

SESSION FIVE: REGIONAL APPROACHES TO FISHING SAFETY



Fishermen in artisanal craft in Bay of Bengal (Photo courtesy of Dr. Yugraj Yadava)

IMPROVEMENT IN FISHER HEALTH AND SAFETY THROUGH POVERTY ALLEVIATION: A CASE STUDY ON THE INDUS BASIN FISHING COMMUNITIES IN PAKISTAN

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Abstract

The socio-economic conditions of traditional fisher communities in Pakistan are studied with special reference to the need for health and safety education for artisan fisheries in the Indus basin. The study indicates that poverty alleviation not only contributes to the welfare and prosperity of these fisher communities, but also promotes safety and occupational health by enhancing awareness. Supplementation of traditional fishing with aquaculture to diversify resource competition is suggested as a means of improving the socio-economic conditions in fisher communities. Health and safety issues are discussed as related to both small-scale fisheries and the aquaculture industry, including a variety of common hazards, from boat integrity to electrical safety, and from drug and chemical handling to WHIMIS training. Improvement and/or gradual replacement of primitive and unsafe fishing gear and technologies, coupled with education and training are suggested to promote fisher health and safety. Community participation and the role of nongovernmental organizations (NGOs) in promoting health and safety awareness are discussed with special reference to local cultural traditions of Southeast Asia. The paper will review the environmental disaster in the wake of the oil spill caused by the ship *Tasman Spirit*, which ran aground in August 2003 at the port of Karachi, and its impact on fisher health and the economy. This oil spill has devastated the coastal fisher communities who earn their livelihood from fishing in the Arabian Sea coast.

Introduction

Pakistan

Pakistan, a maritime nation, is endowed with rich fishery resources and potential. Pakistan is located along the northern shores of the Arabian Sea and has a coastline of about 1,100 km, with a broad continental shelf and an Exclusive Economic Zone (EEZ) extending up to 200 nautical miles from the coast. About 16,000 fishing boats operate in coastal areas in shallow coastal waters and offshore areas. These fishing boats undertake trips from a few hours to about 25 days, depending on the type of fishing. Total production from inland and marine waters is 590,000 metric tons.

Fishing plays an important role in the national economy of Pakistan. It provides employment to 336,000 fishers directly. In addition, another 400,000 people are employed in ancillary industries. It is also a major source of export income. In 2002-2003, fish and fishery products valued at US \$130 million were exported from Pakistan.

Marine resources define the life and livelihood of more than two million people in the coastal provinces of Sindh and Baluchistan, spread across 1,100 km between Sir Creek, bordering India in the east, and Jiwani, adjacent to Iran in the west. The largest concentration of marine fish harvesters and workers is in Karachi Division. The remaining Sindhi population of marine fishers is located largely in Thatta District. The Baloch fishers mostly reside in Gwader, with some found in Lasbela District. A large population of migratory inland fishers live in the Indus River basin, mostly near dams and barrages.

Fisher health and safety

Fishing has been regarded as one of the most challenging and dangerous occupations in the world. The International Labour Organization (ILO) and Food and Agriculture Organization (FAO) estimate that 7% of all worker fatalities occur in the fishing industry, despite the fact that the industry accounts for less than 1% of the worldwide workforce (Lincoln, Hudson et al. 2002). The ILO has estimated that 24,000 fatalities and as many as 24 million nonfatal injuries occur worldwide each year. The fatality rate of the world's fishermen is estimated to be 80 per 100,000 workers per year (ILO estimate). In the case of commercial fishing vessels, safety is a complex interaction involving humans (skipper, crew member, owner), machines (vessel, equipment), and environment (weather, management scheme) (Lincoln,

Hudson, and Conway 2002). The building blocks for artisan fisheries may be the same, but they have not been defined as clearly. Safety problems occur when a single element—human, machine, or environment—malfunctions. Human factors can include fatigue, inexperience, or nonuse of safety equipment. Machine factors can involve older vessels, such as in the case of the *Tasman Spirit*, which spilled oil off the coast of Karachi in August 2003, as well as inadequate safety guards for heavy machinery used in many fishing operations. Environmental factors can include harsh weather and slippery, unstable work surfaces (Lincoln, Hudson, and Conway 2002).

While there is no universal solution for fisher health and safety, strategies to prevent fishermen from being injured or killed on the job need to be explored through efforts such as improving vessel stability and hull integrity, making safety equipment such as survival suits and life rafts more widely available, implementing safer management regimes, understanding and heeding weather information, and averting falls overboard (Lincoln, Hudson et al. 2002).

The FAO reported increased fatalities in artisan fisheries in developing countries as a consequence of changes in the basic nature of fishing operations: overexploitation of coastal resources; advances in vessel and fishing technologies, including motorization and new types of fishing gear; lack of training, experience, and skills; commercial pressure; etc. Where inshore resources have been overexploited, fishers are often opting to work farther away from shore, sometimes for extended periods of time, in fishing vessels designed for single-day, inshore fishing operations (Food and Agriculture Organization 2000). Small-scale fisheries are particularly vulnerable to worker injuries (Ben Yami 2002).

While the general principles and strategies for improvement in health and safety of these artisan fishers are the same as those of commercial fishers, the actual requirements for artisan fisheries can be modified according to the fishing culture and traditions in the area.

Safety problems of small-scale and artisan fisheries have received low priority, even in many industrial nations, and have been all but neglected in most of the others (Ben Yami 2002). The number of casualties is high in Pakistan and other developing countries where small-scale fish workers operate under conditions in which their vessels, safety and communication equipment, first aid, search and rescue, and early warning services are either inadequate or totally absent (Ben Yami 2002).

The consequences of loss of life fall heavily on dependants. In developing countries, the consequences can be devastating: widows have a low social standing; no welfare exists to support bereaved families; and, lacking alternate sources of income, widows and children may face destitution (Food and Agriculture Organization 2000). The present study shows that supplementing traditional fisheries with small-scale, land-based pond aquaculture provides alternate sources of income to poor fishers and bereaved families whose wage-earner perished while fishing. Small-scale integrated pond aquaculture not only diversifies the resource competition, it also helps in improving health and safety, through poverty alleviation, in these fishing communities. Experience has shown that instead of focusing on the individual fisher, the fisher community as a whole should be targeted for health and safety education. The village councils, fisher cooperative societies, and other NGOs can help governments disseminate health and safety education in these poor and largely illiterate communities. Reductions in casualties can be achieved through the concerted actions of fishing communities and organizations, national and subnational authorities, international organizations, and voluntary bodies (Ben Yami 2000).

Fishermen community safety: A Pakistan perspective

Risk to fishermen's communities

Residents of fishing communities are at direct risk of accidents and diseases because of direct contact with water, harsh environmental conditions, poor working conditions, polluted waters, and fish, which spoil easily and can carry disease. Fishermen, especially inland fishermen, live in makeshift villages on banks of rivers and reservoirs where sanitary conditions are very poor. They have no access to hygienic drinking water and are bound to drink water from reservoirs, dams, rivers, and streams, which are becoming more and more polluted by growing industrialization and human population pressures. There are no latrine facilities in these villages. Because of the lack of availability of proper medical facilities in fishing communities, mother and child mortality rates are quite high.

Poverty alleviation projects: Participation approach

Community development in fishing areas should be taken on from a grass-roots, bottom-up approach, as opposed to the conventional approaches of development planning. Such an approach would entail, first, the direct involvement of small-scale fishermen in problem-solving through dialogue and, second, the participation of small-scale fishermen themselves in project

formulation and implementation. Placing small-scale fishermen at the centre of the policy will not only ensure participation, but will also permit the socio-economic and cultural needs of the communities to be taken into account and their own priorities respected.

Development of fisher communities also depends on availability of resources. Projects should be all-encompassing, involving and integrating agriculture and other land-based projects.

The basic purpose of a poverty alleviation programme should be to improve income opportunities in fishing communities, both within and outside the fisheries sector, and improve the standard of living. To succeed, the programme requires strong and independent fisher organizations and cooperatives that can function as pressure groups for community development. The government has attempted to initiate changes at the level of fishing cooperatives to enable them to participate in the new development programmes. Fisher cooperatives should be used as an instrument to improve fisher welfare. There should be small and medium enterprises (SME) banks to provide easier access to credit and initiate schemes to improve the common welfare of these target communities.

The scope of such programmes should include developing fisheries resources in accordance with sound fisheries management practice; generating employment opportunities in the fisheries sector by expanding and modernizing fish production and related secondary industries; and supervising, promoting, and undertaking the economic and social development of fishermen associations.

Fishermen in inland waters are primarily hired by river and reservoir fisheries contractors on a percentage basis. The fishermen cooperatives on their own can contract with fishers, after securing loans and credit from SME banks, which increases income-generating possibilities by eliminating middlemen.

Improvement of health and safety through poverty alleviation projects

The projects should include improving the availability of safe drinking water by providing hand pumps, improving sanitary conditions by building public latrines and appropriate locations to dump fisheries wastes, promoting

health facilities through visits by mobile health workers, establishing health centres, and training and educating fishers in basic health.

