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Introduction

Welcome to this issue of the *Women in Fisheries* Information Bulletin. The various articles indicate the diverse range of fisheries activities that communities, and especially women, are involved in.

Not only are women increasingly involved in fisheries development, they are also the group most affected by major fisheries development ventures. The articles on the tuna industry in the Marshall Islands and Kiribati focus on the activities of seafarers and sex workers, and how expansion in the industry places young women and seafarers' wives at great risk of HIV/AIDS and other sexually transmitted diseases. The national tuna and management plans being developed by the Forum Fisheries Agency include a socioeconomic and gender component, which looks specifically into the impacts of the industry.

Offering a perspective of fisheries activities at the community level, Samisoni and Lilian discuss the state of the Tuvalu inshore fishery, threats to the fisheries, and ways to address the threats. In a separate article Samisoni also provides some insight into the need for scientific resource assessment in management. He argues that with resource assessment and monitoring, management decisions can be based on the highest quality scientific information regarding the biological, social and economic status of the fisheries.

Kim and Clare point to a need to disseminate fisheries information in Papua New Guinea. Poor exchange of information between stakeholders and sectors, for reasons that the authors discuss at length, has been identified as a major constraint to coastal fisheries development. Also discussed in the article are measures taken to try to address the situation — a challenging task given the expanse of the country, its vast population and its diverse languages. With reference to Samoa, Talavou discusses the need for awareness work in communities before manage-

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ment work can be successful. To enable people to be responsible for management of resources, one of the main starting points is making them aware of problems that exist within their marine environment. He presents several approaches that the Samoa Fisheries Department has used to create national and community awareness.

Satya briefly discusses a tilapia farming project in Driti, Vanua Levu, Fiji, involving women at the forefront. He explains how such projects can be implemented in rural communities to support social and economic livelihoods. Within the last two years this initiative has met with tremendous success in terms of monetary and food benefits, as well as community participation and mobilisation.

A short article on the humphead wrasse sets a precedent and challenge to fisheries managers in the region. The species has been listed in Appendix II of the Convention on International Trade in Endangered Species of Wild Flora and Fauna. For any species so listed, trade must be regulated by permits and the importing and exporting countries.

Shunji argues that policy development, decision-making and responsible fisheries management will be enhanced by adequate fisheries data and information that is generated in a timely and reliable manner. He also highlights information needs from outside the government sector, and the tendency for data to be used by a diverse range of stakeholders.

Passion but nothing new was the general feeling at an international meeting in late 2004. This article questions where fisheries management is heading. Most of what we are now doing and what we are planning to do has already been identified and pursued in the last decade. What we may need are new directions and ways of thinking.

As to future issues of this bulletin, we welcome articles on any subject related to community fisheries, women in fisheries, and coastal fisheries development and management. The deadline for articles for the next (June) issue is 30 April 2005. Please send all articles to AlitiV@spc.int.

Aliti Vunisea



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Benefits and costs of the tuna industry: The case of the Marshall Islands

Aliti Vunisea¹

This is a brief summary of a study conducted with the assistance of the Marshall Islands Marine Resources Authority (MIMRA). It formed part of Forum Fisheries Agency work on the development of the National Tuna Development and Management Plan for the Republic of the Marshall Islands.

The Republic of the Marshall Islands (RMI) has, in the last decade, witnessed growth in the tuna industry, mostly through foreign fleet involvement. Majuro is a major trans-shipment port, with distant water fishing nations (DWFNs) regularly coming in for purposes such as trans-shipment, fuelling, and crew offloading and loading.

At the time of the survey (December 2003) there were approximately 500 workers employed in the tuna processing plant in Majuro. Because this factory has since closed down, current local employment is confined mainly to work in the port and wharf area. In addition, a few men work as observers on fishing vessels.

RMI receives substantial funds from the United States under the Compact of Free Association agreement. Nonetheless unemployment is high and public service salaries tend to be much higher than those in the private sector.

The current population of RMI is about 51,000 (1999 census), the majority of whom are Marshallese living in households of about eight people on average. Almost half the population in 1999 were under 18 years of age: this young population will need education and medical care and, of most relevance to this report, will need to enter the workforce in



Women selling food on the roadside in Majuro, Marshall Islands.



The small building at the back of the photo is the "checkpoint" or customs office at Delap dock.

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the near future. The Marshall Islands is one of the most urbanised countries in the Pacific, with almost 70 per cent of the population living either on Majuro or Ebeye. The high population densities on these two islands are a major cause of social, economic and other problems.

Education facilities are available but until recently a fairly low percentage of young people has made it through the formal education system. Young people have dropped out from an early age: in 2003, for example, 23 per cent of females and 18 per cent of males in grade 1 to grade 8 education dropped out. The higher dropout rate for female students was explained as being due to the practice of early marriage and teenage pregnancies.

RMI is a matrilineal society, thus heritage and rights to land are passed through female lines. Respect for traditional systems is strong but, with modernisation, many of the traditional practices and customary use of resources have slowly eroded. One of the unique features of Marshallese culture is the power that accompanies land rights and associated authorities. The gradual erosion of traditional customs and norms, improper documentation and lack of appropriate legal mechanisms for land transfer in the past have contributed to confusion over land rights, which has escalated to land disputes in some cases.

Also, due to erosion of customary tenure, women are starting to lose their power base in the land. Many women, especially in urban areas, no longer live on their own lands. Extended families are breaking down and fewer men follow the tradition of moving into their wife's "family" home upon marriage.

Transshipment

DWFNs currently operating within RMI's exclusive economic zone are Japan, Taiwan, South Korea, China and the United States. With a growth in transshipment activities there has been an influx of foreign businesspeople, especially from Asian countries, into the Marshall Islands. Foreigners have in many cases set up organised activities and exclusive entertainment areas to meet the needs of boat crews that regularly come into port. This has caused major concern amongst the local population.

According to an impact assessment and cost-benefit analysis of the tuna transshipment in Majuro port in 2002, the port sees approximately 300 transshipments each year. Using this figure, total expenditure in Majuro from purse-seine transshipment activities would be around USD 5–10 million. The largest proportion of this expenditure goes on fuel

and on government fees and charges. (Fuel sales by the government-owned Marshalls Energy Company generate profits, which indirectly benefit consumers through electricity subsidies offered by government.) Crew onshore-spending accounts for much of the remainder; imported items are a common purchase, which crew often buy in premises owned and operated by foreigners.

Regulations already in existence

MIMRA already has in place policies and regulations that specifically relate to transshipment and the tuna industry. A circular on these regulations is distributed to shipmasters on all vessels that come into port for fish transshipment, provisioning and other related purposes.

The circular reminds the shipmasters of the conditions attached to their licences. In particular, it states that transfer of bunkers, helicopter fuel and lube oil from one ship to another is prohibited unless specific permission to do so is obtained. In another measure, which is designed to protect the livelihoods of local fishers, the discharge of fish or bycatch to any people or entities on shore is prohibited unless authorisation has been given in advance.

The circular also specifically states that "unauthorized persons or persons not authorized by MIMRA or any other appropriate authorities are not allowed aboard vessels while in Majuro". This statement reflects the local community's concern with the health and social risks associated with prostitution. To take account of these concerns, the Uliga dock is designated as the only loading or unloading area; the Robert Reimers dock can also be used with permission.

The effectiveness of these regulations depends heavily on whether crew comply with them voluntarily. With so many vessels in port, MIMRA and the Customs Authority lack the capacity to monitor every incoming boat individually. In discussions with the police, both authorities have expressed concern about the potential for smuggling through transshipment activities. Products that have not been through customs have appeared on shop shelves in Majuro. The police also have records of women apprehended within the docks and in boats, some of whom have been charged with prostitution.

A national taskforce has been set up to look at transshipment activities and ways of addressing problems that they have created. The taskforce includes personnel from the Sea Patrol Unit, Immigration, Customs Authority, Police Department, Health Authority, education authorities, Environmental Protection Agency, Tourism

Department, municipal authorities and other groups. One of the major jobs of the taskforce is to identify ways of monitoring and enforcing existing legislation. So far it has been focusing on how to educate the general public on issues relating to transshipment. One need still to be addressed is the inclusion of fishers and those directly involved with transshipment in the taskforce.

As became clear in many discussions during the fieldwork for this research, there is a widespread lack of awareness of the tuna industry and related transshipment activities. As a result, people had a lot of assumptions and suspicions about the vessels and their environmental and social impact. In some cases these suspicions translated into concern over the increasing presence of Asians in RMI and their involvement in various businesses in town.

Benefits

The direct and indirect benefits from the tuna industry and its planned development include:

- opportunities for employment, which are especially welcome given the youthful population and the related employment needs that are projected for the immediate future;
- more business for restaurants, bars and other recreational industries;
- opportunities for investment and partnerships for the local population;
- opportunities for further development of small-scale tuna fishing activities for local fishers;
- further training for young men and women and consequently, with the training to find work in the tuna industry, a more mobile workforce;
- development of infrastructure and social services to support the industry, which will also support the development of infrastructure in general;
- a multiplier effect leading to general economic development, as other sectors of the community like transportation, tourism, youth development and agriculture indirectly benefit from the activities of the tuna industry;
- development of wharves, port facilities and new sites for the tuna facility, which may have a wider effect of developing related areas and, with a developed domestic industry, will allow RMI to have a greater say in the development of the industry and the management of the resource; and
- maximisation of foreign earnings through current transshipment activities and licensing fees.

Implications

Any major industrial development, such as that occurring in the tuna industry, will have economic, social, cultural and environmental implications. As

in other Pacific Island states, because some social and cultural changes are inevitable and because it is accepted that they will occur, these changes are sometimes not properly addressed or analysed. Some of the most significant implications are outlined below.

Imposition on local environments and culture

Greater involvement in the tuna industry in the future means more people will use Majuro as a transit point. The influx of foreigners to RMI shores will bring new cultures, new trends in eating and other lifestyle changes.

Seafarer lifestyle

Seafaring is an international occupation where men of different backgrounds meet and work together, and travel through many foreign ports. For these men, being onshore is an opportunity for socialising, drinking and just relaxing. Very few think of practising safe sex when in these situations. Some participants in this research identified abuse of alcohol as contributing to a relaxed attitude towards the risk of HIV/AIDS and sexually transmitted infections (STIs).

Sex workers

Business for sex workers usually thrives in areas where foreigners and locals in the tuna industry interact frequently and where foreign vessels call regularly into port. RMI is no exception. As noted above, RMI does have policies to discourage prostitution: women can be prosecuted for sex work, and all incoming boats can offload only at a certain point, where customs and other authorities are. Enforcement of these policies, however, remains a problem. Dealing effectively with these activities is particularly important because they could be associated with other illegal activities like drug trafficking and smuggling of illegal goods into the country.

According to figures from the Division of the Vice Squad of the Police Force on Majuro, in the period from mid 1999 to early 2001, 88 people (ranging in age from 17 to 22 years) were prosecuted for prostitution. Note that this total represents only those prosecuted. Records were also kept of those *accused* of prostitution, of whom the majority were Marshallese and a smaller number were Chinese. People are also aware of more organised prostitution which is difficult to monitor. The lack of monitoring of exclusive clubs and bars in Majuro may mean organised prostitution is not dealt with at all.

The activities of “pimps” or go-betweens have become sophisticated operations. Dealing with this problem may require laws that allow for the prose-

cution of pimps and others in the business of marketing sex workers.

Although reluctant to talk on the subject of sex workers, men interviewed emphasised that prostitution was against traditional and customary beliefs and principles. It will continue to be a major problem. A more concerted effort by government, non-governmental authorities, local authorities and traditional bodies is needed to look for ways to reduce the involvement of young women.

Most of the women questioned about their involvement in these activities had few options for employment elsewhere and liked the easy life that crew members offered them. The lack of employment for young women and limited recreational activities on board for crew members are both contributing factors to the sex trade. In addition, easy access to alcohol, lack of recreational activities and the opportunity to gain some form of monetary return draw women to the trade.

HIV/AIDS and sexually transmitted infections

The incidence of HIV/AIDS and STIs is closely linked to seafarers all over the Pacific. Transshipment activities that allow extensive interaction between locals and foreign crew are a major reason for this link. Although there have been few reported cases of HIV infection in RMI, the lack of HIV testing equipment is likely to be one reason why the local total remains low. In discussions

with the health authorities, it was disclosed that an HIV test could take months or up to a year to be conducted because of the lack of facilities in RMI. Tests are conducted in Hawaii.

There is no system of screening for STIs in men who come off boats or women who are arrested on boats or on the dock. Some research participants suggested voluntary screening systems, where people's identities are not known or needed, could be introduced. Another referral area, where identities can be kept, or a more private arrangement could encourage people to come for medical checks. This was with the argument that voluntary testing for sexually transmissible diseases (STIs) in a small place such as the Marshalls does not work. Confidential information easily leaks out and people make certain "assumptions" if people went for tests.

Environmental concerns

Because of the scale and intensity of transshipment activities in Majuro, it is highly likely that the environment — including the Majuro marine environment — is being adversely affected. There are shortcomings in environmental monitoring and activity surveillance by the responsible RMI authorities. Many people interviewed on the impacts and benefits of transshipment activities voiced their concerns over the environmental impacts and the efficiency of current monitoring and enforcement systems.

