he said. Many intermittent spawns since then produced more than 100,000 fertile eggs each, White said.

The largest spawn produced about 150,000 eggs, Laidley said.

But the scientists are striving for a reliable way of producing fish.

"Just doing it once is a big deal," Laidley said, "but a lot more needs to be done so we can rely on it".

He said red snapper generally grow and adapt well in captivity, but here are two bottlenecks to cultivating them: "getting them to reproduce in captivity ... and getting large numbers of larvae to survive under captive methods."

Being able to get hatched larvae makes the research easier, Shields said. "Now, we're dealing with locally generated material rather than ... shipping larvae all the way from Mississippi to Hawaii to work with."

"We have to get the animals, adapt them to captivity, try to learn about their natural reproductive cycles, their cycle in captivity, how they handle stress, and how to mitigate all those things." Said Laidley, explaining that it is a slow process.

Shields said the team has managed to take the larvae through metamorphosis, from raising eggs to larvae to a small juvenile snapper. But the larvae are only about 1.7 millimeters long when they hatch, and finding the right feed for them is a problem.

The usual marine culture food organisms — brine shrimp and microscopic invertebrate animals known as rotifers — are too large for tiny red snapper larvae, he said.

The scientists are looking for alternative prey organisms that they can culture to improve the production process.

A broad research effort is under way to catch plankton in local waters and isolate certain species for cultivation.

"Rearing those types of plankton is more difficult than off-the-shelf organisms, rotifers, which we can produce in large quantities in the hatchery," Shields said.

That increases the costs, he said. "But we know it's worth pursuing. What we will achieve is control over the production process for this species."

Methods developed for the red snapper larvae diet also can be applied to Hawaiian snappers and ornamental species such as angelfish and yellow tang, the most abundant exported fish in the state, Shields said.

Laidley said the institute's partners will develop stocking technology — putting the fish in natural waters. But OI first has to solve the puzzle of how to culture the species.

The consortium not only is concerned with technology to raise red snapper, but is doing it in responsible, ecologically minded manner, Laidley pointed out.

They are looking at effects on the Gulf of Mexico of stocking the fish, whether natural populations are displaced, the potential role of disease organisms, genetic diversity and other factors.

"It is very integrated collaborative approach," Laidley said. "We hope it will be a model for the world on how to do it."

(Source: *Honolulu Star-Bulletin*, Saturday, 3/03/01)



■ CANCER INSTITUTE FINDINGS BOLSTER AQUACULTURE

Scientists at Big Isle biotech firm Aquasearch Inc. had a hunch microbial plants might lead to new drugs to treat human diseases. Last month, the U.S. National Cancer Institute proved them right after confirming anti-cancer activity in a unique molecule from the firm's first library of microalgae-derived compounds.

"Natural products are by far the most successful source of new drugs," says Aquasearch President and CEO Mark Huntley. "And among natural products, it is plants that have produced more than half of today's current prescription medicines."

In the past, those plants have been terrestrial-based. But

Huntley says modern science has nearly exhausted its efforts to find new terrestrial species with healing potential. "It's very rare to find a new plant species today," says Huntley. "[Practically] nobody finds a new tree these days."

Thus, the firm has turned to the microbial world of plant life in an

attempt to discover new disease-treating drugs, for which Huntley estimates there are approximately 30,000 to 40,000 species that remain undiscovered.

The 24 compounds Aquasearch submitted to the National Cancer Institute were derived from astaxanthin, a microalgae-based product. Researches at the institute first discovered anticancer activity in one of the compounds in November and confirmed the finding in a second series of tests concluded in March. To make certain the results were not a fluke, the National Cancer Institute repeated the tests says Michael Cushman, Aquasearch Vice President of Research and Development. The repeated tests confirmed the original findings.

Astaxanthin was among the 24 compounds tested for activity against 60 types of cancer cells, yet was found to have no anticancer properties. "So it was only by our modifying it that we got activity," says Cushman. "Our approach was to take a molecule known to be already bioactive, but not against cancer and then we sat down and thought about how to modify that in various ways to make it

behave differently to see if we could get different bioactivity."

Bioactivity generally connotes some kind of drug-like activity and bioactive compounds generally have a potential therapeutic effect on the human body, Huntley explains.

"That was our whole approach to drug discovery," Cushman continues. "Make small libraries of interesting compounds — of compounds we knew to be bioactive — and then have them screened against various diseases."

"The pretrial clinical work averages two years", says Cushman. "We've been through almost a year so far — about nine months."

In January, Aquasearch signed a deal to house a collection of more than 2,000 strains of microalgae held by the University of Hawai'i. Under agreement, Aquasearch will research and develop new pharmaceuticals from the microalgae and the university will receive royalties from any new drug candidates discovered.

The National Cancer Institute's results are the first sign of suc-

cess in Aquasearch's quest for new microalgae-based drugs. "This is our first try and it worked," says Huntley. "We've got at least another 170 compounds we haven't started yet. They are unique and bioactive and nobody has enough of the compounds to make libraries, which is where our cultivation technology comes in."

Two things make Aquasearch unique among its peers, says Huntley. The first is its cultivation technology, which allows the company to produce sufficient quantities of microalgae for pre-clinical and clinical trials. The other feature is its compound libraries. "Those libraries multiply the probabilities for new discoveries," says Huntley.

"The key here is this just shows that we have a concept that works," says Cushman, "and we intend to apply that to more bioactive compounds and not just in cancer but in other diseases as well."

(Source: *Pacific Business News*, 6-Apr-2001; <http://www.pacific.bcentral.com>)



FISHERIES IN KOSRAE: TRADITIONAL AND MODERN

The following article is extracted from An Assessment of the Role of Women in Fisheries in Kosrae, Federated States of Micronesia by Lyn Lambeth and Rooston Abraham. Field Report No. 3. SPC Community Fisheries Section 2001)

The role of men and women in providing seafood for the family was very important in the past, before the introduction of cash economies. Increasing numbers of people are now involved in paid work and much of their food, local and imported, is now purchased from shops. However, subsistence fishing and the collection of seafood from reefs and mangroves still plays an important part in providing food for the family.