Community participation

A high level of participation by fisher folk is essential for promoting health and safety in fisher communities. Fishers from poor communities with low literacy rates and socio-economic conditions fish Pakistan waters. The working conditions for these people are appalling, as they have little or no access to basic civic amenities. Generally, these communities grow in isolated and neglected settlements, neighbourhoods, or villages near the coastal towns. While land-based agriculture is the profession of the majority of Pakistanis (74%), fishing is generally seen as a dirty and polluting activity.

Poor fishing communities are seldom in a position to win their own means of production, and thus they have to work on a share basis for the owners of larger boats and nets. The women often make the nets in the fishing communities on behalf of the boat owners, who can procure or invest in the cottage industry of twine making. The fishers, being largely illiterate, lack modern education and only possess traditional knowledge and skills, hindering their emancipation.

Most professional fishers own only their household plots, which are small. A few own additional cultivable land, but many are absolutely landless. It would appear that the fishing communities are very homogenous. This, however, is not the case. They all share a low-status position, but some of the fishers do own boats (although mostly smaller, local ones), nets, and land. Some are more influential with the people in the larger community who control resources, such as markets, and thus gain economic and political influence and benefits.

Assets in the fishing sector are, to a large extent, owned by the middlemen in the fish trade, "aratdars," landowners (in the more rural areas), and businessmen. With the increase in profits following the increase in mechanization and better marketing, investments in the marine fishing sector seem to be by district. This has led to an increase in the incomes of the professional fishers who are experienced in operating the larger, mechanized boats. In parts of these districts, it is said, the daily wage of a professional fisher is about 100 rupees; as a comparison, daily wages for agricultural wage labour is 30-60 rupees in the same area. But the changes have happened fast during the last few years, and too little is known about their effects and impacts.

Most of the marine fishing communities and fishing households still have to be regarded as very poor and vulnerable. The communities are not integrated in the development activities benefiting other communities, and the households very often have to operate using survival strategies.

Fishing is a seasonal activity, and this means that the majority of poor fishing families are seasonally and in times of emergency are severely short of money, to the extent that most will have to borrow money to eat. This, in turn, makes them dependent on some source of quickly disbursed credit, usually from one of the employers or traders in the fishing sector. The dependency of working fishers is reinforced, and, in terms of working relations and trade, is of advantage to employers and intermediaries. Any strategy to improve the terms of trade for poor fishermen, or increase their incomes, must take such factors into account.

Women in fisher communities

Fisher communities are somewhat liberal compared to other communities and tribes in Pakistan and could be considered to be female dominated. The main city and port of Pakistan, Karachi, was initially inhabited by fishers and was named after an elderly fisherwoman, Mai (lady) Kolachi, who sold fish oil to neighbouring countries. Interestingly, children in fisher communities are called by their mother's name instead of their father's. Neighbourhoods, too, are named after mothers. The mother is in charge of all the family matters, including matchmaking and wedding arrangements, going to the markets, and looking after the cattle when the men are away at sea during the fishing seasons. They make handicrafts for home use and sale as an additional income source. Women and their families also accompany the men on sea-fishing expeditions. They participate in preparing fish nets and shelling shrimp. In Sindh Province, on Kinjher Lake, and in the Indus Delta area, fishermen live in traditionally built houseboats. All activities, ceremonies, and celebrations are confined to water.

Role of NGOs in fishermen's community development

The increasing concern with poverty alleviation for poor fishers, with popular participation in development activities, has brought attention to the role played by many NGOs. There are only a few NGOs working for the betterment of fishing communities. The biggest one is the Pakistan Fishermen Cooperative Society, which is actually under government control. The most ac-

tive and popular one is the Pakistan Fisherfolk Forum. There are few others that confine their activities to specific geographic areas, including Banh Beli (working in the Indus Delta area), Sawani Sanjh (working at the River Ravi), the Sustainable Aquaculture Development Foundation (SADAF) (working in the Punjab area), the Human Rights Commission, and the Peoples Right Movement (Karachi area).

The government has realized that poverty alleviation and development in fisher communities cannot be successfully achieved without the popular involvement of communities and the NGOs. The development experience of the last 55 years has proven that NGOs have been more successful in reaching the target groups than more formal government development projects. The NGOs have been able to be more innovative and flexible in working within Pakistan's feudal agrarian society. Many of them have also been more successful in identifying the needs of the target groups and in finding ways to improve socio-economic conditions. The smaller area of focus and lesser bureaucracy helps NGOs create programmes with fewer formalities than governmental programs. It is suggested that international donors should strengthen the NGOs and university faculties to train and promote fisher health and safety in poor fishing communities in Pakistan.

Improving fishing conditions

Poverty among fishers could be alleviated by introducing aquaculture techniques in coastal areas, as well as along inland waters. This includes shrimp and finfish farming in coastal areas and in brackish water; cage and pen culture in lakes, reservoirs, and dams; and fish farming in river plains. Efforts should be made to change traditional fishing gear, crafts, and techniques to modern ones. During the last 15 years, aquaculture in Pakistan has increased at a rate of 8% per annum, especially near the Indus River basin.

Building large, small, and minidams is among the government's top priorities. These dams could provide water for irrigation, on one hand, and also become a source of income for fishers, leading to improved socio-economic conditions in the fisher community along the Indus Basin. Special attention is being given to study the projects' effects on fisheries and the environment. Regular stocking is being done in existing reservoirs and barrages by government agencies and private investors, and fish production from these reservoirs has increased significantly in recent years. At this same time, however, coastal fish farming is a neglected area and requires immediate attention to train fisher communities in aquaculture and new fishing methods.

Boat building and mechanization

In the aftermath of the 2003 monsoon cyclone that destroyed many fishing boats and caused scores of fatalities on the open sea, Pakistani fishers looked toward international assistance to address the grave issues of health and safety. An international project to build and distribute improved motorized fishing boats is part of an effort to encourage commercial artisan fishing, improve boat and motor technology, and improve the income of poor fishers, who are routinely hit by cyclones. The government has provided facilities for training in boat building at Karachi, and similar facilities are planned in Baluchistan Province. In addition, however, improvements in supplies, services, and marketing of the catch from fishers need immediate attention.

Case studies

Plight of shrimp peelers

The peeling industry is predominantly made up of women. The shrimp perish fast when warmed, so peeling has to be done prior to noon time—working hours are mostly from 4 a.m. to midday. There are no set working hours for the workers. Peeling is performed primarily with bare hands. Rubber boots, gloves, or any other protective clothing are unheard of. For this reason many of the workers' hands are covered with cuts, but for fear of losing their jobs, the workers hide these wounds. The working environment is damp and dingy. Most common health problems are back pain, swollen hands and feet, infections, and allergies. Sitting in an unchanging position for long hours causes many of these workers to develop spinal column trouble. This problem can prove very serious for pregnant women.

Oil spill: An environmental disaster for fisher communities

The running aground and final breaking up of the 24-year-old oil tanker *Tasman Spirit* in August 2003 caused a major environmental disaster in the heart of the coastal fishing communities of Pakistan. The oil was imported by a government-owned refinery in an old, single-hulled ship chartered by the Pakistan Shipping Company. The oil spillage along the Karachi coast continues to threaten Pakistan's US \$130 million annual seafood export trade. The Marine Fisheries Department, Karachi Port Trust (KPT), Karachi Fish Harbour Authority, and other agencies concerned failed to control the oil spill. The fishers were directly exposed to the dangerous crude petroleum vapours, and they are feeling respiratory, eye, and skin problems.

Presently, the Karachi Fish Harbour caters to the needs of around 2,300 boats with an annual catch of around 650,000 tons of fish and shrimp.

Through export of seafood, most of which goes to European countries, the harbour earns around 150 million dollars annually. The first victim was the Harbour. The spill entered and filled the entire harbour area, creating pollution and environmental hazards for the fishers. Located at the far end of the Karachi port toward the West Wharf, the harbour had started giving off the foul smell of the oil. On the other side, concerned authorities had issued directives to the fishers not to light any fires, something they normally do to cook their food.

Since the fish and shrimp breeding season was still on, most of the fingerlings, which normally stay near the coastline, may have been killed. The negative impact of the disaster may not be immediately visible on marine life, but next season's harvesting of fish and shrimps could disclose the true story. The immediate effect would be on crab, which once lived near the coast.

Authorities used chemicals to contain the spill. The chemicals would settle the oil on the sea bed, directly affecting marine life, particularly shrimp, underneath the water. Although the Karachi Fish Harbour was already polluted, the oil layer over the sea water was more hazardous and damaging to the ecology and marine life than previous levels of pollution.

Foreign buyers are losing confidence in Pakistani seafood as more than 20,000 tons of crude oil has been spilled into the sea, damaging the mangrove forest, coral reefs, and breeding grounds of thousands of tropical and other fish species. The coastal fisher communities and artisan fishers are devastated by this environmental catastrophe. It has resulted in health problems and disease, a drastic decline in fish catches, and deterioration in socio-economic conditions of this vulnerable community. The fisher communities along the coastline where the oil tanker *Tasman Spirit* broke apart have complained of severe irritation to their eyes, respiratory problems and breathlessness, headache, drowsiness, choking, and throat irritation.

The extensive damage done to marine life and ecology needs to be evaluated, penalties need to be imposed on the responsible parties, and insurance damages for the fishers and environment be realized.

