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SAFETY AT SEA AS AN INTEGRAL PART OF FISHERIES MANAGEMENT

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PREPARATION OF THIS DOCUMENT

The Fisheries Department of FAO has been working in the field of fishermen's safety for 50 years, during which the fishing industry has been greatly affected by political, social, economic and technological changes. These changes have led inexorably to increased pressure on fish resources. Consequently, governments have recognized that they need to be better aware of the state of their fisheries, to implement effective policies to prevent resource depletion and the wastage of fisheries inputs and, increasingly, to facilitate stock rehabilitation. While the extent and effect of fisheries management measures put in place around the world vary widely, they tend to be more concerned with the long-term conservation and sustainable use of fisheries resources than with the welfare of those who harvest them.

Maritime administrations on the other hand, have safety of seafarers as one of their overriding concerns. They frequently have difficulty in addressing the safety aspects of the fishing industry adequately because the nature of fishing operations is so different from the cargo handling and transport activities encountered in merchant shipping. Fishing vessels are excluded from the vast majority of provisions of international shipping conventions, and to this day, there is no international instrument in force dealing with the safety of fishing vessels or the training of their crews. While the formulation and enforcement of regulations have an important role to play in safety, data collection and analysis, training and education, fisheries management and perhaps above all, the attitudes and relationships of all parties concerned, also play a key part.

The Fishery Industries Division of FAO commissioned this report to provide an up-to-date global review of the status of fishermen's safety, and to provide an assessment of opportunities, constraints and priorities for action, both for FAO and for national administrations.

PERSONAL NOTE OF THANKS

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Gudrun Petursdottir and Olafur Hannibalsson

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ABSTRACT

Fishing has always been, and continues to be a dangerous occupation. While risk will always be an inherent part of fishing, measures to reduce risks at sea have had some success, particularly in the technologically advanced parts of the world. Nevertheless, fishing still holds the record as the most dangerous occupation pursued by man.

One of the basic obstacles to improved safety is the fact that, in most places, safety measures have been carried out on a voluntary basis. Regulations covering the construction and equipment of larger vessels generally exempt vessels under 24m and in most countries safety education and training are still not obligatory.

In this paper it is argued that safety at sea should be integrated into the general management of the fisheries in each country. The global fisheries situation has changed dramatically in recent years. The United Nations Convention on the Law of the Sea, which came into force in 1994, states not only the rights, but also the obligations of coastal states to manage their 200 mile Exclusive Economic Zones (EEZs). Thus it is to be expected that coastal nations will take measures accordingly over the coming years. This will open the way for regulations ensuring the safety and well-being of the fishermen, as well as sustainable utilization of the fishstocks. The industrialized countries have spent decades trying to improve safety at sea on a voluntary basis. There is now general consensus amongst safety promoters that obligatory safety training is the prerequisite for any success. Linking safety requirements to fishing permits for example, is a practical way of overcoming the lack of motivation that has been a barrier to improved safety at sea for fishermen for so long.

Safety at sea is a very serious problem in the developing countries. It is likely that many developing nations will seek external advice in planning the management of fisheries in their EEZ. The Food and Agriculture Organization of the United Nations (FAO) has many years of experience in providing expert advice and assistance for fisheries in the developing countries and developing an extensive network of local expertise. It is particularly well placed to provide assistance for improved fishermen's safety in the fields of data collection and analysis, training, education and the development of regulations, and will advocate a holistic approach to fisheries management with safety at sea as an integral part of the management regime.

.... a high risk of loss of life or injury has been accepted as a part of the fishing-culture. "A fisherman's life should and had to be dangerous." This attitude has perhaps been one of the major underestimated obstacles to improved safety and work environment in fishing.

Sverre, J. E. Nordland
Research Institute, Norway
International Symposium on Safety and Working
Conditions Aboard Fishing Vessels,
Université de Quebec, Rimouski, 1989

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I. Dimensions of the problem

Fatalities in fisheries

Comparing fatality statistics in the fishing industry with those for other occupational categories reveals that fishing is one of the most dangerous occupations. In Australia, between 1982 and 1984, the fatality rate for fishermen was 18 times higher than the national average (143/100,000 person-years compared with 8.1/100,000); in Denmark, from 1989 to 1996, the rate was 25-30 times higher than the rate for those employed on land; in the United States in 1996, the death rate in fisheries was estimated at eight times that of persons operating motor vehicles for a living, 16 times higher than occupations such as fire-fighting and police work and over 40 times the national average. Other estimated comparative rates for 1997 include (x indicating the national average occupational fatality rate): Republic of Korea (15x); Estonia (11x); Italy (21x); Lithuania (11x); Poland (9x); Spain (6x); and Canada (3.5x).[1]