There is a strong demand for fish and fish products in the Federated States of Micronesia (FSM), and per capita consumption has been estimated at over 70 kg per year (FAO 1998); much of this is supplied by the subsistence sector. Artisanal harvesting of marine resources is also becoming more important as greater numbers of people, men and women, fish and collect to sell locally. The increasing mobility of people, both on land and at sea, has also given them access to more fishing grounds than in the past.

Land ownership and tenure is complicated within FSM and varies from state to state. Traditionally, the chiefs controlled the distribution and use of land resources and accessible marine resources. Rights could

by Rooston Abraham⁽¹⁾
and Lyn Lambeth⁽²⁾

be given, earned and inherited. Ownership of shallow reefs and the intertidal flats and their resources was traditionally held by the adjacent landowner. This traditional ownership is no longer recognised in Kosrae and Pohnpei, but remains to a large degree in Chuuk and Yap (SPREP 1993).

Traditionally on Kosrae men were involved in farming and, less regularly, fishing beyond the coral reef. Fishing in the shallow waters of the lagoon was the domain of women. Net fishing was a varied and highly developed fishing activity practised by Kosraean women, with different nets designed for specific fishing techniques, marine habitat, tide, and number of people fishing. Up until the early 1970s over ten different net fishing techniques were in use on Kosrae. By the early

1990s these varied techniques and specialised gear had been replaced almost entirely by the use of monofilament gill nets (Des Rochers 1992).

On Kosrae women have traditionally been regular providers of seafood for the family, through their regular netting, handlining and reef gleaning activities. Men's contribution was mainly in catching those species that required fishing beyond the reef in boats, or in diving or spearfishing.

Harvesting

Subsistence and artisanal harvesting

The mean annual commercial production from coastal fisheries in FSM between 1989 and 1994 was estimated at 637 tonnes (1 mt = 1.1023 US ton) with a value of USD 1.5 million, while the mean annual subsistence coastal fisheries production for the same period was estimated at 6243 tonnes with a value of USD 11.2 million (Dalzell et al. 1996). For Kosrae, the estimated artisanal landings was 85 tonnes compared to 250 tonnes for the subsistence sector. Jobs in agriculture and fish-

Traditional management of land and marine resources

In the past there was a king or paramount chief of the whole island who understood 'magically' all the resources of the land and the sea. He divided the island into sections, with a chief for each section. That chief was responsible for looking after the resources in his section, from the mountains to the edge of the reef. If the people from one section were chasing a fish and the fish crossed over into another section, they would have to stop chasing it at the border between the two sections. The paramount chief had a deep understanding of spawning times and sites, and fishing was strictly regulated according to phases of the moon. If a chief failed to provide for the people in his section he could be killed — giving him a strong incentive to succeed.

Source: Rooston Abraham, *pers. comm.* 2000.

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eries account for around 18 per cent of the workforce in Kosrae (SPREP 1993).

Subsistence and artisanal fishing are important for their role in nutrition, informal employment and their contribution to the cultural identity of coastal communities. The contribution of subsistence activities and informal employment to the economic and social well-being of Pacific Island communities is sometimes overlooked in the drive towards development and the management of commercially important resources.

Invertebrates

The collection of shellfish, crabs and other invertebrates is still an important subsistence activity for many women. Mangrove crabs, *Scylla serrata*, **powa**, are a highly regarded food item and source of income for many families. They are caught by traps, by hand in the mangroves or using baited lines from adjacent rivers and estuarine waters (Smith 1992). The overharvesting of mangrove wood for firewood and building has reduced the mangrove crab's habitat and may have led to their reduced numbers.

Land crabs, *Cardisoma* sp., **aieng**, live in burrows in the forest and come out at night to feed. These crabs migrate to the sea to release larvae from their eggs at spring tide. They emerge at dusk, a few days before the full moon. Women collect land crabs at night by hand, especially during their spawning migrations. Coconut crabs, *Birgus latro*, **aie**, are similarly collected for subsistence at night with coconut meat baits laid in the bush, or by searching for burrows with sticks during the day or night. The growth of coconut crabs is slow and recruitment is low and highly variable, making recovery of heavily exploited populations slow.

Giant clams, *Tridacna* sp., **netula**, were an important traditional food although *T. gigas* has become locally extinct due to overharvesting. *T. maxima* is the most common species found throughout FSM but numbers appear to be declining. *T. squamosa* seems to have disappeared from Kosrae though low numbers may still be found in Yap, Chuuk and Pohnpei. The four states of FSM are now involved in various hatchery and restocking projects using *T. derasa*, *T. gigas* and *Hippopus hippopus* supplied by the National Aquaculture Centre on Kosrae. Giant clams are collected while spearfishing outside the reef or while reef gleaning.

Women harvest the mangrove clam, *Anodontia edulenta*, **popol**, at low tide by searching in the mud with their feet. The clams are mostly used for family consumption. Trochus, *Trochus niloticus*, **takasungai**, only endemic to Yap, was successfully introduced over 70 years ago and is now found in all four states. Trochus are collected by

both men and women during the limited open season. Kosrae maintains sanctuary areas within which harvesting is not permitted.

Octopus, *Cephalopoda*, **koet**, are caught using a metal hook to remove them from their holes. Spiny lobsters, *Panulirus* sp., **ungung**, are speared by men while diving in deep water during the day, or may be speared or caught by hand at night during a full moon at low tide. Spearfishing is done only by men.

Only one species of sea cucumber, the curryfish, *Stichopus variegatus*, **wurur**, is harvested by women for their own use in Kosrae, although other species for collected for export have been overharvested. Curryfish internal organs are collected by cutting a small slit with a knife, or using the finger to make a hole in the underside to remove the intestines. The sea cucumber is then returned to the water where it regenerates its internal organs after an unknown amount of time.



Lyn Lambeth

Handlining on the reef flat, Lelu

Shells are collected by people walking over the sand or coral at low tide or, for the larger shells, by diving in deeper water. Ornamental shells such as cones and cowries, various shells used in handicrafts (money cowries and helmet shells), and specimen and rare shells such as the golden cowry are collected for the tourist market (Smith 1992).