SPC Women in Fisheries Information Bulletin ONLINE

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<http://www.spc.int/coastfish/>

Go to "Publications" to find the *Women in Fisheries* and other information bulletins, as well as other recent SPC Marine Resources Division publications

HIV risks through the tuna industry

Aliti Vunisea¹

Korekoreas — or women sex workers in Kiribati — are increasingly associated with tuna industry operations, visiting foreign fishing vessels that come into port for transshipment purposes. These young women are in the trade essentially because of the lack of alternatives for employment and entertainment. Like women involved in the trade elsewhere in the Pacific region, these women are branded by terms that define the work they are engaged in, which explains the name “korekoreas”. In most cases, women sex workers have very limited education and training.

Activities of sex workers and related problems are some of the challenges facing fisheries departments in Pacific Island countries. For most of our island nations, the tuna industry offers the greatest potential for economic development but, at the same time, it brings social costs that most countries are ill equipped to deal with. The saying that prostitution is one of the oldest trades in the world is often used to explain away the presence of sex workers. However, in the case of their association with the tuna industry, the concern is not simply their presence but the modern social and health costs related to their activities. One significant cost is the greater risk of HIV/AIDS, which has in recent decades become a major health, social and economic issue for Pacific Island countries, and is closely linked to seafarers and the tuna industry.

For countries with limited land areas and a fast-growing population like Kiribati, the need for

employment, resources and capital to cushion the impact of population growth is urgent.

The current population of Kiribati is 84,494 (Report on the 2000 Census of Population), spread over 33 islands with a total land area of 810 square kilometres. South Tarawa’s population alone stands at 36,717, which is 43 per cent of the total population. The population in most villages on South Tarawa is highly concentrated, ranging from 1500 to 12,300. Concentration is highest in Betio village, home to 12,268 people or 33 per cent of the total population of South Tarawa. The majority of the population (72.5 per cent) are under 34 years of age; 88 per cent of the population are under 50 years of age, those within the working age. With unemployment already a major problem, these trends in population density and age relate closely to higher levels of unemployment.

Moreover, the youthful nature of the population, as shown in Figure 1, will increase the pressure on resources, services and infrastructure in future. It also indicates that informal and illegal activities, such as the sex trade, could become more prominent alternative methods of income generation. In other words, many young people are likely to be pushed into activities such as the sex trade because of lack of alternatives.

Kiribati depends significantly on the tuna industry, and most earnings come from licensing fees and transshipment activities. Because of limitations in

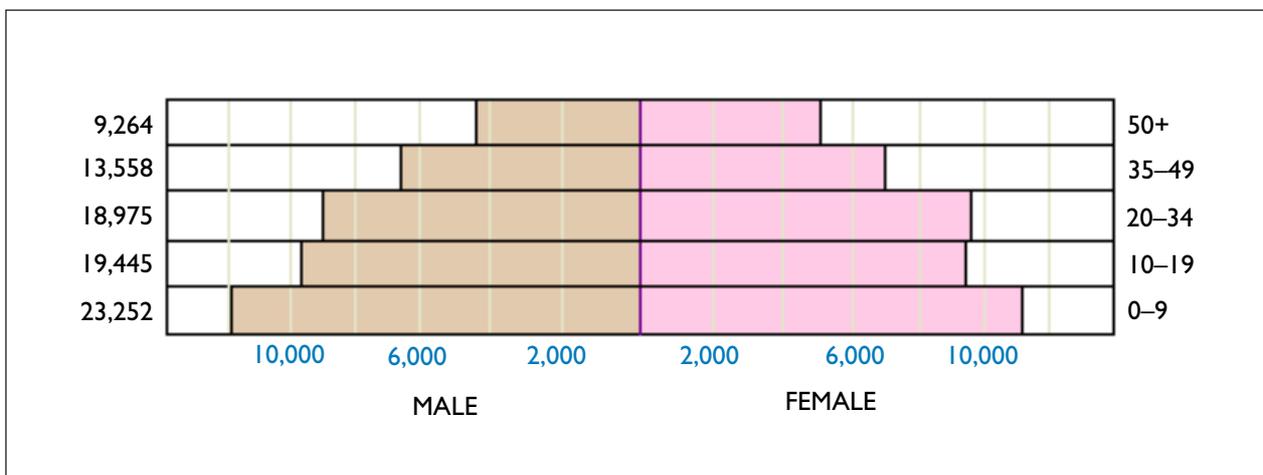


Figure 1. Population pyramid for Kiribati, 2000

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industrial development, another major means of income generation is for young men to become seafarers in foreign fishing vessels. The increasing involvement of local people both as crew on foreign vessels and in the industry at home makes the tuna industry the most promising option for economic development for the country in the future.

As a direct result of Kiribati men becoming crew members on foreign fishing vessels, a high number of households are headed by women. Remittances from these men also contribute substantially to the country's revenue and to household finances. On the other hand, as international travellers visiting ports in other parts of the world, these men are exposed to the risk of HIV infection. Most seafarers do not take precautions when in different ports and therefore are vulnerable to sex-related diseases. Kiribati women are then exposed to two potential sources of HIV infection: foreign crew members coming into port, and their own men when they return from serving as seafarers in foreign countries.

When local people are involved in transshipment activities, such as those in Kiribati ports, they interact with foreign crew members and people of different ethnic backgrounds. Most of these crew members are unaware of and insensitive to local cultures and traditions. Thus, interacting with local women is not an issue with them. In a small, close knit community such as Kiribati, activities related to the sex trade and relationships with local women are openly conducted without much consideration for local people.

A growth in transshipment activities usually also means an increase in shore-based services and, in turn, an increase in activities associated with the sex trade. In Betio particularly, more entertainment and service ventures have developed around the wharf area. Sex workers frequent the ports and vessels in Betio harbour and, because of gaps in policies and regulations, most of their activities cannot be fully addressed through legal means. Where women are arrested for suspected prostitution and loitering, loopholes in the legal system prevent the police from following through the cases to prosecution and conviction. Women as young as 15 years old are on the Police Department records as being apprehended on vessels.

It has been noted that the sex trade:

...is one of the most important factors regarding gender in tuna fisheries develop-

ment in Kiribati. There appears to be widespread HIV infection among the seafaring community throughout the Pacific and this is usually from young women working as casual sex workers to earn money. (Seafarers in the Pacific 1998)

The expansion of the tuna industry could mean the sex trade also becomes more involved with the industry. This outcome is especially likely without appropriate legal mechanisms to address prostitution and illegal activities associated with the trade. A growth in the sex trade also contributes to the breakdown of family and communal groups, alcohol and drug abuse and other social problems, as well as to smuggling.

In recent years, increasing HIV infection rates amongst Pacific Island seafarers have become a major concern. Seafarers and their wives make up more than half of the 38 cases of HIV infection in Kiribati. It is apparent that the seafaring industry will continue to be a major contributor to the growing number of HIV cases in the Pacific region. The nature of the industry exposes seafarers to extreme environments where in one instance they are out at sea — isolated, confined, and under strict rules — and the next they are in port, bombarded with sex workers and alcohol. Young women who are involved in this trade do not undergo compulsory medical tests of any kind and may well be victims of both foreign crew members and their own seafarers back from overseas.

The tuna industry and the employment of local men as seafarers on foreign vessels are necessary for the economic development of Kiribati. The tuna industry, which can only expand in the future, brings substantial benefits to small island countries.

Given that the tuna industry is here to stay, efforts to combat its undesirable side effects should be rigorous. In particular, there is a need for campaigns, awareness raising and positive steps to reduce the risk of HIV/AIDS.

Reference

Seafarers in the Pacific. 1998. Pacific AIDS Alert Bulletin 15.

Vulnerability and dependence: The nearshore fisheries of Tuvalu

Samasoni Sauni¹ and Lilian Fay Sauni²

... too much is going on in our seas and life is getting tougher by the day. I spend long hours out on the reef and at times on my canoe, only to discover that I can no longer ... fill my small woven basket with fish and invertebrates as I used to ...

Nuausala Apelamo, Nukufetau fisherman, age 60

Our study focused specifically on nearshore fisheries of Tuvalu. We investigated the extent to which communities on two atolls, one urban and one rural, were dependent on these fisheries for both food and income. With the results we compare current catch and consumption rates with previously published data. We also consider our results in the light of available information on the size of available standing stocks. This leads to a discussion of whether current fishing efforts are sustainable, and what management approaches may be required.

Background

The economy of Tuvalu is best characterised as traditional, non-cash and subsistence in nature. For cash income, people depend heavily on public sector employment and on remittances sent home by family members working overseas. In rural areas, copra production, fishing and handicrafts may provide the only options for part-time cash employment. Fishing may also be a subsistence activity, along with agriculture and firewood gathering. In Tuvaluan households, it is not common to earn a living from trading in only one product. Household members may be formally employed, work on a plantation, or fish, but most commonly perform a combination of roles.

Inshore fisheries of Tuvalu may be categorised as subsistence, artisanal or semi-commercial. Total catch from these fisheries was estimated to be 720 tons in 1994 (Berdach and Maynard 1994). Fishers use small canoes and boats that rarely reach 10 metres in length. These craft are propelled by paddle, oar, sail or outboard engine. The size of vessels limits fishing to inshore waters. Catches consist predominantly of pelagic species including varieties of tuna and flying fish that are fished using pole and line or trolling. Demersal species are caught by handlining on reef formations. Netting and spearfishing are restricted to shallow reef areas. Offshore commercial fisheries in Tuvalu's

EEZ are licensed and monitored. However, data on inshore fisheries are scarce.

Fisheries and related matters are governed under the Fisheries Act of 1978 and its subsidiary provisions, which was revised in 1990. This legislation highlights the power of the government to protect fish and to promote, regulate and control fishing industries.

Research methods

Fully structured household questionnaires were used to collect data on fish catch and consumption on Funafuti and Nukufetau atolls in July and August 1997. Sampling aimed to capture as many households on the two atolls as possible. Only those households that did not have any adults at home at the time of the surveys were intentionally omitted; some other households chose not to participate for various reasons. There was no bias toward fishing households and the survey covered people of both Tuvaluan and non-Tuvaluan origin. The 164 households included in the Funafuti survey represented 33 per cent of the total households on the atoll. On Nukufetau, survey coverage was 50 per cent (72 households).



Fishing is part of everyday life for Tuvaluans, even children participate.

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In addition to household surveys, a creel survey was performed on all the handlining and gillnetting boats that landed at the sampling site on Funafuti over a 15-day period. A total of 45 boats, including both individually owned vessels and those that were part of the commercial fishing fleet, were surveyed. Records were taken of the number of individuals on each boat, fishing time and gear used, as well as of species, weight and number of fish caught. Household data had showed that gillnet and handline fishing were associated with large catches. The creel survey data were compared to catch and effort levels recorded in household surveys.

An independent consumption survey was carried out on a random sample of 100 households. Respondents recorded what they consumed in every meal over one week. While it was not possible to issue every household with a set of scales to weigh the fish eaten, respondents recorded the average length of each fish using a graduated 0–15 cm scale drawn along the side of the survey form. Average fishing time, catch and fishing effort were calculated from both the household and creel surveys. With data on the number of fishers per boat trip and the fishing time, it was possible to estimate the mean catch per fishing boat and the mean catch per person-hour. Such estimates are based on the assumption that there was no prolonged adverse weather that affected fishing during the sampling period.

Key results

Levels of participation in fishing, especially subsistence fishing, are high on both Funafuti and Nukufetau. However, a small percentage of households on each atoll did not participate in any form of fishing.

In the creel survey, about 27 fish species were observed in the catch from handlining and gillnetting on Funafuti's coastal reefs and lagoons. Lagoon and reef species were prominent in terms of number of fish caught, and weight. Total catches were low for demersal species, large pelagics (average weight 1.6 kg) and small bait fish (average weight 0.3 kg).

A wide array of gears were used to catch fish, but hook and line, followed by gill nets, were most commonly used on both atolls. In both Funafuti and Nukufetau, people preferred to fish in lagoons and coastal reefs, despite lower catch rates in these inshore habitats relative to the open sea and deep reefs. Reef and lagoon species also predominate in the creel survey of Funafuti fishers. One reason for such trends in favour of inshore fishing may be that costs (fuel and time) are higher for deep-water fishing. It may also signal that some demersal, pelagic and bait fish are less abundant, either in

general or in the season sampled. Alternatively, the trends could reflect the fishers' preference for eating or selling inshore species, or a seasonal preference for fishing in particular habitats.

Catches per trip on Funafuti's open sea (i.e. trolling for pelagic species and handlining for deep-water snappers and related bottom dwellers) were relatively high. However, these catches were highly variable and therefore not, on average, significantly different from Nukufetau. By contrast, catches per fishing trip targeting inshore reefs were significantly higher on Nukufetau. Also, in Nukufetau, where fishers have little else to do but fish, they may well stay at sea even when fishing is not very productive. In Funafuti, by contrast, fishers often have day jobs and therefore must be efficient because they have limited time for fishing. Funafuti households reported shorter fishing trips than did Nukufetau households. In addition, compared with individual fishers, commercial boats sampled in the creel survey fished for longer periods, employed more fishers per trip and landed larger catches per trip.