Box 1. Estimated number of people engaged in fisheries

It is impossible to assess the total number of people engaged in fisheries in the world, due both to lack of registration and to the utilization of different definitions. In the statistics, "fisheries" may encompass not only fishermen, but also workers in fish processing on land and those involved in aquaculture. The International Labour Organization (ILO) publishes The *Yearbook of Labour Statistics* which relates to total employment (paid employment plus self-employment) and persons in paid employment worldwide. In this series, fisheries are generally classified together with agriculture, hunting and forestry. Consequently fishermen cannot be separately identified.

The most comprehensive data of the number of persons engaged in fishing is maintained by the Food and Agriculture Organization of the United Nations (FAO), which estimates that roughly 15 million fishermen (or "fishers") are employed aboard decked or undecked fishing vessels operating in the marine capture fisheries, of whom about 98% work on vessels less than 24m in length. If part-time fishermen are included, as well as those involved in freshwater fisheries and aquaculture, the number rises to 36 million.

The ILO's Occupational Safety and Health Branch estimates that 24,000 fatalities occur worldwide per year in fisheries. It seems plausible that the fatality rates in countries for which data is not available might be higher than it is in those that do keep records. Recent reports from the Nordic countries indicate that the fatality rates in fisheries lie between 90 and 150 per 100,000, and yet the accident prevention, survival training and search and rescue services offered in these countries are among the best in the world.[2] From the developing countries much higher figures are cited: it has been estimated that fatality rates in Sri Lanka's offshore fisheries are ten times higher than in Norway[3]; a study on fatality rates in canoe fishing in Guinea in 1991-94 gave an indicative rate of 500 per 100,000; and in a number of other countries along the West African coast, the artisanal canoe fatality rates appeared to be in the range of 300 to 1,000 per 100,000 fishermen.[4] Recent figures from South Africa report 585 fatalities per 100,000 fishermen.[5]

[1] Report on Safety and Health in the Fishing Industry. International Labour Organization, Geneva, May 1999.
[2] Safety and Survival Education for Nordic Fishermen. Report for The Nordic Council of Ministers, under preparation.
[3] Emil Aal Dahle. A Study For "Safety Guidelines on Design, Construction and Operation of Small Offshore Fishing Boats in Sri Lanka, Bay of Bengal Project, FAO, 1990.
[4] FAO, The State of the World Fisheries and Aquaculture, 2000. p. 42.
[5] FISH Safety Foundation, June 2000.

Box 2. Composition of the fishing fleet

According to FAO data (The world fishing fleet, in The State of World Fisheries and Aquaculture 1998:66-68, FAO Rome 1999), in 1995 the world fishing fleet numbered about 3.8 million vessels. About one-third of these were *decked* vessels, the remaining two-thirds were undecked vessels, generally less than 10 m in length. While almost all decked vessels are motorized, only about one undecked vessel in three is equipped with an engine.

Most of the world's fishing vessels operate in Asia. The proportion of non-motorized vessels is higher in Africa (about 80%) than in any other continent, while Europe has the highest proportion of decked vessels (about 70% in 1995). In the Asian fleet, slightly fewer than 40% are reported to be decked vessels.

In the last 25 years, the world fishing fleet has more than doubled both in terms of tonnage and in number of vessels. The number of *decked* fishing vessels went up from around 600,000 in 1970 to 1,260,000 in 1995 with a corresponding increase in tonnage from 12 to 28 million grt. The graph below shows the development of the distribution of *decked fishing vessels* by size from 1975 to 1995. It clearly shows that the vast majority of the world's decked fishing vessels are under 25 grt, thus falling into the category of artisanal fisheries, together with all the undecked vessels (FAO *Bulletin of Fishery Statistics*, No. 35 Rome, 1998).