Dispersants, booms, and skimmers

Pakistani authorities were ill prepared for a possible salvage operation of the grounded oil tanker. The tanker grounded on July 27 and finally broke into two pieces on August 15, 2003. During this period, 70,000 tons of crude oil

could have been shifted to other ships, avoiding the environmental disaster.

Dispersants to emulsify oil and minimize the impacts of oil pollution and other environmental hazards are ineffective and again unsafe for coastal communities. The debris and sand mixed with crude oil should be removed and safely disposed of. Oil booms, skimmers, dispersant spray systems, and other response equipment were not available until after the ship became grounded. Oil spill response teams were untrained and unprepared to deal with the crisis.

The geo-politico-economic location of Pakistan has placed it on the oil route of the world. An area of the Arabian Sea is identified as Pakistan's EEZ, and approximately 80% of the world's oil traverses it to be loaded at ports serving the oilfields of Iran, the Arabian Peninsula, and the Gulf States. The tremendous economic advantages have not been shifted to the fisher communities whose habitats and livelihoods are affected by the perils of the sea, including oil spills and shipwrecks.

The federal government did not approve Marine Security Agency's Oil Spill Plan, a proposal prepared in 2000. It had proposed to purchase US \$5 million worth of oil spill control equipment, a pollution control vessel at the cost of US \$20 million, and some US \$10 million for the training of the personnel and the purchase of oil spill dispersing chemicals.

References

Ben Yami M (2002). Safety in small-scale fisheries: What is to be done? *In Proceedings of the International Fishing Industry Safety and Health Conference* (Woods Hole, Massachusetts, Oct. 23-25, 2000), Lincoln JM, Hudson DS et al., eds. Cincinnati, OH: National Institute for Occupational Safety and Health. DHHS (NIOSH) Pub. No. 2002-147.

Food and Agriculture Organization (Rome) (2000). Selected issues facing fishers and aquaculturists. The state of world fisheries and aquaculture. Parts 1 and 2, pp. 1-64.

Lincoln JM, Hudson DS, and Conway GA (2002). Executive summary. *In Proceedings of the International Fishing Industry Safety and Health Conference* (Woods Hole, Massachusetts, Oct. 23-25, 2000), Lincoln JM, Hudson DS et al., eds. Cincinnati, OH: National Institute for Occupational Safety and Health. DHHS (NIOSH) Pub. No. 2002-147.

THE NEED FOR LEGISLATION TO IMPROVE SAFETY AT SEA FOR SMALL FISHING VESSELS: THE CASE OF THE PACIFIC ISLAND STATES

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Introduction

For the people of the Pacific Island States, fishing forms an integral part of their culture. The Pacific States covered in this paper are the 14 independent nations of the Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu. For the purposes of this presentation, “small fishing vessels” refers to fishing vessels under 12 metres in length, motorised or nonmotorised. Fishing by Pacific Islanders is undertaken primarily in these small fishing vessels. It is therefore imperative that adequate regulations are in place to ensure the safety of the users of such vessels. The purpose of this presentation is to provide insight into the status of sea safety laws in the Pacific Island States through the following steps:

Examine the laws that provide safety measures for small fishing vessels.

Highlight the laws that do not provide safety measures for some small fishing vessels.

Suggest ways to incorporate and implement appropriate safety-at-sea legislation for such vessels.

Develop an understanding of the significance of fisheries resources to the Pacific Island States that will substantiate the need for safety measures to protect local fishermen adequately.

Significance of fisheries resources to the Pacific Island States

The geographical composition of these states plainly illustrates the rationale behind the significance they place on fisheries resources. With the exception of Papua New Guinea, these Pacific Island States are predominantly a collection of large Exclusive Economic Zones (EEZs) dotted with small islands.

The EEZs of the Pacific Island States account for 19.8 million square kilometres (Food and Agriculture Organization 1997b). In contrast, their land area amounts to just over 527,000 square kilometres, 88% of which is held by Papua New Guinea (Secretariat of the Pacific Community 2003b). Hence, most of the communities of these states are coastal in nature. The dramatic land-to-sea ratio of these Pacific Island States is clearly exemplified by Kiribati. Kiribati only has 811 square kilometres of land while its EEZ covers 3.55 million square kilometres (Secretariat of the Pacific Community 2003b). Thus, it is no surprise that marine resources form the core of Kiribati's economy. Fishing provides approximately 80% of Kiribati's households with a livelihood (World Bank 2000b).

The foremost significance of oceanic resources to these coastal communities is as a source of food. An estimated 50 kilograms of fish per person is consumed annually (World Bank 2000a). It is also estimated that in the last two decades, the annual per capita consumption is an average of 140 kilograms in Kiribati and an average of 115 kilograms in Tuvalu (Food and Agriculture Organization 2002c, f). This is considered high by world standards, especially when one considers that by comparison the average Australian is estimated to consume 8 kilograms per year (Food and Agriculture Organization 1997a).

As a consequence of their meagre land base, the Pacific Island States have limited land resources. However, these are prone to natural disasters, such as cyclones (most common), earthquakes, landslides, volcanic eruptions, and tsunamis (see note a). Such disasters could lead to several problems, including the destruction of the agricultural sector (see note b.) All these factors intensify the significance placed on fisheries resources.

Small fishing vessels operating in the Pacific Island States

Vessels operating with a Pacific State as a base are (1) motorised and non-motorised local fishing vessels and (2) locally based foreign fishing vessels. Locally based foreign fishing vessels are specifically defined in the laws of the Pacific Island State (see appendix for more information about locally based foreign fishing vessels and related safety concerns). Table 1 clearly illustrates that the majority of vessels in the Pacific Island States consists of motorised and nonmotorised artisanal fishing vessels.

Table 1: Estimates of the number of fishing vessels in the Pacific

Location	Locally based vessels (Gillett 2003)	Motorised artisanal fishing vessels (McCoy 1991)	Nonmotorised artisanal fishing vessels (McCoy 1991)
Cook Islands	10L/L	200	120
Fiji	96 L/L; 1 P/L	1,600	400
Fed. States Micro.	34 L/L; 8 P/S	2,000	600
Kiribati	2 L/L; 1 P/S	600	5,000
Marshall Islands	54 L/L; 5 P/S	500	250
Nauru	1 L/L	100	80
Niue	100 skiffs	60	240
Palua	71 L/L; 1 P.S	700	40
PNG	40 L/L; 24 P/S	8,000	10,000
Samoa	153 L/L	80	100
Solomon Islands	8 L/L; 2 P/S; 12 P/L	1,800	5,000
Tonga	26 L/L	800	200
Tuvalu	20 skiffs	200	500
Vanatu	10 skiffs	250	500
Total	495 L/L; 40 P/S; 14 P/L	16,890	24,530

(P/L = Pole and line vessel; P/S = Purse seiner; L/L = Longliner)
Source: R. Gillett, Aspects of Sea Safety in the Fisheries of Pacific Island Countries, Rome: FAO, 2003, 12 (see note c).

The most commonly used local fishing vessels in these Pacific states are canoes and small outboard-powered craft under 12 metres in length. For example, in Niue, the most common crafts are one-man outrigger canoes. The largest fishing vessels are 8.5-metre aluminium catamarans (Food and Agriculture Organization 2002b). In the Marshall Islands, canoes are extensively used for subsistence fishing, while 4.5- to 6-metre craft powered by outboard motors are mainly used in artisanal fishing (Food and Agriculture Organization 2002a).

Research indicates that small fishing vessels are the most vulnerable to safety-at-sea incidents (McCoy 1991; Gillett 2003). An estimated average of one incident of distress per day is reported to search-and-rescue groups (McCoy 1991). Due to communication problems and the remoteness of many islands and villages, this number is likely to be higher (McCoy 1991). Hence, it is critical that appropriate legislation ensures the protection of local fishermen and that this legislation is enforced.

Many of these small fishing vessels are also used for other tasks during which incidents of distress can occur (McCoy 1991; Gillett 2003). The most common alternative use of these vessels is as inter-island transport. For example, in the Federated States of Micronesia in April of this year, four locals transporting supplies from one main island to their home island 60 miles away spent 57 days drifting before they were spotted and brought back to safety (Federated States of Micronesia 2003). Another incident in the Solomon Islands involved a small vessel with five passengers who had gone to a neighbouring main island to do banking. This vessel ended up drifting for 13 days (Pacific Islands Report 2002b). In Fiji, what was meant to be a half-hour return journey on an outboard-powered punt for five villagers following a shopping trip on one of the main islands turned into 13 days adrift at sea. The vessel had no flares or radio and insufficient water and food on board (Pacific Islands Report 2002a). The various uses of small fishing vessels stresses further the need to ensure that safety measures are in place.