Fish

Inshore fish species, harvested mainly by women using monofilament gillnets, include snappers (Lutjanidae, **srihnac**, **niahluh**), emperors (Lethrinidae, **sriknap**), groupers (Serranidae, **kalsrik**), parrotfish (Scaridae, **mwesrik**), rudderfish (Kyphosidae, **won**, **ikensahk**, **eloh**), rabbitfish (Siganidae, **mulap**, **mweosra**, **luhluhk**), surgeonfish (Acanthuridae, **kaput**), trevallies (Carangidae, **lalot**, **sraprap**), mullet (Mugilidae, **ac**, **kuhraf**), squirrelfish (Holocentridae, **ollol**), and goatfish (Mullidae, **futfut**).

Handlining on the inner reef flat is popular with both men and women, and in areas such as Walung women often provide enough fish for the family in a few hours of fishing. Species caught include emperors, groupers, snappers and triggerfish. Small fish, curryfish intestines or tuna meat can be used for bait. Spearing is often done at night, using torches.

Poison fishing with the roots of *Derris* sp., **op**, a traditional practice once used with hibiscus fibre handnets, is still used in some areas today. The root is gathered and placed in a small bundle, pulverised to release a milky sap and then fanned near a rock or coral head. The drugged fish are then caught with a gill net or picked up off the surface (Des Rochers 1992). Liquid bleach is also reportedly

used by some people to catch fish. Under national and state law the use of poisons is prohibited, but reporting of infringements is rare and enforcement difficult.

Locally made canoes are still popular for fishing, with or without an outboard motor. Night spearfishing is best done without the use of an outboard motor. Men and women use canoes, though women less often and almost always without an outboard motor.

Trolling is mainly practised by men, although sometimes women will accompany them to catch tuna. Species caught include: yellowfin (*Thunnus albacares*, **olwol**), skipjack (*Katsuwonus pelamis*, **katsuo**), mackerel tuna (*Euthynnus affinis*, **makurul**), dogtooth tuna (*Gymnosarda unicolor*, **silo**), albacore (*T. alalunga*), bigeye (*T. obesus*), frigate tuna (*Auxis thazard*) and bullet tuna (*Auxis rochei*).

Albacore, bigeye, frigate and bullet tunas are not common and have no Kosraean names. When caught, albacore and bigeye may be referred to as **olwol**, frigate and bullet tunas as **makurul**. Dolphinfin (*Coryphaena hippurus*, **sirami**), barracuda (Sphyraenidae, **tola**) and wahoo (*Acanthocybium solandri*, **al**) are also commonly caught by trolling.



Flying fish (Exocoetidae), **mokol**, **ik sok**, are caught by scoop net at night, with one boat able to catch up to 200 flying fish in one night.

In Malem district there is limited reef area compared to other districts, and no channel or harbour. This restricts the fishing in that area and the residents tend to target different species from other districts. Very small fish species such as gobies (Gobiidae), **ik sroso**, and damselfish (Pomacentridae), **sruh**, generally not eaten in other areas, are caught by women in Malem using hands and sticks. Saltwater eels (Muraenidae), **semis**, and freshwater eels (Anguillidae), **ton**, are also targeted nowadays not only by people in Malem but those in other municipalities. The area outside the reef flat is particularly good for fishing, presumably because the lack of access has prevented heavy fishing, and people from other areas travel by boat to fish there.

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Fishing Medicine and Magic

As in many areas of the Pacific, Kosrae had a number of beliefs and practices concerning fishing. The belief in the use of special medicines and magic for fishing may have been popular in the past but this is not the case today. In the past, some families were known to have special medicine and magic for fishing. For example, women were able to call eels to them, or used secret recipes to attract fish to their net. The use of local or traditional medicine for the treatment of injuries from fish or other marine resources may still be practised today.

Source: Rooston Abraham, pers. comm. 2000.

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List of commonly caught fish and invertebrates

English name	Scientific name	Kosraean name
Fish		
Yellowfin tuna	<i>Thunnus albacares</i>	olwol
Skipjack tuna	<i>Katsuwonus pelamis</i>	katsuo
Mackerel tuna	<i>Euthynnus affinis</i>	makurul
Dogtooth tuna	<i>Gymnosarda unicolor</i>	silo
Dolphinfish	<i>Coryphaena hippurus</i>	sirami
Barracuda	Sphyraenidae	tola
Wahoo	<i>Acanthocybium solandri</i>	al
Flying fish	Exocoetidae	mokol, ik sok
Snapper	Lutjanidae	srihnac, niahluh
Emperors	Lethrinidae	srinkap
Groupers	Serranidae	kalsrik
Parrotfish	Scaridae	mwesrik
Rudderfish	Kyphosidae	won, ikensahk, eloh
Rabbitfish	Siganidae	mulap, mweosra, luhluhk
Surgeonfish	Acanthuridae	kaput
Trevallies	Carangidae	lalot, srapsrap
Mullet	Mugilidae	ac, kuhraf
Squirrelfish	Holocentridae	ollol
Goatfish	Mullidae	futfut
Gobies	Gobiidae	ik sroso
Damselfish	Pomacentridae	sruh
Saltwater eels	Muraenidae	semis
Freshwater eels	Anguillidae	ton
Invertebrates		
Mangrove crabs	<i>Scylla serrata</i>	powa
Land crabs	<i>Cardisoma</i> sp.	aieng
Coconut crabs	<i>Birgus latro</i>	aie
Spiny lobsters	<i>Panulirus</i> sp.	ungung
Giant clams	<i>Tridacna</i> sp.	netula
Mangrove clam	<i>Anodontia edulenta</i>	popol
Trochus	<i>Trochus niloticus</i>	takasungai
Octopus	Cephalopoda	koet
Curryfish	<i>Stichopus variegatus</i>	wurur

SWORDFISH OPPORTUNITY FOR PACIFIC ISLAND COUNTRIES AND TERRITORIES: HOW TO DRESS SWORDFISH FOR THE US MARKET

Longline fishing for broadbill swordfish (*Xiphias gladius*) can be very lucrative but can also be very risky. Swordfish are generally not as high valued as sashimi tuna but, although there is more labor involved, they are easier to handle on-board and during shipping as they are more "durable" than tuna.