Small-scale sellers after a fishing trip: fish is sold locally in most cases.

The study shows how both men and women have economic roles in inshore fisheries. While men are primarily engaged in finfishing in reef and lagoon areas, using a variety of technologies, the women collect inshore food species with their bare hands, sometimes aided by simple tools. Women are active in processing fish, beche-de-mer and other species, and they also collect and process ornamental shells for cash income; thus, women's fishing is an income source for many households. In urban Funafuti particularly, ornamental shells and handicrafts are frequently the most important income-generating marine product. The proportion of households active in the ornamental shell trade is high because Funafuti is the main market for the trade, with most shells traded coming in from the outer islands (see also Resture and Resture in press). However, the

income generated from shell handicrafts is low compared to income from the sale of fresh fish. Also, harvesters can gather 1000 shells in just one hour requiring much less fishing time each week than those who are catching food fish (Resture and Resture in press). These factors help to explain why women's hand gathering is deemed a relatively unimportant fishing method.

Fish and marine products make up an important component of the diet of Tuvaluans surveyed. Households on Funafuti eat fish at least once a week while a majority of Nukufetau households eat fish every day. The higher rates of fish consumption on Nukufetau probably reflect the limited availability of alternative sources of protein, coupled with very frequent fishing activity; a similar trend may be found on other outer islands and atolls. Alternative sources of protein, primarily imported, are available on Funafuti and would logically replace some local fish consumption there.

Although the levels of consumption differed, people on both atolls were highly dependent on fish. As with the level of consumption, the root causes of this dependence may differ. On rural Nukufetau, where reef resources are more abundant and alternative means of earning cash are few, dependence on fisheries for income was particularly apparent. After world copra prices collapsed, there was a shift from copra production to fishing as a source of income in rural areas. Rural fishing is, thus, critical both as a source of income and as a source of protein.

In contrast, on urban Funafuti the growth in population, resulting from both high birth rate and immigration, may be the key factor that is increasing the demand for fish. A household needs sufficient cash earnings to switch to imported meat or canned fish. Given the limited options for generating cash income, it is unlikely that a family could depend entirely on imported meat. A high percentage of urban households still catch their own fish to eat but relatively few have surplus to sell. Many people on Funafuti are employed during the day and go fishing at night and on weekends. They fish not only close to home but also out at sea. As long as there is a demand for pelagic species, households with trolling gear can be expected to participate in this fishery, even though it occupies many hours and requires them to search out schools of fish at a great distance from land.

Data comparisons: Changes in exploitation and consumption over time

A key finding of this study is that fish catch rates have increased from past estimates. For instance,

weight of catch per trip reported from the creel survey is much heavier (by 64 per cent) than rates extrapolated from annual catch estimates for 1993 and 1994 (Dalzell et al. 1996). Similarly, fishing assets per household and use of motorised, aluminium or plywood boats are greater compared with the 1980s and early 1990s.

On inshore reefs, fishing methods have remained consistent over the years. Even though fishing methods are similar to those on Nukufetau, catches from Funafuti reefs are lower. The difference may signify that fish resources in the lagoon and shallow reefs of Funafuti are being depleted by heavy fishing pressure. This depletion is likely to worsen, given that over half of the Tuvalu population now resides in the capital.

Conclusion

In conclusion, this case study confirms that both urban and rural Tuvaluans are highly dependent on inshore resources for food, and that rural Tuvaluans are particularly dependent on fish for income. The findings also point to a dangerously high vulnerability as it appears that stocks near Funafuti, the most densely populated atoll of the country, are being fished near or above their maximum sustainable yield. The introduction of modern technologies has not only increased pressure on existing resources but has also allowed access to previously inaccessible resources.

Tuvaluans have little choice but to rely on inshore fisheries as the main source of protein for the foreseeable future. Unless some effective management measures are put in place, however, overfishing in inshore areas will become even worse and could seriously reduce stocks of targeted species, ultimately jeopardising the future livelihoods of Tuvaluans.

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Inshore resource assessment and monitoring

Samasoni Sauni¹

Efforts to monitor and manage small, multispecies, multi-method nearshore fisheries along conventional western lines have generally not been effective in developing countries (e.g. Smith 1991), including those in Oceania. On the other hand, despite a long tradition of customary management in the Pacific, it would be a mistake to assume that Pacific Island marine resources are necessarily being managed *well* (Johannes, 1998).

There are at least two important reasons why management of marine resources along traditional lines by Pacific Island villagers does not guarantee their sound use. First, colonial governments, ignorant of traditional management structures and institutions, introduced various types of ineffective centralised policies and systems for natural resource management, which persist to the present day in many countries and often greatly weaken local authority (e.g. Dashwood 1991). Another important reason is that most villagers do not have adequate scientific information on which to base management decisions.

Generally in our region, fish stocks in coral reefs were harvested in the past only for subsistence purposes. Such fisheries are now becoming rare. Most of the reef fisheries in developing countries are exploited at an artisanal level (Munro 1999). That is, fish or invertebrates are harvested by small-scale fishers and sold at the landing place directly to consumers, or to dealers who will distribute the catches more widely. Unless those making management decisions receive a consistent flow of up-to-date and quality information for resource assessment, and unless stocks and adjacent habitats have some degree of protection rather than facing the extreme jeopardy of full exploitation and habitat degradation, we will be confronted with a growing problem of failure in resource management and the loss of our reef fisheries.

Resource assessment and monitoring ensure that management decisions are based on the highest quality scientific information on the biological, social, and economic status of the fisheries. Information on their biological status includes species responses to environmental changes, exploitation, and other human activities that affect the various species and their habitat. The information generated must be comprehensive, objective, credible, and effectively communicated. It is used not just for current management decisions, but also to conserve resources and anticipate future trends, assure future utilisation opportunities, and assess the success or failure of management efforts. User groups and other constituents also need to understand and accept the validity of the technical dataset and information, which will lead to an understanding of the management decisions for which the information provides the foundation.

To gain the kind of outputs from resource assessment and monitoring that will aid effective management, research must address certain management questions and objectives. For instance, research priorities that would support fisheries conservation and management include: conservation research; research on the fisheries (social and biological); and information management research. In regard to biological research, the primary focus is on the diversity, abundance and life history parameters of the target species. Information comes from fishery-dependent and fishery-independent sources, including in-water diversity and abundance assessment, age and size samples from fish landed, landing records specific to individual fish plants and vessels, and other plant/fleet data. These data are key inputs to stock assessments, development of fishery management regulations, and the production of economic and resource statistical summaries at the national level. The actual level of complexity of an assessment is determined by the amount of available information needed by management.

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Conducting biological surveys in Tuvalu

Improving communications with Papua New Guinea's coastal fishers

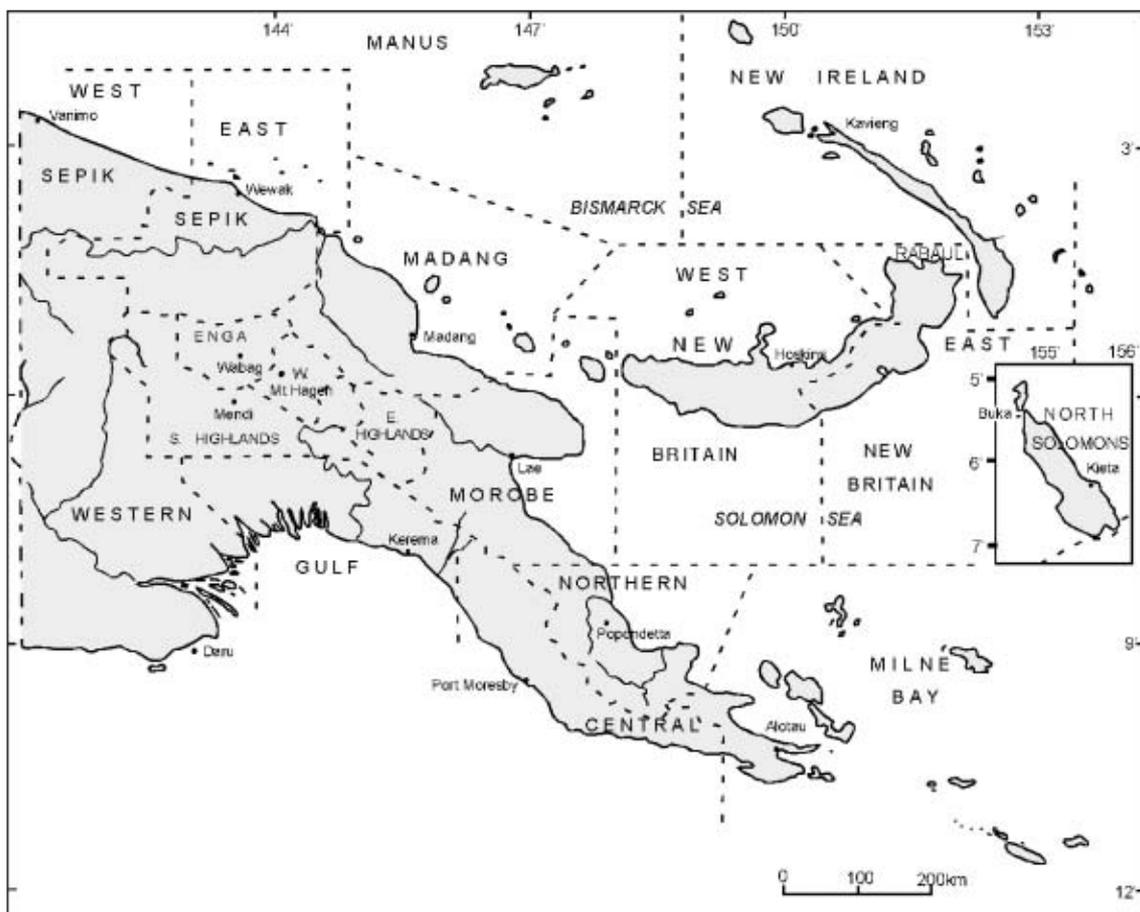
Kim Des Rochers¹ and Clare Ame²

A lack of information about fisheries and environmental issues, as well the poor exchange of information between various stakeholders and sectors, have been identified as major constraints to coastal fisheries development in Papua New Guinea (PNG).

The importance of information to fisheries development came to light during the planning phase of the PNG Coastal Fisheries Management and Development Project (CFMDP). This undertaking, funded by the Asian Development Bank, seeks to promote the sustainable exploitation of marine resources in PNG's coastal waters. The project is operating out of PNG's National Fisheries Authority (NFA).

During scoping meetings, stakeholders — who included members of local communities, commercial and subsistence fishers, national and provincial governments, non-governmental organisations (NGOs), and fishing industry workers — consistently repeated that they needed better and more regular information on various fisheries-related topics. These topics covered a wide range of issues, including fishing regulations, processing methods, marketing strategies, basic marine biology and ecology, aquaculture, more efficient fishing methods, and fisheries management.

As a consequence of the demonstrated interest in improved information related to fisheries and



The CFMDP operates primarily within the PNG provinces of New Ireland, Morobe and Milne Bay.

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marine resources, CFMDP includes a significant information component. Operating in three coastal PNG provinces (New Ireland, Milne Bay and Morobe), this component assists national, provincial and local fisheries administrations and other agencies in developing appropriate information products and in establishing effective information delivery mechanisms.

Constraints to information distribution in PNG

Given PNG's size and widely dispersed and remotely located population, it is not surprising that information flows are poor and in need of improvement. Twenty-five per cent of PNG's population resides in coastal areas where communication systems are poor, unreliable or do not function at all. Towns of any size are often accessible only by boat; recent increases in petrol costs have made even that access problematic for many people. Literacy rates in the more isolated communities are quite low, particularly among girls and women. In addition, hundreds of different languages are spoken in the coastal areas, and there are vastly differing cultural practices. The exchange of information is further hampered by the inability of various levels of government — national, provincial, local and ward — to communicate effectively with one another.

To overcome the various constraints of getting information to stakeholders in the coastal fisheries sector, it is important to consider as many options for information dissemination as possible; no single strategy will provide the answer in a country as diverse as PNG. Remote coastal communities are an important target group and, for them, direct communication methods are the best answer. Strategies to reach villagers in these communities include talking one-on-one with fishermen and women, working with church and women's groups, talking directly with village leaders (who can in turn help change public opinion), and working with teachers to introduce and improve school curricula on marine environmental processes.

Education is of particular importance. As the manager of NFA's Monitoring and Surveillance section stated, "targeting children and youth with messages about conservation and teaching them the basics of marine resources and processes is essential for conservation and for making decisions about the marine environment." Other strategies include using theatre groups (which can deliver important messages about protecting marine resources in a lively and captivating way that is understood by all members of the community) and video, both of which have proven effective in rural coastal areas outside of PNG.