Legislation in the Pacific Island States dealing with safety at sea

The relevant legislation containing safety measures for fishing vessels is found in the fisheries and shipping laws of these island states. Apart from Niue, the Pacific Island States generally establish any detail concerning safety measures for vessels in their laws governing shipping. In the major-

ity of these Pacific states fisheries laws, the extent of providing safety for small fishing vessels is to make it a precondition of licensing to (1) comply with relevant national laws governing shipping or navigation in Papua New Guinea, Nauru, Tonga, and the Cook Islands or (2) obtain a seaworthiness or safety certificate under the shipping laws in Kiribati, Samoa, the Solomon Islands, Tuvalu, and Vanuatu. Fiji's and Palau's fisheries legislation does not cover safety at sea. The Federated States of Micronesia and the Marshall Islands fisheries laws broadly state that a license will be denied where the vessel "does not meet required safety standards." However, no such safety standards have been stipulated. Moreover, safety at sea does not appear as an objective of fisheries management in most of the Pacific states. Niue is the only Pacific state that dedicates a part of its Domestic Fishing Act to safety at sea. This reflects Niue's priority to cater expressly to safety at sea for its local fishermen. A possible reason for the other Pacific states not highlighting the profile of safety at sea is that, as developing states, it is common for the objectives of their fisheries laws to focus on maximising economic development and the sustainable use of the fisheries resources (see note d).

With regard to their fisheries and shipping laws, these states can be divided into two categories:

- States whose safety measures cover all small fishing vessels and
- States whose safety measures cover only some small fishing vessels.

Pacific Island States whose safety measures cover all small fishing vessels

The legislation of Pacific states rarely covers all small fishing vessels. Samoa is an exception to this (see note e). Its regulations apply to all vessels less than 15 metres in length (see Section 2(1), Samoa Shipping (Small Vessels) Regulations 1998.) These regulations, therefore, cover canoes and other small vessels that are used in near-shore fishing for subsistence purposes. The Minister of Transport does, however, have the authority to exempt any vessels from the operation of these regulations or any class of vessels (Section 2(2), Samoa Shipping (Small Vessels) Regulations 1998). These regulations also cover the popular 9- to 10-metre *alias* (aluminium catamarans) powered by outboard motors, as well as catamarans and monohull longliners between 10 to 15 metres long, which operate outside the reefs and offshore.

Initially, *alias* were generally used in bottom fishing inshore (see note f). However, due to the increasingly heavy exploitation of inshore resources,

fishermen began seeking resources offshore, especially highly valued tuna. This led to the construction of larger, yet unstable, catamarans. The result was an increased loss of lives at sea, most of which involved catamarans (Secretariat of the Pacific Community 2003b). It is for this reason that the 1998 shipping regulations were introduced. These detailed regulations have made a significant difference to the safety at sea of Samoan fishermen. It would be useful to point out some of the safety measures in these regulations to illustrate the extent of safety measures applied in one of the Pacific Island States.

Under these regulations, fishing vessels in particular must be licensed and hold a seaworthiness certificate, as well as a small vessel safety certificate (see Section 3(1)-(2), Samoa Shipping (Small Vessels) Regulations 1998). These certificates are issued by the Secretary of Transport. An application for such certificates must be accompanied by another certificate from the Department of Labour which affirms the vessel's compliance with occupational, safety, and health requirements (see Section 3(3), Samoa Shipping (Small Vessels) Regulations 1998). A fishing certificate may be refused by the Secretary of Transport when the vessel

- ♦ Does not meet the requirements in these regulations.
- ♦ Is not seaworthy.
- ♦ Is not equipped with the requisite safety equipment as stated in these regulations.
- ♦ Is not constructed by authorised vessel builders.
- ♦ Is, in the Secretary's opinion, a threat to life, property, or the environment (see Section 3(4), Samoa Shipping (Small Vessels) Regulations 1998).

The specifications and construction plans to build a vessel must be submitted to the Secretary of Transport for his approval (see Section 5(1), Samoa Shipping (Small Vessels) Regulations 1998). Also, small fishing vessels operating within 20 nautical miles offshore are required to carry specific safety equipment, including the following:

- Lifejackets for every person on board.
- Appropriate marine compass.
- Storm (sea) anchors.
- Parachute rockets, flares, and smoke signal.
- VHF marine radio with the appropriate channel.

Engine spare parts and tools for repairs at sea.

First-aid kit.

Fire extinguisher.

Survival rations or food and potable water for all persons on board, sufficient for at least 3 days.

Waterproof handheld torch or mounted searchlight.

The regulations also provide specific requirements for the manning, training, and certification of crew (see Section 7, Samoa Shipping (Small Vessels) Regulations 1998).

The life-saving changes resulting from these regulations can be clearly illustrated in Table 2. This table shows that the number of fatalities at sea significantly dropped and continually decreased after the 1998 introduction and active implementation of these regulations.

Table 2: Statistics of Samoan fishermen lost at sea

Year	Number of fishermen lost at sea
1988	22
1997	17
1998	7
1999	6
2000	5
2001	3
2002	0

Source: Secretariat for the Pacific Community (2003a), 'A Samoan success story', in Regional Maritime Programme Newsletter Issue 19 (March 2003), 3; the 1988 figure was provided by F. Lafoai, Head of School of Maritime Training, Samoa (11 September 2003).

The success of these regulations in minimising, and in 2002 eliminating, the loss of lives at sea is attributed to the regulations, discussions with stakeholders, and extensive follow-up work in the form of a training and education programme (Secretariat of the Pacific Community 2003a). In this regard, Samoa's regulations and the implementation process that followed are highly commended and provide a positive example for other Pacific Island States.

States whose safety at sea measures cover only some small fishing vessels

Most of the Pacific Island States fisheries and shipping laws only apply to certain types of small fishing vessels. The most common type of exemption in these states' laws is vessels under a specific length. For example, Tonga's Fisheries Act does not apply to vessels under 6 metres, and its Shipping Act does not apply to vessels under 8 metres. Vanuatu's Fisheries Act does not cover fishing vessels under 10 metres, and its Shipping Act excludes boats whose sole means of propulsion is through manpower. Similar exemptions are made in most of the other Pacific Island States. In doing so, these laws exclude numerous small fishing vessels from their scope of regulation and, as a consequence, only require some small fishing vessels to carry safety equipment. In Kiribati and Tuvalu, such exemptions result in the exclusion of most, if not all, privately owned fishing vessels, which are used for inshore and offshore fishing for commercial and subsistence purposes (see note g).

Another common method of exempting some small fishing vessels in these states' laws is to exclude those small vessels, often canoes, that fish on a noncommercial basis. For example, the Solomon Islands Fisheries Act and Shipping Act only cover vessels that fish on a commercial basis, and Niue exempts canoes from its Domestic Fishing Act and subsidiary legislation. This is of critical concern, considering that most local fishing that occurs in the Pacific Island States is for noncommercial or subsistence purposes (World Bank 1996; Food and Agriculture Organization 1997a, b). There is no rationale for making a craft used for commercial purposes safer than a craft used solely for subsistence means. Exempting such vessels could prove perilous for subsistence fishers. For example, by exempting canoes from its domestic fisheries laws, Niue excludes the most common craft used for subsistence fishing. This lacuna in the law is underlined further by there being 200 canoes as compared to 62 registered local fishing vessels (Food and Agriculture Organization 1997b). Also, in the late 1990s in Niue, two of the four incidents resulting in fatalities at sea involved canoes (the other two involved diving) (Secretariat of the Pacific Community 1999).

An obvious reason for the exemption of smaller fishing vessels and canoes from the scope of most of these states' laws was highlighted in a 1991 FAO study. This study found that officials in most of the Pacific states generally believe that it would prove impossible to enforce any safety regulations on such vessels (McCoy 1991). Most Pacific states consist of several islands that are remote from the main islands, resulting in communication and enforce-

ment problems. Another reason for the exemption could be that small fishing vessels tend to fish close to shore and are less likely to be involved in sea safety incidents. This deduction overlooks the fact that small fishing vessels continue to venture offshore to fish, not just for commercial purposes, but also for subsistence means, e.g., in Tonga and Tuvalu (Preston, Chapman et al. 1987; Gillett 2003).

It has been established that there are threats of overfishing in some Pacific states' coastal areas and lagoons (World Bank 2000b). Coupled with the cash economy, this may entice more users of small fishing vessels to pursue fishing offshore and thereby carries implications for their safety, as was the case in Samoa.

Suggestions on ways to improve safety at sea for users of small fishing vessels

The following suggestions could assist Pacific Island States in taking steps toward promoting and improving the safety of local fishermen. These suggestions are grouped into three steps:

1. Groundwork for any changes to the law,
2. Establishing safety laws, and
3. Implementing and enforcing such laws.

Groundwork for any changes to the law

1. A prerequisite to amending any of these Pacific states' laws is extensive consultation with individual fishing communities regarding existing small fishing vessels and equipment and the scope of their use.
2. Data on sea-safety incidents must be collected and documented to establish an informed view on which vessels are vulnerable at sea (Gillett 2003). In the villages or remote islands, much of this information will be based on oral information. These data could also be collected from the relevant government authorities responsible for search-and-rescue operations.
3. Such information allows any consequential amendments to the law to be adapted to fishers' real-life situations to improve their safety at sea and complement, rather than radically change, their existing fishing customs. This would also promote their compliance with such laws.