They are, however, more expensive to catch. The cost of squid bait and chemical lightsticks, both necessary for swordfish longlining, makes operating expenses high for a swordfish trip. Because of these costs, few Pacific Island longline fisheries pursued swordfish in the past.

Costs, however, have come down recently. Chemical lightsticks, which used to be priced at around USD 2.00 each, are now about USD 0.30 each. Market opportunities have also improved. A recent court decision in Hawai'i has closed the fishery for all Hawai'i-based longline boats from the equator to the north pole. The Hawai'i longline fleet was a major supplier to the US mainland market. The US market is still very hungry for swordfish, however. What this means to the rest of the Pacific is that this could be a good time to be getting into this fishery.

Stocks of swordfish have been identified in or near numerous Pacific Island fisheries, including those of Fiji Islands, Tonga, French Polynesia, and New Caledonia. Longline boats in the

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region can easily be converted to make the switch from tuna longlining to swordfish longlining. All that is needed, besides squid bait and lightsticks (chemical or electric) and different hooks (9.0 swordfish hooks), is a switch in fishing strategy and knowledge of how to process and market swordfish.

The biggest difference in fishing strategy is that swordfish gear is set at night, nearer the surface than tuna gear, and is hauled in the morning. This is just the opposite of tuna longline gear, which is generally set in the morning and hauled in the evening.

Fishing is also done around the full moon, and swordfish boats are usually back in port during the new moon. Additionally, more attention is paid to sea surface temperature and boats search for temperature breaks, or places where the temperature rises or falls one or more degrees (Celsius) in a short distance.

The main marketing concern is access. In the past, swordfish have been suspected of having unacceptable levels of methyl mercury in their flesh, usually in larger fish only. Different countries have different acceptable levels, but generally, any amount

above 0.5 to 1.0 parts per million (ppm) is too high. To enter the US market a certain number of fish must pass mandatory testing, after which the exporting company will be issued a "Green Card" and all further shipments will be allowed entry but still be subject to spot testing. The best way to get a Green Card is make contact with a fish wholesaler in the US who deals in swordfish and has had overseas importing experience.

Generally, about 500 kg of fish weighing between 30 and 100 kg each and sent in three separate shipments need to pass the mercury tests before a Green Card is issued. Aside from passing the test for mercury, one of the most important concerns for overseas markets is proper on-board handling of the catch.

US markets have certain guidelines for dressing swordfish. Fresh swordfish are marketed as fully dressed trunks, that is, all fish are headed and gutted and finned. The main focus of this article is to outline the proper procedures for on-board dressing of swordfish for the US market.

As with other pelagic longline species, swordfish should be gaffed in the head, not the body. After the fish has been gaffed and landed, it should be clubbed or spiked if it is alive, although swordfish usually come up dead on the hook.

Bleeding is not necessary. The hook should be removed and the fish should be laid out on a



padded surface such as a carpet for dressing. Swordfish do not bruise easily like tuna but care should still be given not to damage the flesh or mark the skin unnecessarily by rough handling. The necessary tools for dressing the fish and a sea water hose should be nearby. Tools include: a saw for cutting the head and fins, a sharp knife for cutting the gill membranes and anal opening, and a stiff brush or large spoon for scraping away blood and slime. Gloves should be worn at all times when handling swordfish.

The first step is to remove the head. This is done by cutting straight through the head at a 90 degree angle to the body exactly on the line formed by the second gill cover (Fig 1). This cut removes the head but leaves the pectoral girdle intact. This is important for preserving the overall shape of the dressed fish. It is also important not to remove too much flesh from the dressed fish. A cut farther back would waste several kgs of good meat. A cut farther forward would result in a higher air-freight bill.

The next step is to remove all fins (Fig 2). This is usually done with a meat saw but can also be done with a heavy chopping knife. The tail is cut off in one piece just behind the caudal keel (Fig 3). There is an indentation on both sides of the fish between the caudal keel and the tail. This indentation should be used as a line to guide the cutting. The result is what some buyers call the "Boston cut". After this cut is made, the fully dressed trunk can still be lifted by a tail rope as the caudal keel will hold the rope in place.

The gill covers are cut off next (Fig 4) and the gill membranes are cut all the way around (Fig 5).



Steve Beverly

Figure 1:
Cut head on line of 2nd gill cover



Steve Beverly

Figure 2:
Remove all fins



Steve Beverly

Figure 3:
Cut tail behind caudal keel



Steve Beverly

Figure 4:
Cut gill covers

Steve Beverly



Figure 5: Cut gill membranes

Steve Beverly



Figure 6: Cut circle around anal opening

Steve Beverly



Figure 7: Slit belly up to pectoral girdle

Then the fish is turned so it is facing belly up and a circle, or “donut hole”, is cut around the anal opening without cutting through the intestine (Fig 6). A cut is then made from the donut hole forward along the belly and ending just behind the pectoral girdle (Fig 7). Care should be taken not to cut through the pectoral girdle, as the fish will lose its shape if this is cut. The gills and guts can then be pulled out in one piece through the front opening to the body cavity (Fig 8). All loose bits of gill membrane tissue should then be cut away.

The next procedure is to thoroughly clean the inside of the body cavity. This is accomplished by first cutting away the bloodline from the backbone (Fig 9). Parallel cuts can be made on either side of the bloodline and the tissue can be pulled away in one piece. Care should be taken not to cut into the flesh on either side of the backbone. All remaining tissue and blood needs to be brushed or scraped away from the backbone and the gut cavity lining using a brush or large spoon and lots of seawater for rinsing (Fig 10).

The gut lining should be free of slime, and clean white bone should be showing along the backbone (Fig 11). The entire trunk should be rinsed but the outside does not need to be scrubbed. The result is a fully dressed trunk ready for icing and ready for the US fresh swordfish market (Fig 12). Dressed trunks are usually placed in polyethylene “body bags” before being iced. The body bag prevents melt water from the ice from seeping into the flesh and also helps to preserve skin color.