Reasons for poor information flow

CFMDP has been underway for about one year. One of the project's first information-related tasks was to undertake an initial assessment of fisheries information needs and constraints within NFA. The assessment also covered provincial fisheries offices, NGOs, fishing companies, fisheries exporters, and local communities.

The assessment found that several factors contributed to the poor exchange of information:

- a lack of motivation and enthusiasm on the part of provincial fisheries officers;
- a lack of physical and financial resources for getting information to isolated communities;
- a lack of understanding of basic marine environmental processes on the part of communities;
- an inability on the part of national and provincial fisheries officers and NGOs to effectively communicate and raise awareness about marine environmental issues; and
- a failure to make use of the various means by which information can be disseminated.

If fisheries information is to be effectively disseminated, action must be taken to upgrade procedures, staff capacity and information products within both NFA and provincial fisheries offices. It also requires a better understanding of the information needs of communities, fishing industry workers, and small- and medium-scale fishers, as well as an understanding of what is constraining the exchange of information with these various stakeholders. Improving communication will help influence policies and decisions, sway public opinion, and enable stakeholders to share information.

Improving information dissemination and communication with communities

Talking directly with communities and individuals, and holding workshops and meetings are both potentially effective approaches to information dissemination and communication. These strategies have been used by many NGOs and provincial fisheries officers in the past. With either approach, words and form of language need to be carefully chosen, as not everyone in the community may be familiar with scientific terms or development jargon (e.g. "total allowable catch", "sustainable development"); it is important to always keep the target audience in mind when explaining any aspect of fisheries science or management.

Another useful method of helping villagers understand new concepts is to use alternative explanations or examples. For example, an NFA Resource Management Officer reported that he once was

involved in a workshop on spawning aggregations, where nearly all the workshop participants were unfamiliar with the terms “spawning” and “aggregation”. To clearly explain why areas where spawning aggregations occur should be protected, he likened spawning aggregation grounds to a hospital, where a pregnant mother goes to give birth. In the hospital she is protected and looked after and allowed to recover afterwards, allowing her child the best possible chance of survival and good health. Likewise, he said, spawning aggregations should be protected so that juvenile fish may mature and eventually reproduce. These analogies proved effective for the NFA officer. Similar approaches can be developed to help convey other unfamiliar concepts.

Not all information may be welcomed by community members, however. One NFA Fisheries Management Officer stated that messages regarding closures, minimum fish length, mesh-size limits, etc. have not been well received in certain coastal areas in PNG, and that some people are quite resentful that NFA imposes such restrictions. The officer said that some communities see such laws and regulations as a threat to their livelihoods and that such attitudes must be changed.

Understanding basic biological processes and benefiting from research

A common theme that emerged during the project’s information needs assessment (which was

voiced by national and provincial fisheries officers as well as by members of the NGO community) was that many communities lacked a basic understanding of marine biology and ecology, and had no concept or understanding of how their activities impacted on fisheries, marine resources and the marine environment as a whole. Many contributing factors were identified, including an erosion of traditional customs and related conservation practices, information from scientific studies not getting back to communities, information contained in international conventions and laws on conservation not reaching the right people, and information being distributed in forms that are not readily understood by many fisheries stakeholders (especially rural villagers).

One NFA fisheries manager stated that, in his view, “a primary information need is extracting data from technical reports and ‘translating’ this information into understandable language for non-scientific fisheries stakeholders, such as communities (especially village fishermen and women), the fishing industry, and government decision-makers”. In many coastal communities in PNG, women are very active fishers, yet they are rarely included in the information loop. The Director of Conservation International’s Melanesia Program stated that many scientists working in the field do not release their data in a form that communities can use and understand, and that such information is critical for village decision-makers. Much of the information that does reach communities is in English, and



CFMMDP information materials target not only adults, but also children and youth with messages about conservation and basic marine ecological processes.

is useless to people with little education and who have limited opportunity to read, especially outside their local language.

Another NFA fisheries manager said that perhaps one of his biggest information-related problems was that some community leaders do not pass the information they learn from meetings and workshops back to members of the community. This may be due to the absence of a real climate of information-sharing about work activities in PNG.

Approaches to communicating fisheries information

Each type of media or information product has its own strengths and weaknesses. These need to be taken into consideration when developing communication strategies.

Radio

Non-print media — such as radio — can be both very rapid and cost-effective, and may be one of the few options for reaching remote villages. Nearly every stakeholder interviewed in the project's needs assessment identified radio as the most effective way to communicate information to everyone with a concern about fisheries and marine-related issues.

An effective strategy for reaching a wide range of people in the provinces is to work with a local radio station to organise regular announcements and produce a 15-minute radio programme that addresses issues related to marine environments and fisheries. To be effective, the programme needs to be aired regularly (i.e. at least once a week). It also must use a variety of formats, such as interviews with fisheries staff in which they explain rules and regulations, drama scripts that impart a message about destructive fishing practices, interviews with someone from the maritime industry describing their work, and interviews with village elders describing changes to their village's reefs.

CFMMDP has, to date, over 25 radio scripts, each 15 minutes long, on a variety of topics related to marine resources, such as the live reef fish trade, marine protected areas, destructive fishing practices, and how to start a small fishing business. More scripts will be produced as the project continues, and these will become part of NFA's regular work programme. The radio scripts will be broadcast in English and/or Pidgin, depending on the province they are to be aired in. The project is in the process of recording these scripts so that they can be broadcast from national and provincial radio stations around coastal PNG.

Brochures

Brochures targeting community members need to be carefully written — without using scientific jargon and technical terms — and with a minimum of text. Literacy rates are quite low among villagers living in remote areas, making images far more important than text. Brochures (and posters) must be well thought out to take the power of images into account while still imparting an important message that will be understood by all. Moreover, that message must not be too abbreviated: communities are too often bombarded with messages about saving reefs, but typically no information is given about the process by which to do this. Likewise, villagers already receive messages against taking too many turtles or undersized fish, but these messages are not reinforced with adequate background information, such as an explanation as to why they should not, and what the repercussions are if they do.

Not only should words be carefully chosen, but so should the images to be included in brochures. Many messages for marine environmental awareness include images that do not represent reality to local villagers, are meaningless (e.g. cartoon representations of marine animals) or can be misinterpreted. CFMMDP regularly consults its staff of PNG nationals and works with local NGOs to ensure that both the written text and the images will reach the target audience.

CFMMDP is working with the Fisheries Information Section of the Secretariat of the Pacific Community in Noumea, New Caledonia on the production of a brochure on PNG's fisheries regulations for specific resources (e.g. dugongs, lobsters and beche-de-mer). Many fishermen and women claim they are not aware of government laws and regulations regarding resources, and do not know where to go to get such information.

Posters

In reflecting on the shortcomings common to many posters, one member of a non-governmental organisation said "The failure of many posters is that they describe a problem, but do not offer solutions or give information about the 'next step' that should be taken. For instance, they often do not suggest where to go for further information or what needs to be done to alleviate a certain problem, or the action a community should take. Communities are bombarded with messages about saving reefs, but no information is given about the process by which to do this."

So, although posters are one of the most commonly used information media by NGOs and others — often containing lovely photographs of reefs, turtles and fish — they rarely deliver a message that will change the behaviour or attitude of villagers, despite such change being the critical, underlying goal.

In keeping with the underlying goal, then, poster images and text should aim to inform and influence people's behaviour and attitudes. They should encourage people to consider how their behaviour and actions affect the environment around them.

CFMDP is taking a hard look at how to deliver messages effectively, so that they change the attitudes and behaviours of a community, or provide specific answers to pressing problems, which allow direct and relevant actions to be taken. The project has hired local artists to design and illustrate posters on a variety of topics/themes, such as government regulations regarding the size limits of various marine animals, the hazards and impacts of using dynamite to catch fish, before-and-after underwater images of reef organisms that have been affected by the use of poisonous plants to catch fish, establishment of marine protected areas, and safety at sea.

Other print and non-print materials

In addition to the "standard" information materials mentioned above, discussions with provincial fisheries officers and NGOs in the three target provinces highlighted the need for other types of awareness and information materials designed for

villagers and communities. Such resources are critical in particular for villagers who lack a clear understanding of how their activities affect the marine environment. For example, some people do not understand that the use of a small-mesh gill net results in the capture of juvenile fish that have not yet reproduced. It was also reported that some villagers do not understand the impacts of cutting down mangroves on various species of fish, crabs, shellfish and birds that depend on these forests.

In response to the need for alternative types of materials, CFMDP is developing a series of comic book stories that contain messages about properly managing reef resources, the dangers of HIV/AIDS, impacts of destructive fishing methods (e.g. dynamite and poisonous plants), sea safety, marine conservation areas, etc. These comic books are being illustrated by local PNG artists. To date, two comics have been printed: one tells a story of a fisherwoman who contracts HIV from the crew member of a foreign fishing vessel; and the other is about an underwater classroom where sea animals learn about the dangers of using dynamite and fishing with poisonous plants. Two other comic books are currently being illustrated and developed (one on sea safety and the other on marine conservation areas). The comic books are aimed at school-aged children as well as adults, and will be produced in both English and Pidgin.

CFMDP is also developing a tide calendar that provides the daily times for high and low tides, and highlights a particular resource each month. Basic information about each resource is presented along with any applicable regulations. The calendar is expected to be out early in 2005.



In addition to "standard" information materials CFMDP is also working with theatre groups to convey marine conservation messages.



Besides producing comic books with conservation messages, CFMDP has also produced a comic that tells of the dangers of AIDS and fishermen and fisherwomen.

Video

CFMDP is currently filming two docu-dramas, each of about 15–20 minutes duration. One focuses on overfishing and the other on destructive fishing practices. The project has enlisted the help of a professional film-maker in Kavieng to produce the videos. The scripts for these videos were developed by CFMDP staff, and will be performed by local actors. All footage is being taken in New Ireland Province, but will be done in such a way that the videos are relevant to other coastal PNG communities.

All video materials (docu-dramas as well as puppet shows) will be used as community engagement

tools that provide a topic or discussion point to be raised during village visits by the project team, and visits by environmental NGOs.

Theatre

Theatre groups and/or puppet shows can also be highly effective methods of communicating difficult concepts. Mahonia na Dari (an NGO based in New Britain) has a highly successful marine education programme that has proven to be a powerful tool in building a grassroots constituency for conservation. CFMDP has filmed two of Mahonia na Dari's puppet shows, which are being recorded onto VHS and shown in remote coastal village communities in



CFMDP has filmed two puppet shows put on by “Mahonia na Dari” (a New Britain-based NGO), a highly successful marine education programme that has proven to be a powerful tool in building a grassroots constituency for conservation.

PNG. To distribute these videos further, CFMDP is working with local NGOs; it is also investigating possible work with other theatre groups.

TV

At this time, CFMDP is not making use of television because it is both costly and inaccessible for most people in coastal PNG. However, the project may use it at a later date in order to reach politicians and other decision-makers.

What's next?

The above-mentioned information products are being trialled in New Ireland Province for an expected period of about one year. Once feedback is received on these various information products, the project will adapt or modify the products for the other two provinces involved in its information component. We anticipate that the adaptations for the other provinces will involve slight variations from what has been developed for New Ireland. For instance, for Milne Bay Province, the project may produce specific information on beche-de-mer (e.g. price sheets for individual species, or rules and regulations regarding seasonal closures), in addition to other information materials.

Likewise, the docu-drama produced for that province may focus more on harvesting beche-de-mer and trochus, or on the destruction of sea turtle nests.

CFMDP ends in 2007. One of its primary goals is to make certain that its work will continue afterwards through the efforts of NFA, NGOs, provincial fisheries offices, and other agencies and individuals. To this end, PNG nationals are being trained in various areas, including socioeconomic survey work, information production and dissemination, and community fisheries management and development.

Raising community awareness: A starting point for sustainable management

Autalavou Taua¹

This paper was presented at a training session on fisheries management and statistics, September 2004, in Nadi, Fiji.

In most Pacific Island countries, the marine environment has been seriously damaged and catches of fish and shellfish are very low. Most fisheries agencies and fishing communities realise that catches of the most accessible fish and shellfish of the lagoon and reefs have been declining over the years. Reasons for the decline in inshore catches include overexploitation, the use of destructive fishing methods (such as dynamiting, chemicals and poisons) and environmental disturbances. Environmental disturbances have resulted from natural disasters such as cyclones and storms, as well as from human activities. Governments are concerned about damage to the marine environment and about low fish catches in village communities but their ability to deal with these problems effectively is limited. Although most island countries have national regulations in place to protect fish stocks, enforcing such laws is still difficult.

Fishing communities respect traditional knowledge concerning fish stocks and have a high level of awareness of the marine environment. Most coastal communities are traditional owners of fishing areas, thus have some degree of control over immediate inshore areas. With this mode of ownership, communities are in an ideal position to be responsible for management of resources. To enable them to take this responsibility, one of the main starting points is to make people aware of problems that exist within their marine environment. If the majority of fishers are aware of the need for conservation and the purposes of fisheries regulations, compliance is likely to be high and fisheries management will be more effective. This article describes ways of raising community awareness and outlines a process devised to appraise management success.