4. Local officers already based in fisheries divisions in the outer islands should be employed to facilitate such meetings. Meetings in villages could be conducted through the use of local authorities and traditional village gatherings such as a *fono* in Tonga.
5. Based on the findings of such consultations, any small fishing vessel considered to be vulnerable to safety-at-sea incidents must be included in the scope of application of the fisheries or shipping laws.
6. It is critical that to change the law in any of these island states, political support must be sought to highlight the need for any safety-at-sea measures (Gillett 2003). This could be encouraged through a workshop to which national and local leaders are invited. Information on the extent of safety-at-sea incidents and the cost to government of search-and-rescue operations could be presented at this workshop. This could prompt political leaders to direct any necessary funds for search-and-rescue operations.
7. The extent of safety-at-sea incidents should be publicised. This will contribute to highlighting safety at sea for local fishermen at a national level.

Establishing safety laws

8. Any subsequent actions resulting from this information must still involve local input. In Pacific Island States with outer islands and remote communities, it is critical that fisheries officers continue to work together with village leaders, as well as the fishermen themselves, as they could assist in tailoring any rules more closely to community needs (World Bank 2000b).
9. The Regional Maritime Programme of the Secretariat of the Pacific Community has established some model maritime regulations that should be consulted when drafting safety-at-sea measures. Such model regulations can be tailored to each states' particular needs. Some Pacific states are already using these model laws as a basis, such as Palau, which currently has an Admiralty and Maritime Bill before its Congress (Moses 2003).
10. Any safety rules must be kept simple. It has been found that "simple management rules work best" (World Bank 2000a). The simpler the rule, the more easily understood and followed.
11. Domestic legislation that is seen to be relevant to the community and endorsed by village leaders as local rules achieves the most compliance (World Bank 2000b). It is, therefore, imperative that local awareness programmes target village leaders to promote compliance with safety at

sea measures.

12. Safety at sea needs to feature prominently in the Pacific Island States' fisheries laws. One of the obvious ways to do this is by incorporating safety at sea as a fisheries management objective, not only in the principal acts governing fishing, but also as one of the priorities in the work agenda (Turner and Petursdottir 2002; Gillett 2003). This will serve to elevate the status of safety at sea and encourage the channelling of resources to this significant area.

Implementing and enforcing safety laws

13. The role of enforcement is critical to the implementation of the law; otherwise, the law would be futile. The lack of enforcement capacity in most of these island states poses a problem. However, community leaders and members may assist in enforcement. For example, in Fiji, the Minister for Fisheries may appoint honorary fisheries wardens (see Section 3, Fiji Fisheries Act 1992), and in the Cook Islands, local fisheries committees and the island councils could assist (see note h). Such island councils can also be found in Kiribati (Food and Agriculture Organization 2002c). In the Marshall Islands, local governments are responsible for managing their coastal fisheries within 5 miles (see Section 43, Marshall Islands Marine Resources Act 1997). In Palau, each of its 16 states is delegated responsibility over its territorial waters (12 miles from shore) (see Section 2, Constitution of the Republic of Palau).
14. Wherever possible, it is also important to make use of traditional systems of authority within these coastal communities when implementing any new sea safety measure. The employment of such systems has proven to be successful for fisheries management initiatives in Samoa. Customary fisheries management in the Solomon Islands has also been effective (Food and Agriculture Organization 2002e).
15. The assistance of fishermen's associations should also be enlisted in drawing up any safety-at-sea measures. The involvement of such associations in this exercise is another means for publicising such measures to the fisher community. A useful strategy would be for fishermen to refuse to go to sea on unsafe vessels (Gillett 2003). Fishermen could, therefore, play a vital role in ensuring that boat owners comply with the law.
16. Effective deterrents for violations have proven to promote compliance with management rules. Governments should support "collaborative enforcement" with lower levels of government and local village leaders.

The publication of successful prosecutions and associated penalties will assist in promoting compliance (World Bank 2000a).

17. It is crucial to raise public awareness for safety at sea through appropriate media.
 - a. This can include news presenters on radio and television. Television and videos are most commonly found in urban areas, which is where most commercial fishing takes place.
 - b. Such presentations could highlight the human cost of failure to comply with the law through publicising actual safety-at-sea incidents or deliberate flouting of safety measures. For example, in Samoa a tragic incident in 2001 highlighted the need for government officials and boat owners alike to adhere to the safety regulations that had been enacted to protect local fishermen. An *alia* owner was granted a fitness certificate despite clear knowledge by both the officials and the boat owners that the *alia* was unfit to go to sea. Before setting off on the fishing trip, the fishermen had alerted the boat owners that a spare spark plug for the engine was needed, yet none was provided. The vessel also did not have any personal flotation devices or flares. The spare engine did not work, and the radio had no battery. Following engine failure, the vessel ended up drifting for 5 weeks. Only two of the four fishermen survived (Pacific Islands Development Programme East/West Centre 2001a, b).
 - c. Such awareness campaigns should be presented in the official or national language and wherever possible in the language or dialect of relevant communities.
 - d. This awareness campaign could target and utilise local authorities (often the elders in the village), women, children, and school-teachers. For example, in Nauru, school children participated in a maritime safety project to make them more aware of vessel safety requirements (Pacific Islands Development Programme East/West Centre 1998). The family and community networks within these Pacific communities can have positive implications for promoting safety-at-sea measures and assisting in their implementation.
18. It is also very important to support the safety at sea programmes in the various marine or maritime centres situated in many of these Pacific states.
19. Training within relevant government administrations is critical. This can occur on several levels.
 - a. The training of relevant government officers on the significance of safety at sea. This should include those responsible for search and

rescue to ensure they document safety-at-sea incidents thoroughly. In some states, such operations may be undertaken by one authority, such as the Navy in Fiji, whereas in states such as Tonga, it involves the Ministry of Police, the Ministry of Marine and Ports, and the Tonga Defence Services.

- b. Involving fisheries officers in implementing safety at sea programmes at a village level;
- c. The appointment of a fisheries officer at the head office whose role is to oversee the implementation of safety-at-sea requirements and act as the contact point for difficulties in implementation by local fisheries officers in the outer islands and local authorities.
- d. Developing long-term strategies within the mandates of fisheries' administrations to reinforce any such safety-at-sea measures (see note i). The financial situation of the Pacific state, especially that of the local fisherman when they need to obtain safety equipment, is a critical consideration in establishing any safety measures.

In conclusion, it is clear to see that the above suggestions need to be implemented in steps by individual Pacific Island States as short-term and long-term work strategies. These suggestions should prove useful when establishing appropriate legislation to improve safety at sea for the users of small fishing vessels in the Pacific Island States.

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References

Federated States of Micronesia (2003). Chuuk foursome survives six weeks at sea. News and Public Statements page, Federated States of Micronesia.

Food and Agriculture Organization, Fisheries Department (1997a). Fisheries and aquaculture in the South Pacific: Situation and outlook in 1996. FAO Fisheries Circular No. 907 FIP/C907.

Food and Agriculture Organization, Fisheries Department (1997b). Review of the state of the world fishery resources. Marine Fisheries 16. South Pacific Islands. Fisheries Circular No.920 FIRM/C920.

Food and Agriculture Organization, Fisheries Department (2002a). Fishery country profile: Marshall Islands.

Food and Agriculture Organization, Fisheries Department (2002b). Fishery country profile: Niue.

Food and Agriculture Organization, Fisheries Department (2002c). Information on fisheries management in Kiribati.

Food and Agriculture Organization, Fisheries Department (2002d). Information on fisheries management in the Solomon Islands.

Food and Agriculture Organization, Fisheries Department (2002e). Information on fisheries management in Tuvalu.

Gillett R (2003). Aspects of sea safety in the fisheries of Pacific Island countries. Rome: Fisheries Department, Food and Agriculture Organization.

Gillett R, McCoy M et al. (2001). Tuna: A key economic resource in the Pacific Islands. A report prepared for the Asian Development Bank and the Forum Fisheries Agency. Manila: Asian Development Bank.

Moses W (2003). Personal communication with W. Moses, manager of Palau's Maritime Safety Branch, Division of Transportation and Communication.

McCoy M (1991). Survey of safety at sea in Pacific Island artisanal fisheries. F. D. 91/3. Suva. FAO/UNDP Regional Fisheries Support Programme.

Pacific Islands Development Programme East/West Centre (1998). Nauru offers marine safety program to students.

- Pacific Islands Development Programme East/West Centre (2001a). Fishing Boat accident survivors welcomed home to Samoa.
- Pacific Islands Development Programme East/West Centre (2001b). Slack and ignorant: Samoa fishing boat owners attitude alarms.
- Pacific Islands Development Programme East/West Centre (2003). PNG maritime licences sold under counter.
- Pacific Islands Report (2002a). Five Fiji villagers survive 13-day ordeal at sea. Pacific Islands Development Programme.
- Pacific Islands Report (2002b). Five Solomon Islanders survive 13 days adrift. Pacific Islands Development Programme.
- Preston G, Chapman L et al. (1987). *Trolling techniques for the Pacific Islands: A manual for fishermen*. Secretariat for Pacific Development.
- Secretariat of the Pacific Community (1999). First SPC heads of fisheries meeting country statement–Niue. Information Paper 24. Noumea New Caledonia.
- Secretariat of the Pacific Community (2003a). A Samoan success story. Regional Maritime Programme Newsletter.
- Secretariat of the Pacific Community (2003b). Selected economies: A statistical summary.
- Talagi P (2003). Personal communication with P. Talagi, Crown Counsel, Niue.
- Tamate J (2003). Personal communication with J. Tamate, project officer, Forum Fisheries Agency, Solomon Islands.
- Turner J and Petursdottir G (2002). Safety at sea for fishermen and the role of FAO. *In Proceedings of the International Fishing Industry Safety and Health Conference* (Woods Hole, Massachusetts, Oct. 23-25, 2000), Lincoln JM, Hudson DS et al., eds. Cincinnati, OH: National Institute for Occupational Safety and Health. DHHS (NIOSH) Pub. No. 2002-147.