Fresh swordfish trunks can be shipped in the same “wet lock” cartons that are used for tuna, or

they can be packed directly into an LD-3 airline container, as long as the container is lined with waterproof insulation. Requirements may differ so airlines and freight forwarders should be consulted on specific shipping instructions. The US market labels fully dressed

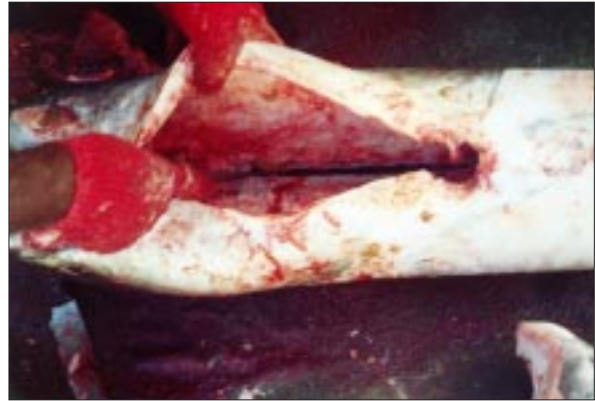
swordfish trunks according to their weights. Fish over 100 lbs (45 kg) are called "markers". Fish between 30 and 100 lbs (14 to 45 kg) are called "pups" and fish under thirty lbs (14 kg) are called "puppies" or "rats". The most desired fish are markers.

Note: all photos were taken during two swordfish trips on the Navimon (New Caledonia) longliner, F/V Iaai Pêche. Many thanks to the captain and crew.



Steve Beverly

Figure 8: Remove gills and guts



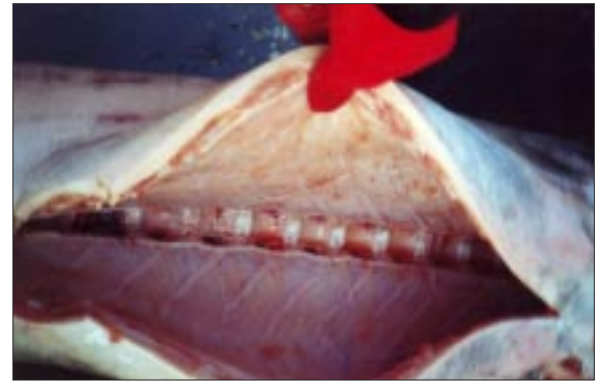
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Figure 9: Cut bloodline from backbone



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Figure 10: Brush and rinse, removing all slime



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Figure 11: White bone should show



Steve Beverly

Figure 12: Fully dressed trunk ready for icing

INTEGRATED COASTAL RESOURCE MANAGEMENT IN TROPICAL SEAS: SOUTH PACIFIC GROUP COMPLETES ONE-MONTH JICA TRAINING PROGRAMME IN JAPAN

Summary

In November 2000, nine people from South Pacific countries visited Japan to participate in the group training course on Integrated Coastal Resource Management. This one-month course combines classroom-based seminars and workshops with field trips to coastal communities and fishing grounds. Participants visited two distinct subtropical island groups located in Japan's southern island chains.

Chichi-jima, in the Ogasawara group, is located 1000 km south of Tokyo and is characterised by a volcanic topography, limited coral reef development, low population, and subtropical climate. There are 30 islets in this group whose isolation from the Asian continent has resulted in a unique flora and fauna. They are also the breeding grounds of the humpback whale from December to April. A strong sense of conservation and a precautionary approach to island development has resulted in an all-out effort by islanders to protect the region's natural beauty.

The second part of the program took participants to several islands in Okinawa Prefecture, Japan's southwesternmost prefecture, consisting of 50 inhabited and 110 uninhabited islands scattered over 1000 km in an east-west direction and 400 km from north to south. The islands are divided into three major groups:

by Frank Chopin,
Adviser for Training and
Development
Japan International Cooperation
Agency

the Okinawa Island group, the Miyako Island group, and the Yaeyama Island group.

Participants visited the capital, Naha, Iheya, Miyako and Ishigaki Islands. In some areas, the higher

populations, urbanisation, tourism and industrial development have had a significant impact on the natural environment resulting in a loss of habitat and biodiversity, land and water pollution, and coastal erosion. Observing these impacts and studying how local governments and island communities have tried to mitigate these problems through restoration and awareness programs provided some valuable lessons regarding rehabilitation of coastal resources and cooperation between ministries of environment, fisheries, tourism and industry.

Participants returned to Tokyo for completion of their training and presentation of their action plan for integrated coastal resource development.

The participants attending the training

In the two years the course has been operating, JICA has accepted seventeen participants from ten countries (see table below)

Name	Country	Occupation	Year
Suresh Chand	Fiji Islands	Asst Manager (Inshore), Fish. Division	1999
Apolosi Ralawari Turaganivalu	Fiji Islands	Acting Principal Fisheries Officer, Fish. Division	1999
Philip Polon	PNG	Executive manager, Research & Management Divn., National Fisheries Authority	1999
Pouvave Fainuulelei	Samoa	Senior Fisheries Officer, Fisheries Division	1999
Peter Ramohia	Solomon Islands	Senior Fisheries Officer, Fisheries Division	1999
Bernard Telei	Solomon Islands	Principal Environment Officer, Environment / Conservation Division	1999
Henry Toropasi	Solomon Islands	Senior Tourism Officer, Dept. of Commerce & Tourism	1999
'Ulungamanu Fa'anunu	Tonga	Principal Fisheries Officer, Ministry of Fisheries	1999
Fritzgerald Niffon	FSM	Marine Specialist – Chuuk Dept. Marine Fisheries	2000
Romio Osiena	FSM	Deputy Director – Chuuk Dept. Marine Fisheries	2000
Tiemaua Tebaitongo	Kiribati	Asst. Fisheries Officer, Fish. Divn.	2000
Lara Atto	Nauru	Women's Fisheries Development Officer, Fisheries & Marine Authority	2000
Lora Demei	Palau	Fisheries Officer, Divn. Marine Resources	2000
Jesse Sengebau	Palau	Asst. Laboratory Technician, Environmental Quality Protection Board	2000
Glen Alo	Vanuatu	Fisheries Extension Officer, Fisheries Department	2000

Training Objectives

To improve the strategic planning policy and management capabilities of personnel in industry and government that are involved in development and use of coastal resources in Pacific Island countries. It will achieve these objectives by providing participants with analytical tools for problem solving (PCM Method), case-based learning seminars on the problems of managing natural resources, comparison of coastal field sites, hands-on experience in sustainable development activities and workshops where participants propose a plan for development of a specific resource sector.