Environmental programmes in schools

Introducing environmental subjects to students at an early stage is most important, as young people are receptive to learning environmental values and behaviour. Communicating information and values to the young can also be a way of raising the awareness of parents and general public. In the longer term, education of the young is one of the

best ways to protect the marine environment. Education gives people the knowledge and skills to make decisions and the ability to act on them.

All relevant government and non-governmental agencies in Samoa assist with environment-related work in schools. In this regard, students participate in activities such as essay competitions, open days and career days. Information sheets and other printed materials can be produced for teachers and students.

Radio and television

The radio can be an effective way of increasing environmental awareness in remote communities in Pacific Island countries. Radio presentations can range from brief environmental messages to interviews with extension staff. Environmental messages are often read by an announcer at the studio. The advantages of using the radio for public awareness are that it:

- is low cost, especially if radio stations are government owned;
- allows speedy delivery of messages;
- reaches very remote areas; and
- reaches a large audience, including those who cannot read.

Alternatively an extension officer can be videotaped demonstrating work in communities. This presentation can then be shown on national television as part of awareness work.

Printed materials

Printed materials — including newspaper advertisements and articles, newsletters, leaflets, information sheets and posters — are commonly used in awareness work. Some media releases require photographs to illustrate the messages.

Arrangements can be made with the editor of a local newspaper to print a regular column (e.g. weekly) on environmental issues such as community-based management, destructive fishing methods, and fish farming. Producing such a column, however, requires strong commitment as the

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preparation is time consuming and, as time goes on, it becomes harder to come up with new ideas for articles. To minimise these problems, it is best to plan ahead by producing a list of prospective topics and committed specialist authors.

Direct contacts

Most awareness work will involve some element of direct contact or face-to-face interactions with people in communities, such as through meetings, public talks, and displays. Such contact is very important for any community-based programme. Scheduled meetings with teachers, church leaders, village mayors and women's committees can be used to introduce and advertise many topics such as news of a community-based programme, a new fisheries development and destructive fishing practices.

Open days and public displays are useful to familiarise the public with the work of government agencies and non-governmental organisations. An

open day can be publicised by running school competitions (in which students produce hand-painted posters, creative essays and/or songs on a selected environmental theme) which will be judged at the open day. Local businesses will often agree to sponsor prizes for these competitions.

The community-based fisheries extension programme of the Samoa Fisheries Division has assisted 76 coastal villages to develop Village Fisheries Management Plans. It is referred to as "The Extension Process" as it is the process employed by Fisheries Extension Officers when they introduce the Fisheries Community-based Programme to village communities. One of the major components of the process is awareness work, which generally involves education, training and provision of information to the public. Such awareness work continues to be vigorously undertaken alongside encouraging signs of its progress, with more than 70 villages having developed their own village management projects.



Traditional meeting houses such as these are also used for awareness work.

Driti Women's Tilapia Project

Satya Nandal¹

Driti is a small village in Bua Province, Vanua Levu, Fiji. This isolated village is 140 km from Labasa town. The women of Driti have been successfully involved in tilapia breeding since 2003.

The Fisheries Department introduced tilapia farming into Bua Province in the mid 1980s. A total of 30 farms with several ponds, ranging in size from 100–1000 m², were established during this period. Most of these farms were operating at subsistence level, with tilapia fingerlings supplied free by the government. Production of tilapia was good until 2002 when the supply of fingerlings was stopped.



Satya Nandal, the SPC Aquaculture Officer, helps out the Driti community in setting up the tilapia ponds.

Although the men's group in the village abandoned the project, the changed circumstances did not deter the Driti village women's club; instead this 36-member club sought help for the project.

In 2003 a member of the women's club attended a week-long workshop on tilapia farming, sponsored by the Canada–South Pacific Ocean Development program, at Nausori. The women's club also sought assistance from the University of the South Pacific, Secretariat of the Pacific Community, Ministry of Women, and Fisheries Department. With the assistance that was then forthcoming, existing ponds were improved; three new ponds, tank

and breeding facilities were built; farms were fenced; and a three-day workshop was held on tilapia hatchery operations and grow-out of tilapia and freshwater prawns.

The achievements to date provide strong evidence that village women can raise tilapia and prawns to meet the needs of their village and can market them efficiently if given the opportunity and support to do so. An important aspect of the project is that people are no longer relying on canned fish, mutton and beef from the village store.

The project opens up the opportunity to pilot other such projects in rural locations for both food and a source of income. It also highlights the important role that women can play in the development of aquaculture in the region. Women are now doing more than their traditional roles of working in gardens and attending to domestic chores; many are now venturing into development enterprises. It is therefore necessary to recognise that women contribute significantly to the social and economic livelihoods of communities. Driti women have proven that, through women's own initiative and hard work, projects such as the tilapia breeding venture can be an important economic activity for the village. The latest record of production was 2.6 tonnes of tilapia, which sold for FJD 9100 (December 2003). With part of the money earned from the project, the women have invested in shares from the Unit Trust of Fiji.



Community members beside the Driti ponds: this growing community project can be implemented in other areas of Fiji.

1. Aquaculture Officer, Coastal Fisheries Section, SPC

Information requirements for policy development, decision-making and responsible fisheries management: What data should be collected?

Shunji Sugiyama¹

Why is fisheries information important?

The fisheries and aquaculture sector is extremely important to the Pacific region in terms of food security, revenue generation and employment. Catching or farming aquatic resources makes an integral contribution to rural livelihoods in many parts of the region. Because land-based resources are very limited in many small island developing states (SIDS), people's reliance on aquatic resources is remarkably high in this region. Indeed, the region has one of the highest rates of per capita fish consumption in the world because communities in rural areas often have no alternatives to this vital food item. Fish is also important to SIDS in international trade. Fisheries products bring in valuable foreign exchange earnings; their contribution is as high as 80 per cent of total exported commodities in some countries.

Knowledge of the status and trends of fisheries, including socio-economic information on fishing communities, is a key to using aquatic resources in a sustainable way. Adequate fisheries data and information that are timely and reliable provide a basis for sound policy development, better decision-making and responsible fisheries management. They are required at the national level for the maintenance of food security and for describing social and economic benefits of fisheries, as well as for assessing the validity of fisheries policy and for tracking the performance of fisheries management.

Marine fisheries resources and people's reliance on them are not as "visible" as with resources in other food production sectors (e.g. agriculture) or development sectors (e.g. tourism) because of the location of marine resources and related fishing activities, in water far from the shore. The economic and social contributions of the fisheries sector to each national economy need to be properly evaluated so that appropriate levels of policy attention and resources are directed to the sector for the management of these important resources. In the absence of reliable information to undertake such evaluations, development decisions may be made in favour of other sectors, such as tourism or agriculture development, at the expense of the fisheries sector.

Outside of the government sector, there is also an increasing need for fisheries information; public interest in the current status of fisheries resources has been high. This need is particularly great where decentralised fisheries management systems (e.g. community-based fisheries management) are in place. With more accurate and timely information at the community level, the public is likely to be better informed and supportive of efforts to manage fisheries and aquatic resources in a responsible manner.

Furthermore, fisheries information is either needed for or consistent with many international instruments, initiatives and programmes concerning fisheries. These include:

- the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (1995), which specifies responsibilities for collecting and exchanging data necessary for stock assessments, including provisions for transparency (Article 12);
- the Food and Agriculture Organization (FAO) Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas (1993), which requires the exchange of some information on fishing vessels (Article VI);
- the Code of Conduct for Responsible Fisheries, which calls for use of the best scientific evidence available, bilateral and multilateral cooperation in research and data collection (Article 6.4), regional mechanisms for cooperation to compile and exchange data (including information on socio-economic factors; Article 7.4), and publication and dissemination of results (Article 12);
- FAO International Plans of Action (Epées) for implementing various aspects of the Code of Conduct, such as the IPOA for the Management of Fishing Capacity, which broadens the scope of the needed information on the status and trends of fisheries, to include measures of fishing capacity;

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- international conventions, such as the Convention on International Trade in Endangered Species of Wild Flora and Fauna (1973) and the Convention on Biological Diversity (1992), which call for the collection and exchange of information on the status of biota; and
- international programmes that call for or need fisheries information. These programmes include (a) United Nations Environment Programme, (b) Intergovernmental Oceanographic Commission of the United Nations Education, Scientific and Cultural Organization (UNESCO), (c) Large Marine Ecosystem projects sponsored by the Global Environment Facility, (d) Coordinating Working Party on Fisheries Statistics, and (e) Inter-Agency Committee on Sustainable Development.

Difficulties associated with collecting fisheries data and information

Clear needs for adequate and reliable information on fisheries, as described above, do not necessarily secure sufficient investment of resources that will comprehensively improve national systems for collecting fisheries data and information. Chronic problems are prevalent in the national data collection systems of many countries, including SIDS in the Pacific, such as:

- insufficient budget;
- limited number of staff;
- lack of training opportunities for fisheries officers and field enumerators; and
- multiple duties given to field staff.

Such problems result in unreliable, poor-quality information, discouraging people from using statistics for fisheries management and policy development, which in turn leads to dwindling support for the development of data collection systems. There is an urgent need to end this vicious cycle of problems that shortcomings in data collection systems tend to create.

Moreover, certain characteristics of SIDS and countries with tropical small-scale fisheries work against the collection of effective fisheries data in the Pacific. Clearly identifying and recognising difficulties specific to the region would help in formulating appropriate strategies to cope with them. Some typical conditions in the region that are unfavourable for data collection are described below.

Dispersed and diversified small-scale activities for subsistence purposes

The Pacific Islands are blessed with rich reef-associated fisheries resources; many islands are

encircled by extensive fringing reefs or barrier reefs that provide well-protected fishing grounds to the local communities. Coastal fisheries within these reef systems support predominantly small-scale activities to supply fish to rural communities at a subsistence level. These informal activities of harvesting fish, which contribute significantly to rural livelihoods across the region, are highly diversified in terms of fishing gear, methods and targeted species.

The dispersed and diversified nature of coastal fisheries, however, is a disadvantage in that it challenges conventional data collection systems that are based on catch and effort. In contrast, the region's offshore industrial fisheries that target tuna and tuna-like species almost exclusively, are generally monitored well and systematically by regional fisheries bodies or national fisheries departments.

Archipelagic nature of small island countries

Compounding the above problem, many countries in the region are archipelagos, with numerous islands and islets spread over a vast geographical area. Geography of this nature inevitably poses serious logistical problems for data collection. For relatively small fisheries departments in the Pacific, which have very limited human and financial resources as well as means of logistics, covering the area can be simply beyond their handling capabilities.

Weak linkage between policy/management objectives and information generated

In many cases, the fisheries data and information that are currently collected are linked only weakly to policy and management objectives for the fisheries. This suggests that national efforts to clarify information requirements may be insufficient or non-existent.

National data collection systems need to provide information that is more relevant to current policy and management objectives. In this regard, small-scale fisheries are frequently given little attention and hence have low priority in the eyes of governments. This neglect probably stems from the relatively "invisible" contribution that small-scale fisheries make in terms of income to the national economy and of staple foods to local communities. Thus information on resource use in coastal waters, where small-scale fisheries predominate, is often limited and of poor quality. This situation, perhaps underlined by an attitude among policy-makers that nothing can be done with small-scale fisheries, adds to the neglect of policy development for this subsector.

Production-oriented data collection that overlooks socioeconomic aspects

Because small-scale fisheries are often operated for subsistence purposes, they are closely linked with the socio-economic issues of rural development, sustainable livelihood of communities and national food security. Data collection systems that focus on production-oriented data (e.g. catch and effort data) may be unable to address these issues. In the process of formulating data collection strategies, due consideration must be given to the subsectors that require data collection to cover different dimensions.

Invalid framework of data collection system

Until fairly recently, fisheries policies in many countries were directed toward the increase of gross production or expansion of the fisheries sector. National data and information collection systems typically focused on the quantity of fish caught in order to establish how many more fish could be caught. At the same time, little attention was given to small-scale fisheries.

Today it should be recognised that fisheries information systems need to be reviewed when there is a major shift in national policies and priorities. The system framework, including strategies to collect data and information, should still be valid and capable of handling current needs for fisheries data and information.

Adoption of inappropriate methods of data collection

Small-scale fisheries in the Pacific region are typically multispecies and multigear fisheries. It is increasingly recognised that conventional data collection systems that were originally designed for single-species commercial fisheries in temperate waters or offshore industrial tuna fisheries in tropical waters may be unable to meet the data requirements of small-scale fisheries. Therefore, rather than simply adopting the types of data and information used in other areas/subsectors, there is a need to carefully evaluate their relevance to tropical small-scale fisheries.

Ideally, to address the difficulties identified above, an effective fisheries data collection system in the Pacific would:

- use inputs that are low in cost and low in human resource requirements (to fit within the limited financial and human capacity of the line agency);
- employ new approaches of data collection that suit the information requirements of small-scale coastal fisheries in the region; and

- still be capable of generating relevant and reasonably accurate fisheries data and information in a timely manner.

However, in practice it is difficult (if not impossible) to meet these requirements. To take the second requirement as an example, there is no proven method of effective data collection on small-scale multispecies and multigear fisheries that SIDS could adopt.