World Bank (1996). *Pacific Island Economies: Building a resilient economic base for the twenty-first century. A World Bank Country Study*. Washington DC.

World Bank (2000a). *Meeting challenges in the global economy: Report of the Commonwealth Secretariat/World Bank Joint Task Force on Small States*. Washington DC.

World Bank (2000b). *Summary report: Voices from the village. A comparative study of coastal resource management in the Pacific Islands*.

Notes

- a. Vanuatu alone recorded 29 cyclones between 1970 and 1985. A similar frequency of tropical cyclones is experienced by most of the other Pacific Island States. The common occurrence of natural disasters in the region is a grave concern as it severely hampers and disrupts economic and social development due to the high dependence of islanders on their natural environment (South Pacific Regional Environment Programme, South Pacific Programme Office United Nations Department of Humanitarian Affairs and Emergency Management Australia, *Natural Disaster Reduction in Pacific Island Countries Report to the World Conference on Natural Disaster Reduction: Report to the World Conference on Natural Disaster Reduction Yokohama, Japan 23-17 May 1994*, Australia: Emergency Management Australia, 1994, 5).
- b. Other problems include villages being wiped out, severe interruption to communication services and significant numbers of human fatalities (F. K Tevi, *Vulnerability: A Pacific Reality*, Suva: Pacific Concerns Resource Centre, 6).
- c. In June 2001, Niue had 200 canoes and 62 registered boats. The total does not include skiffs; the number of skiffs was only noted in countries where industrial tuna vessels are absent.
- d. Although safety-at-sea provisions may not feature prominently in most Pacific States fisheries laws, in general these same laws allow a recognised authority such as the Minister of Fisheries to enact any necessary regulations. Fisheries legislation often lists areas that may be regulated. Some laws specifically list one of these areas as safety measures for local fishermen and fishing vessels (for example in the Cook Islands, the Solomon Islands, and Tonga). These lists are nonexclusive. Hence, if safety measures are not expressly stated, the recognised authority can still stipulate such regulations.
- e. Nauru provides a second example of a state that covers all small fishing vessels in the scope of its legislation. Nauru's Fisheries Act 1997 covers small boats not more than 10 metres in length that are used or intended to be used solely in coastal or internal waters. Under Nauru's Fisheries Regulations 1997, small boats must be registered with the Ministry of Fisheries. The Chief Executive Officer of the Nauru Fisheries and Marine Resources Authority may register a small boat where he is satisfied, amongst other things, that the boat meets "acceptable safety standards" (standards required from time to time by the board of directors for the Authority or the Chief Executive Officer). One of the safety requirements is that the boat is fit for fishing or that the

boat carry a valid sea-going certificate or seaworthiness certificate as required under the laws governing shipping (section 15(2)(d) Fisheries Regulations 1997).

- f. The *alias* were a FAO design introduced in the mid-1970s (FAO, Fishery Country Profile: Samoa, Rome: FAO Fisheries Department, 4).
- g. Kiribati's Fisheries Act exempts vessels under 7 metres from the scope of its application. However, the vast majority of its offshore fishing (for commercial and subsistence purposes) is undertaken in vessels less than 7 metres (M. Miria-Tairea, *Fisheries Legislative Profile: Republic of Kiribati*, FFA Report 95/2, Honiara: FFA, 1995, 13). Similarly Tuvalu's Fisheries Act excludes vessels under 7 metres, yet there are no privately owned vessels over 7 metres operating in Tuvalu (Gillett, *supra* n.14, 20). On Tuvalu's main island Funafuti, 4-to 5-metre outboard motored skiffs are mainly used in trolling for tuna (FAO, Country Profile: Tuvalu, Rome: FAO Fisheries Department, April 2002, 5).
- h. Section 4-7 Cook Islands Marine Resources Act 1989. On one of its islands, Aitutaki island, a fisheries management initiative to establish marine protected areas failed due to the initial lack of community support. However, with the support of the traditional leaders, the Aitutaki Island Council, and the community, this initiative was eventually established. This underlines the significance in engaging traditional and local leaders support for fisheries management (Government of the Cook Islands, *Ministry of Marine Resources Annual Report for the Year ended 30 June 2000*, Cook Islands: Ministry of Marine Resources, 2000, 16). The responsibility of enforcing management measures lies with the Aitutaki Local Council (FAO, Information on Fisheries Management in the Cook Islands, Rome: FAO Fisheries Department, April 2002, 5).
- i. The need for continual reinforcement of fishing safety management initiatives was highlighted in McCoy, *supra* n. 14, 61.
- j. The 495 locally based vessels in 2003 do not include these skiffs.

Appendix : Locally Based Foreign Fishing Vessels and Some Safety Aspects

Definition

These vessels are generally defined in the Pacific Island States' laws as foreign vessels that are "based" in one of these Pacific states. Some of the island states vary as to the meaning of "base." For example, in the Cook Islands, this refers to a foreign vessel based in the Cook Islands or a foreign vessel based in another Pacific state and jointly operated by or on behalf of the Cook Islands' government and one or more other governments in the South Pacific region, under an agreement to which the Cook Islands is a party (see Cook Islands Marine Resources Act 1989, s.2). In Samoa, the vessel has to be based there and land "any of its catch in Samoa" (see Samoa Fisheries Amendment Act 1999, s.2). Similar to Vanuatu, Tonga defines such vessels as a foreign vessel "based in Tonga and landing all of its catch in Tonga" (see Vanuatu's Fisheries Act 1982 (Rev. Ed 1988), s. 1; Tonga Fisheries Act 1989, s. 2; Tonga's Management Bill 2002, s. 2.).

In mid-2000, there were 304 locally based foreign fishing vessels (above 15 metres in length) operating in the Pacific Island States. Most of these vessels were based in Palau (81) (Gillett, McCoy et al. 2001). In 2003, there were 549 locally based foreign fishing vessels, 495 of which are longliners. Most of these longliners are based in Fiji (96) and Palau (77) (Gillett, McCoy et al. 2001). Locally based foreign fishing vessels are mainly comprised of longliners, purse seiners, and pole and line fishing vessels. Skiffs from other states also operate as locally based foreign fishing vessels in Niue, Tuvalu, and Vanuatu (see note j).

Specific safety aspects relating to locally based foreign fishing vessels

1. Recently, Niue entered into a joint venture agreement with Samoa that entails 100 locally based skiffs fishing in Niuean waters (Tamate 2003). Niue's Domestic Fishing Act contains detailed safety provisions for its motorised small fishing vessels. This act also covers a commercial cargo vessel having a gross tonnage "less than five tonnes." A vessel, for the purposes of the act, refers to any boat, aircraft, ship, or other sea-going craft. Hence, these locally based foreign skiffs are covered by this act and its subsidiary legislation. It is imperative that the safety measures in Niue's laws are enforced on these skiffs so that the rise in sea safety incidents that occurred in Samoa (due to the pur-

suit of highly prized tuna and lack of safety regulations) is not repeated here.

2. Having said this, enforcement capacity in Niue, as in the other Pacific Island States, is very limited (Talagi 2003).
3. Some suggestions that have been made for local fishing vessels in the presentation can be applied here. For example, it is imperative that relevant government personnel fully appreciate the significance of safety at sea for seafarers through training. This is a crucial step toward promoting sea safety. Such training will help to avoid problems such as the sale of ship engineers' certificates to unqualified people by government officials. This transpired in Papua New Guinea and resulted in several safety incidents (Pacific Islands Development Programme East/West Centre 2003).
4. Some of the Pacific Island States receive an important source of revenue from their nationals working as seafarers on locally based foreign fishing vessels and foreign fishing vessels. Hence, maritime training programmes within these states and at the University of the South Pacific must be fully supported to ensure that the quality of training is in accordance with internationally accepted maritime standards. It is also imperative that such states provide adequate sea safety measures within their relevant laws to protect their nationals working on such vessels and ensure these laws are enforced. Sea safety measures can be made conditions of licensing or as terms of fishing access agreements.

CHILEAN SAFETY ASSOCIATION AND THE FISHING SECTOR

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First, I would like to express my gratitude for this opportunity to share the Chilean industrial fishing sector's experience with maritime safety.

At present, the Chilean Safety Association, with its 37,000 associated companies, oversees all the economic activities of approximately 1.5 million affiliated workers.

The Chilean Safety Association—Asociación Chilena de Seguridad (ACHS), which I represent—administers the Bill of Work of Accidents and Professional Illnesses. In Chile, three entities provide risk prevention, medical care, economic compensation, and vocational rehabilitation to their affiliated companies and workers. ACHS, the largest, represents 53% of the industry's workers.

The fishing industry in Chile ranks third in total exports for the country, representing 12%, immediately behind the mining and fruit industries.