Departure to Ogasawara

After a short orientation program at JICA Tokyo International Training Centre (TIC), participants boarded the 6670-ton ferry *Ogasawara Maru* for a 25-hour trip to Japan's southern island, Chichi-jima. Course Leader, Mr Hideyuki Tanaka (previously in charge of FAO – South Pacific Aquaculture Project), Frank Chopin (JICA Advisor) and Mitsuhiro Osaki (JICA Training Officer) accompanied the participants to the Ogasawara Island group. Mr Naoyoshi Sasaki, Managing Director of JICA Kanagawa International Fisheries Training Centre (KIFTC) commented that "We included a trip to the Ogasawara Island group for three reasons:

1. its remoteness from the mainland and strong emphasis on marine and land conservation by the island community have resulted in a precautionary approach to industrial development;
2. the island's topography is volcanic with steep terrain,

pocket beaches and limited shallow water areas and presents the island community with distinct problems related to coastal erosion and management of coastal fish populations;

3. even though Ogasawara has a small population (<2000), it has a local capacity for monitoring, researching and managing its fragile natural resources. Self-reliance, natural beauty and sustainable development are the key elements of the trip."

Ogasawara Island program

During the stay in Ogasawara, experts from the island conducted seminars and field trips on various aspects of natural resource management including:

- Self reliance and subsidies – Mr Baba
- Island community development – Mr Savory / Suzuta Industry Tourism Division, Ogasawara Village Council
- Habitat degradation by feral goats and rehabilitation results– Mr Kase, National Parks, Ogasawara

- Habitat degradation on land and loss of biodiversity on reefs due to sedimentation – Mr Inaba, Ogasawara Marine Conservation Centre
- Deep-sea vertical longlining in Ogasawara – Mr Nishikiori/ Nozawa, Ogasawara Fishery Centre
- Constraints to fishery development in Ogasawara – Mr Ono, Ogasawara Fishery Cooperative Association
- Whale Watching Association and Ecotourism – Dr Mori, Ogasawara Whale Watching Association
- Analysis of tourism data – trends and opportunities in Ogasawara – Mr Yamada, Ogasawara Tourism Association

Marine turtle conservation

A study tour was arranged to the Ogasawara Marine Centre, which has researched marine turtles for 18 years and has released over 130,000 juveniles to date. Researcher Manami Yamaguchi described the research programme for monitoring turtle populations and how the Centre works with



Frank Chopin

Mr Kase presents data on the impacts of feral goats on soil erosion and the rehabilitation programme



Frank Chopin

Manami Yamaguchi describes the breeding programme and age of tagged turtles



Frank Chopin

Jesse from Chuuk helps to measure turtles in the Conservation Centre

island fishers to collect adult females for egg laying. The facility tour was followed by a visit to a nesting beach to see how research data is collected and how each nest site is surveyed for survival/mortality ratios. "This centre is more than just involved in the research of turtles," said Manami Yamaguchi.

"We try to bring all members of the island community together to listen, see, learn and discuss the issues of traditional fish-

eries, culture and resource sustainability. We hope the participants can get an idea of this participatory approach to managing natural resources and the importance of sharing information and ideas."

Offshore fishing for tuna and marlin using small boats

The Ogasawara fishery cooperative arranged for participants to spend a day fishing for tuna and marlin using vertical drop

lines on the deep sea fishing grounds off the west coast of Ogasawara using 18-metre FRP boats.

Although, the trip was very short (depart 04h30 return 13h00) participants on both boats could experience the handling, shooting and catching of large pelagic fish. Swordfish and tunas were carefully handled and processed to ensure maximum prices at the Tokyo market. Mr Nishikiori's lecture describing how fishers had switched from heavily fished shallow water reef areas to target large marlin and tuna was well demonstrated.

Participants were particularly impressed with the simple but effective 600-metre drop lines fished in water depths of 1200 metres.

Subtropical aquaculture

Kimura Johnson of the Ogasawara Fisheries Centre described the subtropical aquaculture research conducted by the Centre and how information is passed to the Sea Farming Association for commercial development of aquaculture species. Mr Johnson discussed with participants the problems of early life rearing in tanks and showed them around the Centre's laboratory and holding tanks.

There was also a tour of the Sea Farming Association's facilities and sea cages anchored in the bay. Participants observed the feeding of two species of fish, kampachi (amberjack) and shima aji (striped jack).

"Rearing fish in these pure warm waters requires special care. We are particularly concerned about diseases that can be introduced through ballast water from visiting boats or through juveniles transported

from the mainland.” Kimura Johnson said. “Also, we have focused on species that are suited to the warm waters of the island and also in producing fish without using medicines to control stress or disease. Using simple but labour intensive freshwater bathing, we have managed to control and minimize ectoparasite problems,” Johnson said.

Garbage recycling facility

A short observation tour was arranged to visit the island garbage recycling facilities and to view the efforts made on the island to minimise the impacts of waste disposal. All cans and plastics are separated and packaged for recycling off the island. Burnable garbage is reduced to ash and held in closed containers for burial without the possibility of leaching into the soil. Scavenging systems remove noxious gases from the incinerator flu. In addition, refrigerant gases, glass, old cycles and other equipment are all recycled.

A brief tour was also made of the marine park to show how coral reefs can be viewed by glass bottom boats — a potential source of income for fishers involved in tourism activities. The participants also experienced swimming with dolphins and visited small-scale souvenir making of salt and hand-painted paper coral reef fish.