A logical approach to define information requirements

Certainly there is no easy and immediate solution to the question of how to generate high-quality (i.e. timely, adequate and reliable) fisheries information on small-scale coastal fisheries in SIDS. Yet it does not follow that nothing can be done to improve the current status of fisheries data collection in the region. To the contrary, there already exist some ways of improving the quality of fisheries data and information and their use in policy development or fisheries management.

One starting point to improve the quality of fisheries information is to revisit three basic questions about fisheries information in order to make sure that the current fisheries statistics system is collecting the relevant set of data in an effective way. Frequently, the types of fisheries data collected are adopted from somewhere else, these data are collected as a mandatory routine of the fisheries line agency without considering their adequacy, and ultimately they are not used at all. It is important, therefore, for everyone involved in collecting fisheries data and information to ask themselves the following basic questions:

- Why do you need fisheries information? (Who are the users of the information and for what purpose is the information used?)
- What data do you need to collect in order to meet the users' requirements?
- How best can you collect the required data and information?

In particular, these questions need be asked when a country designs or reviews its fisheries data and information collection system. FAO has been promoting a logically structured sequential pathway in the design/review process, starting from the understanding of *why* (question 1), through the clarification of *what* (question 2), to the consideration of *how* (question 3; for more detail, see FAO 1999). This logical approach is the key to a relevant and effective data collection system; including these basic aspects in any review of a data collection system is important and useful. Figure 1 illustrates a conceptual process of clarifying the information requirements and objectives of data collection (i.e. *why*).

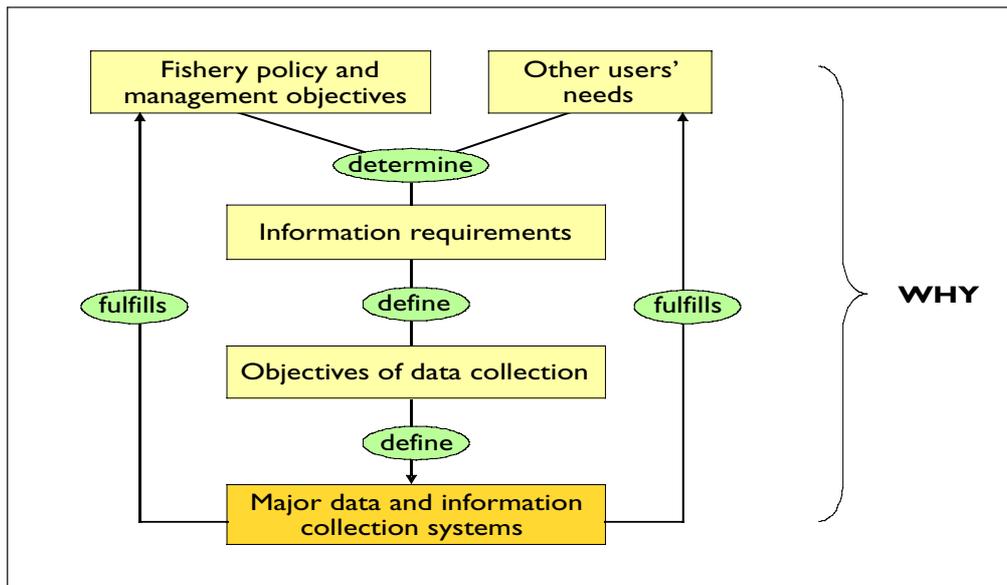


Figure 1. Information requirements and data collection objectives

The following are some critical elements in defining information requirements successfully:

- Stakeholders are involved. In this context, stakeholders are mainly “information users”, not only within the fisheries sector — such as senior officers (decision-makers) of the fisheries line agency and managers of fisheries — but also outside the sector, such as the central economic planning unit of the country, local government organisations and/or non-governmental organisations.
- There is an effective mechanism for consultation among various stakeholders. It would be relatively easy to communicate with information users within the sector.
- Information requirements are reviewed periodically. The information requirements would be changed if, for example, there was a shift in policy emphasis. The data collection system needs to be responsive to such changes.

It would be desirable for each country to initiate a formal national process to identify information requirements. For example, at a national consultation workshop on fisheries data and information requirements, important information users could participate in plans to develop/review the data collection system. The steps of such an exercise could be as follows:

- List important policy and management objectives as well as perceived requirements from other information users, and subsequently list the actions required to achieve these objectives.
- List data and information required for each objective. For example, a country may need to know the current legal framework to support delegation of management authorities, social

structure and systems in local fishing communities, demographic aspects of the communities (number of fishers and their distribution), current pattern of fishing activities, and the purpose of fishing, etc.

- Compare “the data needed” with “the data currently collected”. Then compare the list of required data and information, as identified in step 2, with the existing set of fisheries data.
- Based on the comparisons in step 3, gaps in data collection and/or irrelevancies within the current set of data items collected can be identified. For example, if the required data and information are identified to be A, B, C, D and E, while the data currently collected are A, B, F, G and H, the data items C, D, and E are apparently gaps in data collection. On the other hand, the data items F, G and H are irrelevant items that may not have to be collected. When operational resources are scarce, fisheries departments should not waste their precious resources on collecting this kind of “nice to know” data at the expense of collecting “need to know” data.

The results of this “rapid analysis” could indicate the current quality of information that fisheries departments are producing, and could be used as a basis for formulating strategies to break the vicious cycle of problems related to inadequate fisheries data and information.

Opportunities for improving fisheries data and information

Apart from taking national initiatives as described above, countries in the Pacific region could improve

fisheries data and information by making use of some international instruments currently in place.

Strategy for improving information on status and trends of capture fisheries

FAO has been concerned with the persistent deficiencies of fisheries statistics, data and information systems worldwide. To help overcome these deficiencies, it formulated a "Strategy for improving information on status and trends of capture fisheries" (Strategy-STF; see FAO 2002), which was adopted by the FAO Committee on Fisheries and the FAO Council in 2003.

The Strategy-STF is designed to cover all capture fisheries in inland and marine waters throughout the world. Its main focus is on information concerning fisheries resources and the primary fisheries sector, including socioeconomic information. Its overall objective is to provide a framework for the improvement of knowledge and understanding of fisheries status and trends as a basis for improved policy-making, sectoral planning and management for the conservation and sustainable use of fisheries resources within ecosystems.

The Strategy-STF specifies actions required in the following nine areas:

- capacity-building in developing countries;
- data collection systems in small-scale fisheries and multispecies fisheries;
- expansion of the scope of information on status and trends of fisheries;
- global inventory of fish stocks and fisheries;
- Fisheries Global Information System (FIGIS) participation, structuring and capacity-building;
- development of criteria and methods for ensuring information quality;
- development of partnership arrangements;
- the role of working parties to assess the status and trends of both wild and cultured fisheries; and
- sustaining data and information collection on the status and trends of fisheries.

The Strategy-STF is a voluntary instrument that applies to all states and entities. It calls on states, regional fisheries organisations, FAO, donor countries and non-governmental organisations to assist with its implementation. Its framework to improve the quality of fisheries information is valid and highly relevant for SIDS in the Pacific region.

Project for improving information on status and trends of fisheries

In the implementation of the Strategy-STF, one important instrument that FAO has formulated is a

project for improving information on the status and trends of fisheries (short title: FishCode STF Project) under the umbrella of the FishCode Programme's "Assistance to Developing Countries for the Implementation of the Code of Conduct for Responsible Fisheries". The project is concerned with improving collection, processing and use of data and information on the status and trends of capture fisheries.

The FishCode STF Project is composed of two components with linked immediate objectives.

Component 1: Development of inventories, methodologies and operational guidelines

The immediate objective of component 1 is "improved collection and processing of data and information on capture fisheries (marine and inland) to provide a reliable basis for fish stock assessment, economic analyses and management". It covers the creation of methodological descriptions of fisheries statistical and data collection systems used by all countries and regional fisheries bodies. At the same time it should provide an overview of fish stocks and/or fisheries management units, whether monitored or not, by country and/or region.

The main inventory should cover data systems on all aspects of fisheries, including data on fleets, employment, processing, consumption, trade and sociological and economic aspects. Establishing this inventory should also facilitate an evaluation of data collection and handling practices by each country, of data flows from national to regional and global levels and hence of the data as published by regional fisheries bodies and FAO. Finally, the inventory should form the basis for improvements and identification of training needs in developing countries to be addressed under component 2 (see below).

The implementation of this component should take the following considerations into account:

- There is a need to develop data collection systems that are better suited to small-scale fisheries and multispecies fisheries, and to develop criteria and methods for ensuring information quality and security.
- Because routine data collection on economic and social aspects of fisheries is often neglected, managers are frequently deprived of the data necessary to make decisions in cases of conflict between different types of fisheries, the protection of a labour force engaged in existing fisheries against new arrivals, etc. The FishCode STF Project should investigate requirements and develop systems for the collection of such data.

- Computerised systems facilitate the exchange of data and information, which is the reason behind setting up large databanks such as FIGIS. The project should develop arrangements for the provision and exchange of information and should assist in improving the inputs to FIGIS, including expanding the scope of information on the status and trends of fisheries.
- Ideally fisheries should be managed based on ecosystem considerations. However, ecosystem management requires huge amounts of data. The project should investigate the data requirements and practical solutions for such management systems.

Component 2: Field training and implementation at national and regional levels

The immediate objective of component 2 is “strengthened fishery data collection and processing systems in selected countries, according to the latest global standards and executed by competent staff”. Its aim is to improve substantially the quality of collection and processing of fisheries statistics and other data and information on capture fisheries in selected developing countries with important inland or marine fisheries. Such improvement would lead to better data for fisheries management at national level and, in cases of stocks shared between neighbouring countries, at

regional level as well. Improvements in reporting to FAO and other agencies would be an important additional benefit.

Component 2 covers capacity-building at all levels, and implementation of improved or new statistical and other data collection and processing systems in selected countries. There is also a need for improved interactions among fisheries statisticians, fisheries analysts, socioeconomists and fish stock assessment experts. The FishCode STF Project should facilitate this interaction.

Activities under component 2 will be field-oriented and distributed over developing countries. The beneficiary states will be selected from developing countries with substantial capture fisheries, either inland or marine, that have the potential of becoming an example for other countries in a similar situation.

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Humphead wrasse listed as endangered species

At the 13th Conference of the Parties (COP-13) to the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES), humphead wrasse (*Cheilinus undulatus*) was listed in Appendix II of the convention. This listing was achieved when the required two-thirds majority voted in support of a proposal to this effect, which had been put forward by Fiji, the United States and the European Union. As a result of this Appendix II listing, trade in humphead wrasse must now be regulated by permits and the importing and exporting countries.

The humphead wrasse, the largest reef fish in the Indo-Pacific waters, is highly prized in the live fish trade. Its population has declined due to both over-fishing, encouraged by top-dollar reward for this species, and detrimental catch methods that utilise cyanide.

COP-13 convened from 2–14 October 2004 in Bangkok, Thailand. Drawing together 1200 partici-

pants representing governments, intergovernmental and non-governmental organisations (IGOs and NGOs), the conference considered 64 agenda items on a range of topics, including: reports and recommendations from the Animals Committee and Plants Committee; the 2006–2008 budget and other administrative matters; implementation of the convention; species trade and conservation issues; management of annual export quotas; the relationship between *in situ* conservation and *ex situ* captive breeding; trade control and marking issues; enforcement matters; cooperation with the Convention on Biological Diversity and the United Nations Food and Agriculture Organization; and 50 proposals to amend the CITES appendices.

Humphead wrasse was listed as vulnerable due to multiple and consistent accounts of marked declines, which are linked with heavy fishing and in particular with the recent introduction of export fisheries associated with the international live reef fish trade. Given the projected growth in the trade,

especially into mainland China in the next few years, and the probable vulnerability of such a large and long-living reef fish to overfishing, the fall in population was projected to continue or worsen. Declines in catches and sightings of the fish were reported from countries and territories

such as American Samoa, Malaysia, Indonesia, French Polynesia and Palau. In Fiji the species has virtually disappeared from some places. In other places there were records of declining catches, and in some areas there has not been a recorded catch of humphead wrasse for the last 10–15 years.

Community-based fisheries management in Niue

Aliti Vunisea¹

The Coastal Fisheries Management Section of the Secretariat of the Pacific Community (SPC) worked with the Niue Fisheries Department to introduce community-based fisheries management in Niue in 2004. This collaboration was sparked by the Fisheries Department's interest in involving communities in the management of their own fisheries resources. Before work began, preliminary assessments were conducted in discussions with different stakeholders.

The work in Niue is part of SPC's assistance to countries to put in place coastal fisheries management initiatives that involve the resource owners. Given the resource owners' traditional user rights and ownership of fisheries resources that exist in most Pacific Island countries, participation of the people is not only practical but necessary. This approach to management, which is also used by non-governmental organisations and other institutions in the Pacific, requires people in communities and villages to make decisions and plans relating to their resources. The thinking behind this approach is that, for long-term resource management, the people who use, own and have access to resources must have some say in their development and management. In addition, limitations in human and financial resources of fisheries agencies in the Pacific make it difficult for the government alone to manage, monitor and enforce the use of these resources.