The technological advancements within the Chilean fishing industry have led to more automated methods for harvesting and processing the resource. This implies the industry is operating more efficiently, but work tasks and risks have changed, leading to changes in crew requirements, continuous learning, and specified training.

Since 1992, fishing companies associated with ACHS have experienced fewer accidents, although the accident rate within the fishing industry still exceeds the accident rates associated with other industries. It is estimated

that accidents in the fishing sector cause our country direct and indirect losses of around US \$35 million a year.

Globalization and technological changes have produced enormous challenges that have resulted in important advances for Chile's industrial fishing sector. Because of modernization, fishing requires less physical exertion and brute strength, and subsequent exhaustion of crew members has been lessened. The accident rate, in turn, has decreased. Innovations in fishmeal plants have resulted in a more environmentally friendly industry, and investments in workers training and working conditions have led to improved operations and better worker performance.

The Chilean fishing sector is primarily made up of purse seiners (70%), trawlers (19%), and longliners (11%). The principal resource is pelagic fisheries. The principal fishing centers in Chile are located in the 1th Region (Arica and Iquique—northern area) and in the 8th Region (Concepción and Talcahuano—central southern area), accounting for 71% of the national fish landings. The fishing industry is made up of about 60 thousand workers directly related to fishing. During 2002, the fishing sector showed the greatest number of new jobs, with a 9% increase.

The Chilean fishing fleet is made up of 410 vessels, which caught more than 4.8 million tons in 2002. Forty percent of the vessels in the Chilean fishing fleet range from 101 to 400 gross registered tons (GRT), 50% of its vessels are under 25 years old, and 49% of these boats were built in Chile.

The work performed by Chilean fishermen is considered "heavy work." That is to say, "it is the kind of work which most rapidly damages workers physically, psychologically, and intellectually, causing precocious aging, though not generating professional diseases." This definition of heavy work was established by an Ergonomics Commission formed by representatives of the Chilean government, companies, and workers. The commission makes clear the interest of the Chilean legislation to protect and provide for the fishing vessel crews.

Regarding safety matters and the high occupational accident rate occurring in the whole sector, ACHS has developed effective safety programs to control risks in fishing companies, especially those taking place on board fishing vessels. Our indices indicate that 69% of the industry's accidents occur in fishing fleets and 31% in fishmeal processing plants.

Within the framework of support to companies associated with ACHS, our specialists have developed programs to assist the fishing sector, which resulted in a decrease of the accident indices from 24% in 1992 to 14% in 2002. We believe that this accident reduction is associated with the implementation of our plans, programs, and preventive measures, especially emphasizing the work on board commercial fishing vessels.

The incorporation of technological advances into fishing methods and practices has brought about other risks that must be made known to the crews. The working conditions on board fishing vessels have been improved, as has the quality of life, mainly in the areas of comfort and habitability. Companies and crews have understood that advances in accident prevention not only make work safer, but also allow the Chilean fishing industry to be more competitive with other fishing countries of the world.

In relation to factors associated with accidents occurring on board fishing vessels belonging to the companies associated with ACHS, an analysis of approximately 6,000 cases revealed the following:

- ✦ The crew members involved had been working at the company more than a year, and 62% had more than 1 year of experience with the job in which they were injured.
- ✦ Twenty-nine percent of accidents were classified “hit by/against objects”; “overexertion” accounted for 23%.
- ✦ Thirty-five percent of accidents resulted from moving or maneuvering objects.
- ✦ Hands and feet were the most frequently injured body areas, accounting for 19% and 18% of the accidents, respectively.

From the information obtained through the ACHS accident research and from other related statistics already in existence, accidents occurring to workers in the Chilean fishing industry result primarily from incorrect or deficient working methods and poor risk prevention training on both the management and worker levels. Other factors that may lead to fishing-related accidents include workers’ social and cultural characteristics; not taking safety training seriously, partially because of the implementation of more automation; lack of injury-prevention-related policies in companies; and finally, working atmosphere and environmental conditions, including rough seas and night work. Safety is not considered to be an isolated and specific problem, but an integral part of the administration and efficiency of a company. Active partici-

pation of all the people belonging to the organization is required, whatever their position in a company's hierarchy. This matter has significant importance on fishing vessels. It is urgent to change some paradigms and assumptions existing among the crews, such as "This work has always been done this way," "There is no other choice, so it has to be done," "The vessels cannot stop," or "Performance is first"—all assumptions that have delayed the full development of safe work on board fishing vessels.

The strategic plan developed by ACHS for the fishing sector has been directed to those areas still presenting a high accident rate. Training is mainly focused on the risks associated with the tasks performed on board the vessels or on the training required by the maritime authorities in relation to International Maritime Organization (IMO) courses. Primary focus and consideration is given to the following:

- ✦ Diagnosing the fishing companies' plants and fleet in order to know the degree of development of the Risk Prevention Administration, determination of its strengths and weaknesses, defining strategies that permit operations with acceptable risk levels.
- ✦ Obtaining written documentation of safety policies and how they are applied from company management.
- ✦ Obtaining descriptions of injury prevention programs from fishing companies.
- ✦ Training in the risks associated with industrial fishing, specifically maneuvering, casting of fishing nets, legal issues, and vessel rules.
- ✦ Acknowledging risks on fishing vessels reporting on-board conditions.
- ✦ Enforcement of SOLAS rules, supervised by the Chilean maritime authorities (life-saving equipment, IMO model courses).
- ✦ Performing emergency drills at reasonable time interval.
- ✦ Performing risk evaluations, principally in vessel machine rooms and taking noise levels into consideration.
- ✦ Forming a close relationship between ACHS and the maritime authorities in matters such as rules, courses, and certifications.
- ✦ Supporting crews by publishing information related to maritime safety, such as manuals and booklets, as recommended by the International Labour Organization.
- ✦ Producing videos about sea survival and maritime safety for the different fishing techniques used.

Finally, I would like to point out that to attain better safety levels on fishing vessels, it is necessary to increase the learning and training activities within the fleets, actions that must be carried out using simple, easy-to-understand vocabulary. Therefore, it should be understood that prevention is a continuous improvement task process based on a process of cultural changes within companies to include a safety culture.

ACHS has entered an agreement between our institution and an important insurance agency of Perú. The growth of the fishing industry in Perú is relatively new, and Chile has had a law of work accidents from 1968. Our experience with the subjects of safety and prevention of risk are very solid. This sharing agreement allows the ACHS to give from the experience and knowledge of more than 40 years.

The size of the fishing vessels and the type of fishing methods used by Peruvian fleets are very similar to those of Chile. Between Perú and Chile, an important technological interchange exists, as much in equipment for the flour plants as for fishing vessels. Let us remember that both countries are among the top five fish flour producers in the world. Perú and Chile have needed to develop and maintain a permanent interchange to allow the fishing companies of the region to produce with quality in accordance with environmental exigencies and within a safety culture. The consultant's office of the ACHS is charged mainly with visiting the fishing companies of Perú and fish flour plants, processors, and fleets in their different ports—Paita, Chimbote, Pisco, and Ilo. During these visits, risk analyses are made, and injury prevention and marine safety training is offered. One difference between the expansion of safe practices and safety training in Chile versus Perú is that in Chile, laws addressing safety in the fishing industry and protection of its workers apply to all situations and all workers within the industry—whether in processing plants or at sea. In Perú, current law only applies to the fishing fleets. Hopefully, this will be corrected.

I would like to express my deep gratitude for this opportunity to present and describe some matters related to fishing activity in Chile. I am certain that conferences like this are magnificent opportunities to exchange experiences and definitely allow the fishing sector to develop new policies and incorporate actions to promote risk prevention among fishermen with greater energy. If that is possible, we can reduce the number of maritime accidents throughout the world, including South America.

RISK ASSESSMENT (SAFETY MANAGEMENT) IN THE UK FISHING INDUSTRY

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Introduction

The UK Merchant Shipping and Fishing Vessels (Health and Safety at Work) Regulations 1997, which came into force on 31 March 1998, requires all employers (fishing vessel owners and operators) to adopt a risk-based approach to occupational health and safety.

The regulations require fishermen to carry out a risk assessment of the health and safety of workers arising in the normal course of their activity.

This paper focuses attention on the concept of risk assessment in the UK fishing industry and the benefits of such an approach. However, it also looks at the general lack of compliance by the industry, the concern of UK regulators and safety organisations, and the way ahead.

Background

The UK fishing industry is very diverse and embraces a wide range of activities, from deep water pelagic fishing to scalloping, and from coastal netting to single-handed potting. In June 2002, there were 7,045 UK registered fishing vessels.

Although fishing's contribution to the UK's Gross Domestic Product is small, it is a major employer in some coastal communities and an established way of life for families who have been in the business for generations. The culture of the industry is steeped in the past, and those engaged in it are for-

ever preoccupied with the traditional problems of battling with the elements, dwindling stocks, ever more regulations, what they see as unsympathetic bureaucrats, unrealistic quotas, and ever-rising costs.

Although many UK fishermen have an instinctive feel for safety and practice it in their own way, others virtually ignore it. Given a choice, they will focus any new investment into other areas, especially if it improves their ability to catch fish.