Okinawa coral reef resources

After returning from Ogasawara, participants traveled to Okinawa for seminars and lectures related to coral reef ecosystems. Despite the passage of a typhoon through Ishigaki and Miyako Islands, the group visited various places including, fisheries cooperatives, aquaculture centres, ecotourism sites,



Frank Chopin

Electric hand reels for hauling droplines



Frank Chopin

Early morning catch of marlin using droplines in 600 metres



Frank Choplin

Feeding amberjacks at the Sea Farming Association grow out cages in Ogasawara

marine parks, processing cooperatives, processing companies and a fish market. Lectures and seminars included:

- Marine Parks in Japan
- Characteristics of Okinawa Islands
- Development potentials of subtropical islands
- Use of deep-water resources
- Policy and strategy for coastal fisheries management
- The FAD fishery
- Marine Festival
- Policy and strategy for conservation of coral reefs
- Inshore resource management for conservation of mangrove forests
- Fisheries in coral reefs – Local economy and marketing
- Protection of coral reef from red-soil flow
- Administrative constraints on fisheries development in Okinawa
- Administration of tourism department – coexistence of fisheries and tourism
- Concept of ecotourism and development
- Case study of fisheries resource management

Dr Ian Woesik prepared a lecture describing the importance of coral reef ecosystems and the relationship between “source and sink” regions of the reef system. “These lectures were appreciated because they show the relationship between activities such as fisheries, tourism, sand mining and the need to monitor all activities” said Katri Walenska from Tonga.

The role of the community in becoming more aware of the importance of seed release programs was well illustrated in the “release of juvenile fish” ceremony by village members, old and young. “It is a great way for children and other non-fishing members of the community to

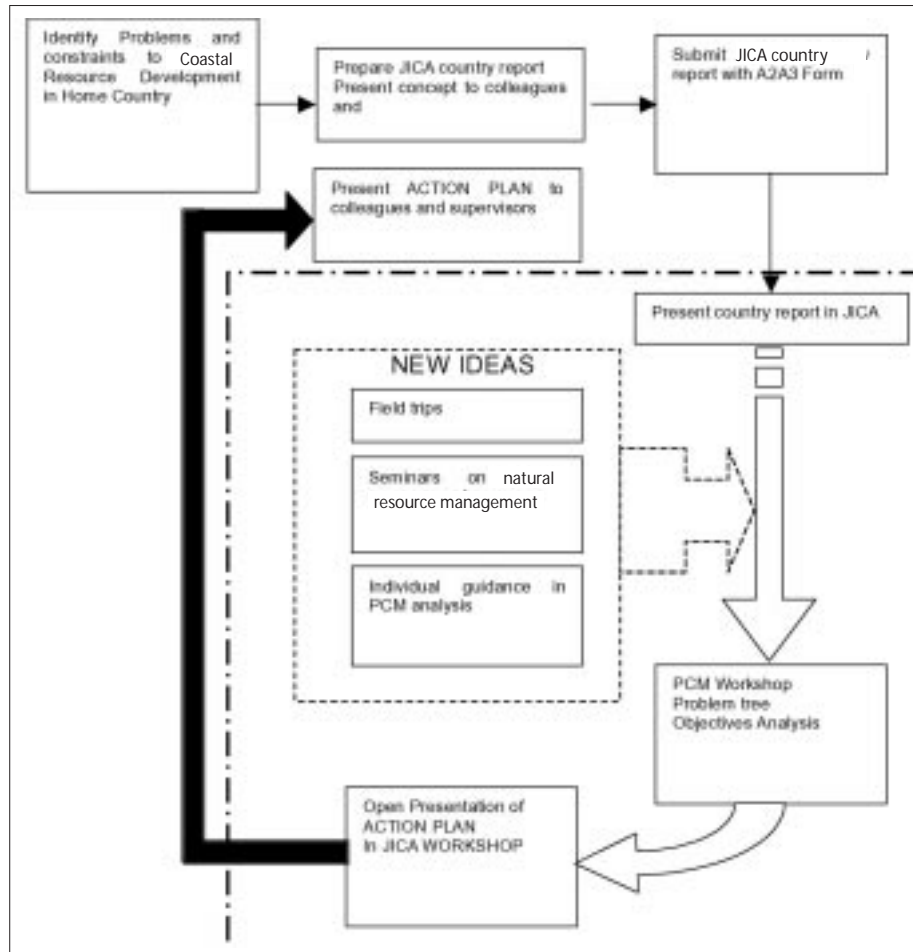
become aware of what the fishery cooperatives are trying to achieve by releasing young fish”, said Fritz Niffon from Chuuk FSM. “Also, the replanting of mangroves by the community fishers and the importance of re-forestation that we observed is very important”, he said.

Preparation of participants’ action plan – using PCM Method

Although the course was very intensive, JICA requested each participant to prepare an action plan for development for the sector each participant was working in. JICA requested this work start in the home country with each participant bringing to Japan a list of problems and constraints to developing a particular coastal sector. This basic data was analysed using Project Cycle Management (PCM) tools such as problem tree and objectives analysis to determine cause-and-effect relationships between problems and to focus on solving a particular core problem each participant was facing.

Participants share their ideas for development

Mr Tanaka worked with each participant through group workshops in Tokyo, on the boat trip to and from Ogasawara and in the hotels in Okinawa. Individual support was also provided as each participant had a different focus for their action plan. Participants presented their plan during a one-day workshop attended by JICA HQ staff and expert commentators invited from the private sector and government institutions. “These workshops are to share development approaches and to discuss how problems are perceived by different resource sectors. Cross-fertilisation of ideas



Concept of training and preparation of action plans by training participants

from different sectors and different countries in the region make for very interesting discussions," said Mr Sasaki of KIFTC. "The participants' presentations demonstrate their increased awareness of the problems that can result from inappropriate development and how important it is for projects to develop through a participatory process," he said.

Pacific Islands need an integrated approach

Mr Tanaka, who arranged the program curriculum noted that, "Coastal resource management is the most vital issue of the Pacific Islands. Because of many similarities, the Pacific Islands could learn many good and bad

lessons from Okinawa and Ogasawara Islands. Without efforts towards an integrated approach, such ocean islands will turn to ocean deserts in the near future. Aquaculture or stock enhancement practices are just two of many alternatives. I appreciate JICA offering such a catalytic course, and wish JICA's future collaboration in implementation of field projects that help in this respect.