Niue consists of a single uplifted coral atoll, with an elevated rugged coastline. The narrow fringing reef that surrounds the island is accessible and utilised for fishing activities more on the western coast of the island than on the east. The preference for the west

is largely due to the huge waves and swells on the eastern coast, which limit fishing to seasonal activities for reef fishing and to the few spells of calm weather when fishing is feasible during the year. As a result, fishers from the eastern villages fish regularly within the fishing areas of the western villages. The shared use of resources has to be taken into account when traditional arrangements and resource use principles are retained.



Fiafia Rex is the fisheries officer responsible for coastal fisheries management in Niue.

Women fish within the narrow reef areas, while men fish from canoes, dinghies and powered boats beyond. Women's fishing activities involve gleaning for shellfish, collecting crabs and other seafood, and using rods and line to catch reef fish along the reef edges. Men mainly troll for pelagic fish, especially the migratory tuna species. The installation of fish aggregating devices has helped to extend men's fishing activities beyond the immediate reef areas.

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Each of the 14 villages in Niue has an elected village council, whose total membership depends on the village population. The village council holds the decision-making authority in each village. The villages also form 14 of the 18 parliamentary constituencies, with the four other parliamentary members elected under common roll. The village councils are responsible for environmental and development issues and provide the link between the government and the people.

Most natural resources are customarily owned. Land is family owned, and cannot be bought or sold but can be leased under long-term agreements. Fisheries resources are under general government jurisdiction, but there exist unwritten rules of fisheries resource jurisdiction and use that people have followed for generations. Coastal areas directly beyond a village are considered to "belong to that village" and, under traditional resource use understandings, people seek permission to fish in village fishing areas from the village elders or the village council. Fishing access agreements allowing use of these areas are not specified under any of the existing regulations. The lack of formal arrangements could be an area of conflict when individual villages take management initiatives such as developing bylaws or measures to limit entry or use by others. At a discussion with women from a village on the western coast, concerns on fishing activities of "other races" in Niue were raised. If such concerns are not addressed now, in the future villages with more accessible and favourable fishing areas could find themselves in conflict over use of their resources.



Steep cliffs from the village sites to the shoreline are the common coastal feature of Niue. Most of the buildings that used to be on this side of the island were blown down by Cyclone Heta in 2004.

As indicated before, the village councils oversee activities at the community level. Their current powers allow them to make decisions on resource use and management. For example, when the striped goatfish (kalowama) is in season from December through to February, village councils can impose bans on swimming in certain areas when the fish is around. There are also bans placed on certain reef or fishing areas following the death of a prominent person. Bans on other species or fishing methods can also be imposed. Implementation of such bans is usually announced on the radio for the general public's benefit.

The majority of the people on Niue lead a traditional subsistence lifestyle, although in discussions most stated that they were not fishing as often as they used to. This view was confirmed by women from Avatele and Alofi South, who said that they rely on the subsistence fishery less than before. Fishing is still a usual occupation for many, but targets the species in season. Older people especially are familiar with the moons, tides, winds and how these determine fishing activities. Moreover, some community members believe that the loss of traditional knowledge is caused by the reluctance of older people to share fishing knowledge. Younger people are less interested in fishing; the increasing reliance on readily available modern foods is seen as a major contributing factor to this change.

Traditional knowledge and skills are still used by fishers who usually go out during certain moon phases, tides and winds. Seasonal occurrences of species such as kalowama and other reef fishes, whales, shellfish and other marine species are well known. Traditional mechanisms for communal food exchange or rituals are still followed. Some customary activities such as hair-cutting and ear-piercing ceremonies require a large amount of fish and other food. Food exchange is not confined to Niue as most of these activities are conducted with relatives in New Zealand. Traditional management mechanisms such as the fono (ban) on swimming areas during the kalowama season are still respected. After a village council declares a fono, it informs those stakeholders who do not reside in the community. Small-scale business operations are dominated by fishers with boats and canoes, who sell to shops, restaurants and hotels on the island. Small-scale fishing for deep-sea fishes is popular and is a major source of food and income for many families.

The International Waters Programme (funded by the Pacific Regional Environment Programme, SPREP), which conducted intensive consultation and information gathering in the 14 villages in Niue in 2001, highlighted concerns and issues from the different villages. Amongst the many identified, the three main issues were:

- the decline and degradation of marine resources (degradation may in this case refer to degradation of habitats);
- declining resources, specifically certain shellfish types and some fin fish species; and
- coastal pollution and fish poisoning.

Cyclone Heta, which devastated the western coast of the island in early 2004, could have major ongoing impacts on the reef and inshore fisheries. Alofi South, Alofi North, Makefu and Avatele, which are the island's more popular fishing areas, suffered badly from the cyclone. A scientific baseline survey conducted by David Fisk (2004) highlighted the damage to coral reefs in these areas and also alluded to the possible loss of fish and other marine species. Thus the cyclone has worsened the existing situation.

In their work together, the SPC Coastal Fisheries Management Section and the Niue Fisheries

Department have developed a management model that is tailored to suit the social context. This model, which can be modified and changed, will be used for work in all the communities of Niue.

A national training of trainers workshop has also been conducted. Through the training activities, fisheries officers, government representatives and community leaders were made aware of the project and their own roles as facilitators in community-based management. Thereafter, meetings and discussions were held in the first community that showed an interest in adopting the programme, which led to the development of a village management plan for Alofi South. Fisheries Department staff will next work on the training of community leaders and the development of village management plans for the other villages in Niue.

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What used to be the hospital in Niue. In the background are the remains of the Niue Hotel after Cyclone Heta.

World Fisheries Congress: Passion, but nothing new

D. Nandakumar¹

The recent 21st Century Fourth World Fisheries Congress in Vancouver saw a lot of passion, but little fresh insight.

The five-day 21st Century Fourth World Fisheries Congress in Vancouver, Canada, 2–6 May 2004, focused on how to reconcile the human use of aquatic resources with the conservation of ecosystems. It sought ways to manage fisheries without causing unacceptable losses of biomass, species, diversity, habitats and ecosystem function. To achieve this goal, it examined fresh, interdisciplinary ways to evaluate and maintain the economic and social benefits of healthy fisheries, in the face of global climate change, human population trends, competing habitat demands and the expressed desire for a future world of aquatic ecosystems endowed with natural diversity and resilience. The conference identified these as the major challenges facing the management of aquatic ecosystems.

There were seven plenary keynote speaker sessions during the five-day Congress. The concurrent sessions addressed each of the questions raised in the plenary keynotes. In his keynote address, Daniel Pauly addressed the need for reconciling fisheries and conservation efforts, using his much-presented assessment of fishery impacts on the ecosystem, based on a compilation and synthesis of historical information on a grand spatial and temporal scale, utilizing a mapping approach. The talk highlighted the decline of North Atlantic fisheries, how it occurred, and what to do to reverse the situation.

Kevern Cochrane of FAO/South Africa addressed the first of four critical questions: What should we care about when attempting to reconcile fisheries with conservation? He concentrated on concepts of equity and fairness, as well as responsible fisheries. The concurrent session discussed the FAO Code of Conduct for Responsible Fisheries, treaties, international conventions, limits and restrictions, and monitoring.

The human dimension featured in issues relating to community management, stakeholders and effective institutional designs. The ecological dimension was covered in discussions on reference points, targets, thresholds and uncertainty in setting harvest and escapement goals. Also discussed were fisheries

trade, current and historical trade statistics, trade measures, ecolabelling, common markets, capitalization, and market and ecosystem interactions.

Historical lessons were sought through model reconstruction of past ecosystems and diagnosis of historical depletions. Speakers also dealt with how to maintain intact ecosystems, avoid extinctions and reverse local extinctions. On the matter of reconciling fisheries conservation with jurisdictional equity, the need for harmonization of law and management, in the context of international agreements, was discussed. There was also a session on the role of sport/recreational fisheries in minimizing fish mortality and maximizing value.

The second critical question, “Who owns the fish and what are they worth to society?” was presented by Steve Dunn of Australia, who sought to define issues of ownership, resolving conflict and evaluating costs and benefits to society, while attempting to reconcile fisheries with conservation.

Concurrent sessions

Five concurrent sessions followed. One focused on the mismatch between fish distributions and boundaries, in the context of straddling and migratory stocks. Another dealt with aboriginal, artisanal, small-scale and subsistence fisheries, their conflicts with large-scale sectors, and the issues of rights, harvest and stewardship.

“Can we get more fish or benefits from fishing while reconciling fisheries with conservation?” was the question presented by Yingqi Zhou of China, who looked at whether the limits of harvest, habitat and culture have been reached or exceeded, and whether there are any solutions or improvements that may be made to current social and economic benefits.

Concurrent sessions discussed the effects of fishing on increasingly smaller target species, including the effect on life histories, food chain effects and fishery collapse. Supplementary themes included conservation through stock enhancement, the role

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of hatcheries, sea ranching, re-stocking, supplementation, grow-out, invasive species, and introduced species and the challenge to reconcile fisheries with conservation. One session dealt with how to reconcile fisheries with conservation and the constraints of climate change, and how aquatic ecosystems respond to climate change. On the question "How can we manage fisheries ecosystems to achieve the reconciliation of fisheries with conservation?" speakers discussed how to reconcile fisheries with conservation and quantitative ecosystem indicators, and what quantitative management goals are needed for ecosystem management. Examples of ecosystem model approaches to fisheries management and where they have been successfully applied were analyzed.

The role of data quality and the imperative for improved methods in catch statistics was highlighted.

On the issue of overcapacity and effort management, case studies of effort reduction to reconcile fisheries with conservation were presented. A related topic was marine and freshwater protected areas, zonation, and temporal and spatial closures. After discussing improvements in fishing gear and techniques, and rectifying wasteful and destructive fisheries, the session turned its attention to stock assessment and adaptive management.

The session on habitat began with coral reef examples and the role of conservation in coastal zones, estuaries, enclosed seas, polar seas and deep seas as well as large rivers, natural lakes and human-made lakes, streams, watersheds and floodplains.

Apart from these concurrent sessions on keynote questions, there were dialogue sessions and an all-day 'Pathways to Reconciliation' session featuring presentations and panel discussions by leaders from the fishing industry, conservation organizations, and interest groups within the fisheries community hosted by the Sustainable Fisheries Foundation. Their goal was to improve communication among fisheries scientists and the non-scientists within the fisheries community.

The forum on the sustainable seafood movement provided an introduction to the use of social marketing strategies to advance ocean conservation, using illustrations from the seafood industry and other sectors. Panelists also highlighted the Seafood Choices movement, an effort to harness market forces and the power of consumer choice in favour of ocean conservation.

Innovative business–environment partnerships in the seafood sector, including ecolabelling and audits of seafood sources for sustainability, were discussed, as was fish farming as a potential source of environmentally friendly and healthy seafood.

The congress featured many social events too. At the opening welcome ceremony, the Copper Maker Dancers put up an excellent performance by the Kwagu'l tribe of the Kwakwaka'wakw people on the northwest coast of the US. The dances they shared were the salmon dance and the grease trail fun dance. The welcome reception also included a grand banquet with a sampling of local culinary delights prepared by some of Vancouver's best chefs.

There was no dearth of audience in most of the concurrent sessions, and a couple of those that addressed aquaculture or large-river issues were packed and the discussion was very lively.

But some sessions, such as those on small-scale fisheries or the ethical approach, were rather thin in participation. At the end of the conference, many participants commented that there was nothing new that this congress achieved although the speakers at the plenary discussion thought that there was a general consensus on moving towards a fisheries management regime with conservation as a priority. There were passionate outbursts as well—mainly on social science being neglected and not addressing the issue of poverty resulting from the decline of fish stocks such as that of the Atlantic cod, the small-scale fisheries sector being given little importance and the imbalance in representation from African, South American and Asian continents.



News from the SPC Coastal Fisheries Management Section

Niue

Work to launch community-based fisheries management initiatives in Niue is underway, having started with initial groundwork in 2003 and early 2004.

The Fisheries Department of Niue asked the Coastal Fisheries Management Section of SPC to assess the possibility of establishing community-based coastal fisheries management. The preliminary assessment that the section then produced included a proposed plan of work and management model. It took account of key features of community-based management: that is, the people will make decisions, influence changes and set the direction in regard to the general management of coastal fisheries in Niue.

The assessment also acknowledged the coastal fisheries management initiative of the International Waters Programme (IWP), which is under Niue's Department of Agriculture, Forestry and Fisheries and involves two of Niue's 14 villages. The proposed community-based management work will focus on the other 12 villages, but could include some collaborative work with the villages involved in IWP work. When work on this new project began in the first participating community in Niue, it also drew from information collected and work done by IWP in communities, to avoid duplication of efforts. During village-level workshops, additional participatory learning and action exercises will be used to collect further information on identified areas of concern, village development plans and other village-specific information.