Although many fishermen will maintain they are safety-conscious, the evidence in the UK from vessels involved in accidents strongly suggests otherwise. There is no doubt many fishermen find that maintaining their vessels and safety equipment in good order is extremely expensive. Costs weigh heavily on their minds, and they will argue that meeting any new regulation to improve safety is prohibitively expensive. But as the UK Marine Accident Investigation Branch (MAIB) frequently points out, nearly all the fishing vessel accidents investigated by the Branch could have been prevented, not by investing in large sums of money, but by exercising greater care. Again and again it has been found that the enemy of safety is not so much a shortage of money as it is the fishing industry's failure to adopt a safety culture, with everyone doing their best to prevent accidents from happening in the first place.

Not wanting to impose more regulations on the UK fishing industry, particularly in light of the costs involved, a risk-based approach was advocated as a way forward to reduce the number of accidents in the industry.

Method

During the course of the author's work as an inspector with the MAIB, several accidents that resulted in fatalities were investigated where risk assessment has been, or should have been, undertaken to identify the need for preventive measures. These investigations included several visits to fishing vessels in service and exhaustive interviews with skippers and crews.

Health and safety at work regulations

The current UK Merchant Shipping and Fishing Vessels (Health and Safety at Work) Regulations (SI 1997/2962) have been in effect since 31 March 1998 and are promulgated in UK Marine Guidance Note 20. These regulations place duties on all *employers* and *workers* on board ships. A worker is

defined as “any person employed by an employer under a contract of employment, including trainees and apprentices.” There are no exemptions.

All employers have a duty under these regulations to ensure the health and safety of workers and others affected by their activities so far as is reasonably practicable. The basis of all safety measures taken should be an assessment by employers of any risks to workers’ health and safety from their work activities, commonly known as a health and safety risk assessment. This assessment does not have to be written. However, it is made clear in the available advice relating to risk assessment that it is beneficial to do so, especially if litigation is involved.

Risk assessment

Risk assessment is not a new concept; it has been common practice and effective in industry ashore for many years. It has also been used at sea over the years, albeit in a less formal manner. Since its use on board ships was made mandatory, however, accident investigations have revealed that compliance has been sporadic. During the last 3 years, since this conference was last held in 2000, a further 57 lives have been lost from fishing vessels. This safety record is inevitably open for improvement, and a more widespread use of risk assessment has the potential to contribute in this respect.

The lack of employment contracts through single-handed operation or partnerships theoretically excludes some operators from compliance with the regulations, as they are not deemed to be workers in so much as the regulations are concerned. This issue currently is being tested in the UK courts. It is not known how many fall into this category, but considering there are approximately 6,037 small commercial registered fishing vessels (under 15-m registered length) operating in the UK, there will be many that do. It is more than likely that the operators of many of these vessels have not conducted a risk assessment because they are either unaware of the requirement to do so or do not understand the process. This has certainly been the case in the majority of fishing vessel accidents investigated by the author.

Advice in the UK for carrying out a risk assessment is promulgated in a Marine Guidance Note (MGN 20), which a majority of operators might not have read. Consequently, they might not be aware of the requirement to conduct a risk assessment. Operators that have read MGN 20 could be forgiven if they were baffled by its contents. Its style is very formal, and the guidance provided on risk assessment in its annex and appendix appears very

technical. Persons unfamiliar with risk assessment could find this guidance off-putting and difficult to put into practice. As compliance with the health and safety regulations is not usually audited, other than when a serious accident has occurred, the failure to conduct a risk assessment, for whatever reason, frequently goes unnoticed. Because risk assessments do not have to be written, such an audit would be extremely problematic.

To help fishermen with the process of completing a written risk assessment, the Sea Fish Industry Authority (SFIA), the UK body responsible for promoting the fishing industry, made available a pro forma document for fishermen to carry out the process themselves. However, this document attempts to cover the majority of risks on board fishing vessels and inevitably in doing so, includes many trivial risks. Consequently, a lack of emphasis is placed on the major risks when taken in the same context. This has the effect of fishermen trivialising the entire document and disregarding it.

In addition to this, the Maritime and Coastguard Agency, through the Sea Fish Industry Authority, has introduced an additional 1-day training course specifically designed to educate fishermen in the values of risk assessment. However, this course, at the moment, is voluntary, and the current take-up is not good.

There is also a need to audit to ensure the procedure is being carried out correctly. However, the problem with auditing, or even giving on board advice, is that the regulator may be viewed as having endorsed the assessment, and if an accident does happen, it will be no surprise where fingers will be pointed!

Noncompliance

Many fishermen in the UK are using consultants, for a fee, to complete the process (risk assessment) on their behalf and document it to comply with the regulations. However, once this process has been complete, rarely, if ever, do fishermen refer to the documentation again, defeating the whole object of a continued risk-based approach to safety.

Worse still, a good deal of fishermen (skippers, owners, and operators) have not completed or been involved in any kind of risk assessment. This is a poor reflection on a regulation that has now been in force for more than 5 years.

The main reason for noncompliance is that fishermen do not fully understand the process of risk assessment. They are unaware that one needs to

be complete. They see little benefit in completing one; it does not add the catching capability of the vessel, and the documentation produced in order to help fishermen in its process is not user friendly. As long as this situation remains, risk assessments will have little effect on the improvement of safety in the UK fishing industry.

Enforcement

For many years in the UK fishing industry, a tenuous relationship has existed between the industry and the agency responsible for enforcement of regulations (UK Maritime and Coastguard Agency 2002).

One problem that appears to manifest itself in the fishing industry, probably more than in any other industry, is the difficulty in reaching agreement between the regulator and the industry itself. Even when agreement is reached, enforcement of regulations is not carried out. This inevitably leads to complacency both in the industry and in those responsible for enforcement.

In addition to this, the fishing industry has a very strong political lobby. Representatives of fishing communities are continually arguing in support of sustained economic well being, which masks safety to a certain degree. As long as profit remains at the forefront of fishermen's lives, it could be argued that any change in attitude to safety is a long way off. As far as government policy on safety is concerned, it meets industry representatives every 6 months in an effort to reach agreement on a range of related issues. However, progress is slow.

Benefits of risk assessment

The benefits to safety when risk assessments are properly conducted and involve persons familiar with a vessel's operation are considerable. They tend to be of little use when they are seen as a bureaucratic requirement, are conducted by outsiders, and sit on a shelf gathering dust after completion.

Risk assessments identify the known hazards, their potential consequences, the risk of such hazards occurring, and the control or safety measures to reduce the risks so far as reasonably practical. What is as far as reasonably practical is a decision that has to be made based on the risk involved balanced against the cost (in time, money, or inconvenience) to reduce the risk further. Ideally, this information should be passed to everyone concerned, thereby with safety awareness raised and risk reduced, a safer working environment results.

Risk assessment is a self-perpetuating process as lessons learned in the activity of commercial fishing are translated into the continued process to improve safety. When used proactively before the start of a new operation, the identification of appropriate safety measures through risk assessment can prevent learning by bitter experience.

Conclusions

The results of this research, which included several visits to fishing vessels that had been involved in accidents and exhaustive interviews with those skippers and crews, has shown that the risk assessment approach to safety in the UK fishing industry is not yet working.

The UK regulators and safety organisations are concerned about this fact and currently are working toward a different approach.

It is not envisaged that the requirement for a risk assessment to be conducted on all vessels is going to disappear. In fact, in an increasingly litigious society where personal injury claims are almost forming an industry in their own right, it is likely that the pressure for employers to minimise risk in the workplace will continue to increase.

Risk is assessed each day by many conscientious operators when they walk on board their vessels, identifying the hazards—be they related to weather or the condition of the vessel—and deciding what can be safely achieved and what safety precautions need to be taken. This is not a new process. The vessel operators are professionals more than capable of undertaking what is required.

Safety assessment is an imposition like any other prescribed regulation. However, a good assessment requires knowledge, motivation, perception of need, and a will to do it. It also requires a positive safety culture.

The challenges are to make fishermen aware of the requirement to conduct risk assessment and to produce guidance in a user-friendly format, encouraging fishermen to use it. As with the ISM Code, applicable to merchant vessels, there is also a need to audit. Only then can risk assessment start to have a positive impact on the safety of fishing vessels. Other avenues of getting the message across will probably need to be investigated.

Unfortunately, although I regret to say so, enforcement also has its part to play. If only one fishing vessel operator were prosecuted for noncompliance with the regulation, and this fact was publicised in the fishing press, it would probably have as much effect as all the education and training put together. However, it is appreciated that obtaining such a conviction when risk assessments need not be written would be difficult.

The fishing community must change its attitudes and adopt a positive safety culture. Every individual fisherman must be concerned about safety so that it becomes second nature to carry out basic checks and to correct things that are wrong. They must be seamen as well as fishermen, and they must resist the temptation to condemn anyone who suggests there are better ways of doing things.

With a change in practice in the way things are done it is hoped that the benefits of risk assessment will fall out of good practice. It is unlikely that risk assessment as it stands in the UK fishing industry today will lead to that practice unless a different approach is adopted.

Finally, it is in everyone's interest that all fishing vessels operate as safely as possible. Risk assessment can contribute toward this goal. It is a useful tool and of benefit to all.

Reference

Maritime and Coast Guard Agency (2002). Annual report and accounts, 2001-2002. House of Commons, London Stationary Office, United Kingdom.