Lessons learned from 1999 and 2000 and future planning

Based on evaluations of the two courses, JICA is in the process of re-designing its program for fiscal year 2001. "We have tried to develop a course that shows the

importance of integration of fisheries, tourism and environment and to some extent have achieved the objectives of increasing awareness of the need for this approach" said Mr Sasaki. "However, our target of attracting participants from tourism and the environment sectors and creating a balanced training group has not been realised. In retrospect, we probably placed too much emphasis on fisheries and not on the process of integration. So next year we will amend the curriculum to illustrate more clearly the integrated approach." This point was echoed by Mr Mikuni who noted that "Ogasawara and Okinawa have practical examples of integrated and sustainable use of natural

resources. For example, the presence of turtles and their relationship to island food culture, ecotourism, coastal habitat and sustainability is a case in point." Mr Mikuni illustrated this point by referring to the information shown in Figure 15.

The presence of turtles around the islands has created multiple opportunities for various industry sectors to benefit from their existence. Island fishers need a regular supply of turtles if food traditions are to be maintained; tourists come to Ogasawara to have a chance to see nesting turtles or the chance to photograph them on a scuba diving tour; and turtles contribute to the biodiversity of the island and maintaining biodiversity is an important element of all the island communities. To achieve a balance, the island recognises

the need for an integrated approach to conservation. This has included establishing marine parks, developing rules for harvesting, turtle conservation education programs in schools, release programs for islanders and tourists, protection of beaches, recycling of plastics, and research and early life protection for hatched turtles. Sustainability and multiple use can only be achieved when everyone understands the issues," said Mr Mikuni.

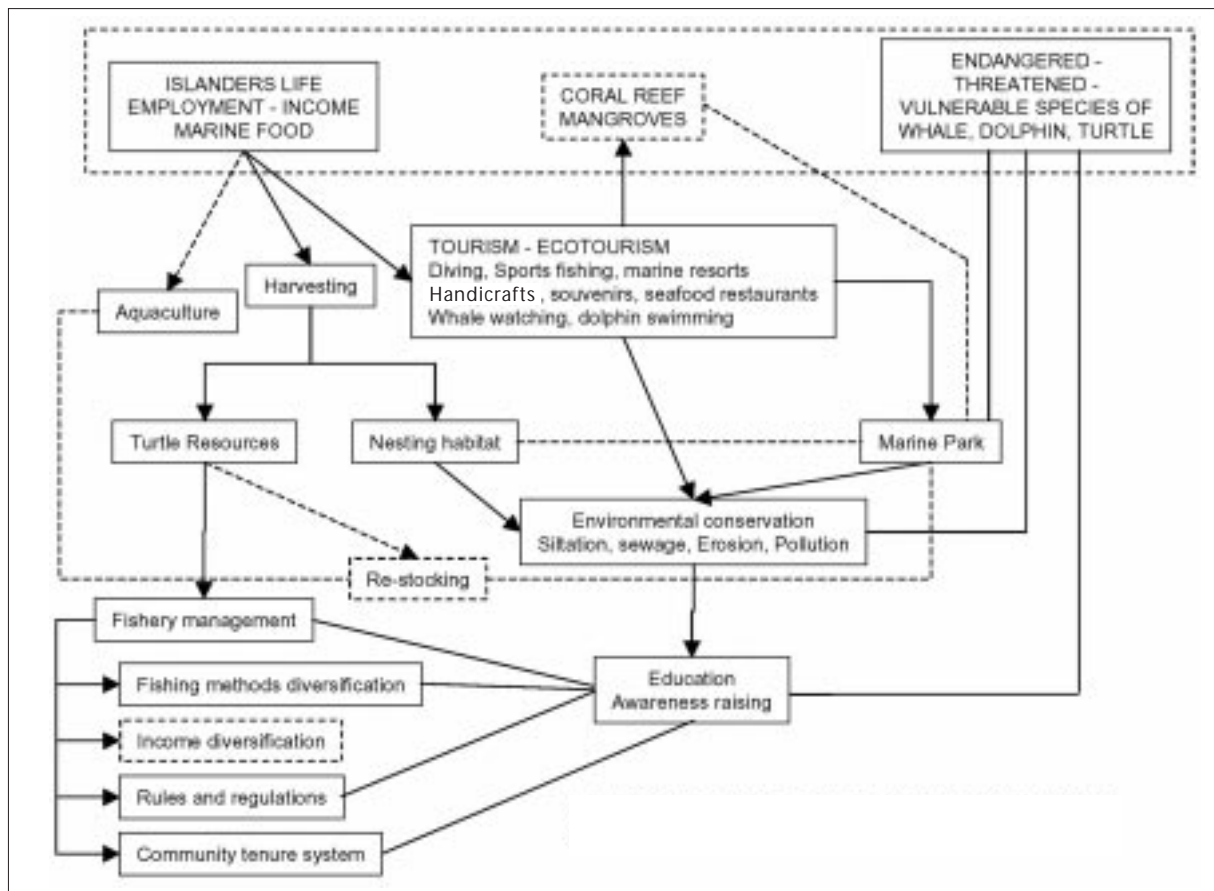
How to apply for next year's course

"Each year JICA conducts surveys among the different countries asking the types of training they would like to see in the coming fiscal year. These surveys are sent to the national organisations of each country

that act as contacts for assistance by the Japanese embassies and /or JICA offices. The results of these surveys are reflected in the upcoming fiscal year allocation of training seats," explained Mr Mikuni.

Details of the group training courses, such as this one, are summarised in the General Information booklet. These booklets are sent to aid coordinating organisations prior to the course commencement date, and describe the conditions and qualifications for participating in a course, course objectives, curriculum and other important information.

Applications are available from Japanese embassies, JICA offices and national aid coordinating organisations in each country. Each applicant must have their



Relationships between the industry sectors utilising the presence of turtles in Ogasawara

application authorised by the organisation they are affiliated with and the coordinating organisation. This authorised form is then sent to the JICA office.

Come and join the 2001 Course!

JICA invites persons to apply for the next training course starting in October 2001. Participants should:

- be a university graduate;
- be engaged in fisheries, tourism or environment protection of coastal areas; and
- complete the A2/A3 form and associated information included in the General Information Booklet.

There are only a limited number of places available for this training program and we are looking for persons who are involved in design, implementation or evaluation of policy, or development projects in fisheries, tourism and environment sectors.



Frank Chopin

Another beautiful day for participants on Ogasawara Island

Earlybird Closes 30 June 2001

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19–23 August 2001
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Original text: English

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