Other information used in the assessment came from the Inshore Fisheries Management Plan for

Niue (Adams 2003) and a baseline study of Niue coastal resources (Fisk 2004). A national training of trainers workshop in August targeted fisheries officers, other government officers and community leaders. In Niue it is necessary to work with other organisations, community leaders and government departments given the limitations in human resources. Following the one-week workshop, a village management plan was developed in Alofi South, one of the major fishing communities in Niue. The community is now working with the Fisheries Department to implement some of the actions identified in its management plan. The Fisheries Department staff plan to introduce community-based management to the other villages in Niue as well.



In some parts of Niue, fishing is impossible because of the rugged nature of the shoreline.

Tuvalu community-based management work

Work on community based management in Tuvalu has started, with the preliminary survey and initial discussions and interviews conducted in October 2004. The Tuvalu Fisheries Department staff

assisted in the survey, arranging meetings, providing interpretation and helping with interviews. Backed by widespread enthusiasm and support, work on the project should continue in 2005.

Tuvalu already has in place some management initiatives. The Funafuti conservation area, established under a project funded by the Pacific Regional Environment Programme (SPREP) in 1997, is still in operation. In several documents and in interviews with people involved, the lack of a plan to guide work on the conservation area has been noted as a weakness in the establishment and running of the project. Nevertheless, the existence of the conservation area has over time made people aware of the need for management. Specifically, the initiative has motivated those in the outer islands to also set up some system of management. Fisheries Department staff were aware of requests from the islands to set up conservation areas. About seven of the nine islands were undertaking some form of management, ranging from imposing closed areas to banning certain types of gear. Restrictions in place were mostly within the boundaries of the lagoons. Discussions with government representatives and community representatives showed there was a general consensus for the need for management. Some older people recalled change in resource availability, abundance and distribution over the years. Reasons given for the decline included the growth in the human population, especially in Funafuti, and the increasing demand for fisheries products. Because the major source of protein is fish, fishing is an everyday activity, mostly done by men.

The Falekaupule Act, which came into force in 1997, also allows bylaws to be developed to assist the enforcement of any management initiatives implemented. This power is given to the Falekaupule, or island councils, consistent with the Act's purpose of formalising the devolution of powers from the central government to the Falekaupule. Under the Act, the Falekaupule can also put in place mechanisms for management and resource use where required. In addition, the Act gives islands jurisdiction over the immediate 12-mile zone.

Traditional institutions and linkages are still utilised in Tuvalu, and are especially strong in the

outer islands. On Funafuti the Toeainas are representatives of island councils. For community-based management, such institutions should be involved to maximum effect.

All islands have a community fisheries centre, with most operations subsidised by the government. People sell fish to the centres, which then sell fish locally before all surpluses are brought to the National Fishing Corporation of Tuvalu, which is the business arm of the Fisheries Department, for sale in Funafuti. Although reports and studies show that this system is uneconomic, it is still supported by government. Currently the Fisheries Department is trying to hand over responsibility for running the community fisheries centres to their communities. There was a lot of enthusiasm and support for putting in place some form of community-based plans for management of resources. Awareness and training were seen as very important before actual groundwork begins. The Fisheries Department has sufficient staff to undertake the work on management and there will be little need for any major input of funds before national training starts. For future work on management, SPC will operate within existing institutions and arrangements.



Traditional canoes are still commonly used in Tuvalu.

Training on fisheries management and statistics

A training workshop on fisheries management and statistics was held in Nadi, Fiji from 15 to 19 November 2004. The workshop, which was initiated and organised by the Coastal Fisheries Management Section of SPC in conjunction with

the Food and Agriculture Organization (FAO), was attended by fisheries officers, managers and statisticians from Pacific Island countries. It was held in response to a strategic plan for coastal fisheries management developed by Pacific Island countries and approved at SPC's third Heads of Fisheries meeting in August 2003. The strategic plan contains six goals:

- to enhance the capacity of fisheries agency staff in managing sustainable fisheries;
- to assist in collecting and analysing data;
- to assist countries with practical and enforceable fisheries regulations;
- to assist with the involvement of stakeholders;
- to assist in raising public awareness; and
- to assist in setting up marine protected areas.

One of several strategies proposed to achieve these goals was to organise regional training courses and workshops, particularly on practical fisheries management and fisheries statistics.

The Nadi training workshop was the first of a series to address this part of the Regional Strategic Plan. It was also the first workshop in which representatives from the United States and French territories and from independent countries had the opportunity to work together, thanks to funding support from FAO, the Commonwealth Secretariat and the Western Pacific Regional Fishery Management Council.

The regional training workshop on fisheries management and statistics had two goals:

- to enhance the capacity of fisheries agency staff to manage sustainable fisheries; and
- to assist fisheries agency staff in their efforts to collect, store, retrieve and analyse basic fisheries data and/or indicators to monitor the status of fish stocks.

These goals are part of the "Strategic plan for fisheries management and sustainable coastal fisheries in Pacific Islands", a document developed by SPC member countries and territories. It is the first initiative implemented under the Regional Strategy Plan since its endorsement at SPC's third Heads of Fisheries meeting.

Topics covered at the workshop included data collection and analysis, fisheries regulations, public awareness, the involvement of stakeholders, fisheries management, marine protected areas, aquaculture and the structure of fisheries agencies. All topics included extensive participant discussion and many included practical exercises in data analysis and fisheries management.

With financial support from the Commonwealth Secretariat to SPC, the Coastal Fisheries

Management Section planned the training workshop in close collaboration with the FAO Sub-Regional Office for the Pacific Islands in Apia, Samoa. The joint effort was encouraged by memoranda of understanding between the two organisations, which require them to work together in projects of common interest. Other assistance was provided by: the European Union (through PROCFish), which funded six participants; the Western Pacific Regional Fisheries Management Council, which funded the participation of United States territories; and SPC, which funded the participation of French territories.

At the workshop Mr Saimone Tuilaula (Acting Director of Fiji's Fisheries Department, Ministry of Fisheries and Forests) delivered the opening address. He stressed the importance of fisheries resources in providing food security, economic development, employment and foreign exchange. A major challenge he identified is keeping a balance between fisheries development and management in order to sustain a fish supply for future generations. He emphasised the importance of coastal area management to food security and poverty alleviation, especially in rural areas. Challenges for Pacific Island countries include a growth in the human population, along with a corresponding increase in fishing effort and the use of overly efficient fishing methods. In addition, they face the complexity of dealing with multispecies fisheries, harvesting within sustainable limits, collecting information from resource users, raising awareness, and implementing legislation after proper consultation with stakeholders.

Mr Tuilaula also stated that although there is huge potential in the tuna industry, it brings limited returns to the national economy. Despite the high value of subsistence fisheries, there has been little research and data collection in relation to them. Guiding principles for future work should include the involvement of communities (and traditional knowledge), government agencies (and scientific information), non-governmental organisations (NGOs), fishing industries and marketing bodies. Fisheries management involves the management of the users of fisheries resources. Mr Tuilaula concluded with the observation that fisheries management is about managing the people who harvest the fish, rather than only those who look after fish stocks.

Dr Mike King, who was the main facilitator, coordinated most of the sessions, with topics in each covered by resource people. Discussions focused on threats to fisheries in Pacific Islands. Recent surveys suggest that causes of declining catches include overexploitation, growth in human populations, a shift from subsistence to commercial

fishing, the use of overly efficient and damaging fishing methods, and environmental degradation. Key environmental disturbances include the destruction of nursery areas (mangrove areas and corals) as well as siltation from coastal development and poor land management practices. Most fisheries agencies in the region have moved from an emphasis purely on development to a focus on development and management, thus the challenge lay in identifying threats and addressing management needs.

The session on statistics emphasised data collection. Countries were urged to make an effort to collect reliable and accurate data; collecting timely and updated data is particularly important. A wide range of uses are made of the data gathered from annual fisheries statistics questionnaires that are distributed to countries worldwide. For example, these data are used to compile the FAO annual statistics yearbook, FISHSTAT database, the Status of Fisheries and Aquaculture, Country Fisheries Profiles, Aquaculture Country Profiles, and National Aquaculture Sector Overviews.

For information to be useful for policy development, decision-making and responsible fisheries management, it is necessary to clearly understand why information is collected. Fisheries data and information can be used for assessment, for developing sound policies, for better decision-making, for tracking the performance of management plans, for planning, and for informing the public on the need to support management.

Some typical problems include poor quality of the information, limited or non-use of the information, and limited support for data collection. Such problems are caused by the difficulties in data collection, lack of capacity, a weak linkage between management objectives and information, lack of attention to socioeconomic aspects, and an invalid framework for a data collection system. One strategy to counter these problems that was proposed was a back-to-basics (why, what and how), logical approach. Fisheries data and information system should be guided by a country's information requirements.

Following a brief introduction on SPC's Pacific Regional and Oceanic Fisheries (PROCFish) project and its activities, a recently developed socioeconomic manual developed by PROCFish was presented. After these presentations, participants voted overwhelmingly to use the manual, with modifications. As a result of this vote, the PROCFish Section at SPC will meet the expressed need of Pacific Island countries for a simple method of assessing subsistence fisheries (includ-

ing an estimation of fishing effort). Participants were assured that there would be future training associated with the use of the manual. Participants also expressed a need for additional workshops designed for those with different levels of experience and noted that the practical exercises provided on the analysis of fisheries data were most useful.

The nature of subsistence fisheries, particularly in relation to how to involve owners and users of this resource in management, was discussed. For effective management, there is a need to consider traditional institutional knowledge, traditional skills, customary rules and emerging issues and how these affect fishing communities.

Many people in Pacific Island countries rely heavily on subsistence fisheries. Between and within the countries of the region, there are both similarities and differences, such as in length of fishing time, frequency of fishing, gender participation, and complexity of the fishery (commercialisation, target species, tourism, competition for resource use etc.). The subsistence fisheries in the Pacific Islands are based on many different species and fishing methods, increasing the difficulty of collecting catch and effort data.

Other presentations dealt with ongoing country assessments and fisheries surveys. Surveys discussed included a rapid statistics survey of fisheries in the Marshall Islands, and a village fishery survey and fisher creel survey in Samoa.

Types of controls that can be used to regulate fisheries were discussed at length. *Input controls* involve limiting the amount or type of fishing, such as by issuing fishing licences or restricting the use of certain fishing gears. *Output controls* involve controlling fish catches, such as by setting size limits and minimum mesh sizes on nets, or by rejecting female fish caught. An increasingly important need is to protect fish habitats.

Next was a discussion on enforcement of fisheries regulations and who should do it. Where fisheries officers are the enforcers, this role brings them into conflict with their primary role as data and information collectors. Public education to raise awareness of the need to manage resources is required; penalties and fines should be regarded as a last resort.

Mr Tuilaula described legislation and the process followed to gain support for a new law from the Fiji Cabinet. He cited the example of the humphead wrasse, which 10 years of survey work in Fiji revealed to be a severely depleting species. He

noted the importance of consulting with different sectors (e.g. Fijian Affairs, Environment Department, NGOs) to ensure their support when a proposal such as banning fishing of humphead wrasse was submitted to the Minister for approval and presentation to the cabinet.

The development of management plans by communities is important in any management work. For community-based fisheries management specifically, communities develop and prepare plans, while the relevant government authority (e.g. Fisheries Department, Environment Department) facilitates the process.

A session on resource assessment and monitoring emphasised the need for scientific information in management. The multispecies and multi-method nature of fisheries makes management problematic; Western-style management approaches have had little success. Scientific assessment and monitoring should enhance existing community knowledge in management ventures.

Development of small to medium-sized enterprises was also presented as an essential component of coastal fisheries management and development.

The session on aquaculture looked specifically at the role of aquaculture in the management of fisheries, both in terms of re-stocking and of reducing pressure on existing coastal fisheries. One of the constraints against the development of aquaculture in the region is the lack of an aquaculture tradition in the Pacific, including the lack of associated legal frameworks, guidelines and national support. At the practical grassroots level, there is a lack of funds, capacity, seed sources, feed materials, marketing channels, and technical assistance and skills. Training in the culture industry, which differs significantly from the capture fisheries that most people are used to, is needed for fishers.

The importance of involving stakeholders (particularly fishers) in fisheries management was dis-

cussed. Fisheries co-management results in the ownership of management plans, as well as in greater compliance with rules and regulations. To involve stakeholders, extensive awareness work is needed so that people understand what the management initiative includes and so that communities are committed and can play their necessary role in the process.

Closing remarks were delivered by Mr Tuilaulala. He emphasised the importance of fisheries statistics and information in fisheries management. He said that the five-day meeting had been intense and had covered a wide range of areas and topics. The challenge was to apply the lessons learned to managing our declining resources. One of the key tools is catch and effort data, which provide baseline information on the state of our resources. In shifting effort away from fisheries, the importance of aquaculture cannot be overlooked. Although not covered in detail during the training, value-added processing is another area that needs to be supported and encouraged.

Mr Tuilaulala said that people in the Pacific have the answer to fisheries management; community participation is the key to workable management. With the shift from development alone to development and management, the focus in fisheries sector work has changed substantially. Now the emphasis is on conservation and reliance on communities is paramount.

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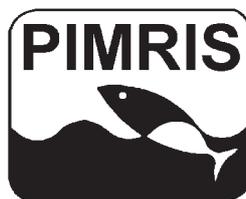
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