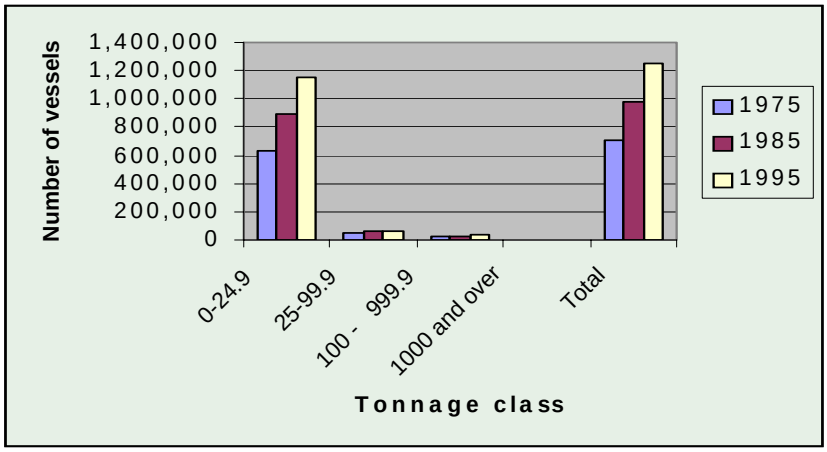

Figure 1: Distribution of decked fishing vessels by tonnage

Undecked fishing vessels: The number of undecked vessels increased from about 1.5 million in the 1970s to about 2.5 million by 1990, mainly as a result of higher numbers in Asia. The vast majority of undecked fishing craft in Asia and Africa are not powered by engines. Given that decked craft are relatively few in Africa, the typical African fishing vessel is undecked and non-motorized. In Asia, the typical vessel is different, as the proportion of decked fishing craft is comparatively high.

Inadequate documentation of injuries

Non-fatal injuries are very common in the fishing industry as shown by separate studies and records from national health and welfare services in many countries.[6] In spite of the high numbers cited, it is clear that these injuries are grossly under-reported. According to an Icelandic pilot study on fishermen's attitudes towards safety, 80% of fishermen have either suffered an injury or witnessed someone else onboard being injured. Official injury reports do

[6]Rafnsson, V. Health Problems and Disease Patterns. ILO Encyclopaedia of Occupational Health and Safety. Chapter 66 Fishing.
Minko, V.M. On Safety and Health in the Russian Fishing Industry, paper prepared for the ILO.
British Columbia Workers Compensation Board .
Törner, M. et al. Analysis of Serious Occupational Accidents in Swedish Fishery. Safety Science 21, 1995:93-111.
Tomaszunas, S. Work-related Lost-time Accidents in Deepsea Fishermen. Bulletin of the Institute of Maritime and Tropical Medicine, 1992; V.43, no 1-4.

not reflect any such numbers.[7] In general, records on injuries and fatalities in fisheries are inadequate and not comparable between countries, because of different systems of data collection and classification. Many countries do not provide any such records. Although the members of the International Maritime Organization (IMO) decided that the collection and analysis of statistical information on casualties, including fishing vessels and fishermen, should be prepared on an annual basis, they acknowledged in 1999 that there has been very limited response.[8]

The nature of employment arrangements in fishing, which may place many fishermen outside traditional occupational accident and disease reporting systems, also contributes to this lack of information. Where recorded, injuries in fisheries may be included in the more general category of Agriculture, hunting, forestry and fishing. The ILO recommends that governments should adopt classification schemes which are convertible to the International Standard Industrial Classification of All Economic Activities (ISIC), revision 3.[9] Classifying fisheries as a separate entity is warranted by the unique and dangerous working conditions, which cause more accidents than are known in any other occupation. The causes of accidents need to be identified so that preventive actions can be defined and prioritized.

Uniformity in data collection between countries or regions is an ambitious goal, which may never be attained. However, this is mainly important for comparative studies. Whether comparable or not, collecting data on accidents within each region is important for the planning and prioritizing of preventive actions. Only by knowing where and how accidents occur, can suitable measures for intervention be found. Fisheries are very diverse. Vessels range from huge and highly mechanized factory trawlers down to one-man, dug-out canoes. The causes of accidents obviously reflect the type of fisheries involved, vessel, gear, climate and weather, conditions at sea, harbouring facilities, etc. Not least, the "human factor" is of prime importance, including inadequate training, lack of experience and skills, recklessness, undermanning and fatigue to name but a few. Often risk factors coincide, as aptly put by the US Coast Guard officers, who note that sometimes "vessels are operated in an unsafe condition, in unsafe places at unsafe times".[10]

The word "accident" implies that the event in question is isolated and unforeseen. Indeed, some of the losses or injuries to fishing vessel and crew are regarded as unavoidable casualties of unpredictable and often treacherous working conditions at sea. Inevitably, however, a combination of circumstances and incidents lead up to the unfortunate event. One useful way to look at why accidents occur and to emphasize the complexity of accident causation, is illustrated by "Reason's model" put forward by Prof. James Reason of Manchester University, U.K. This model looks beyond the immediate circumstances of the accident and scrutinizes the preconditions at the time of the occurrence. This may be a useful tool in identifying who should take what actions to prevent and mitigate the effect of future accidents.

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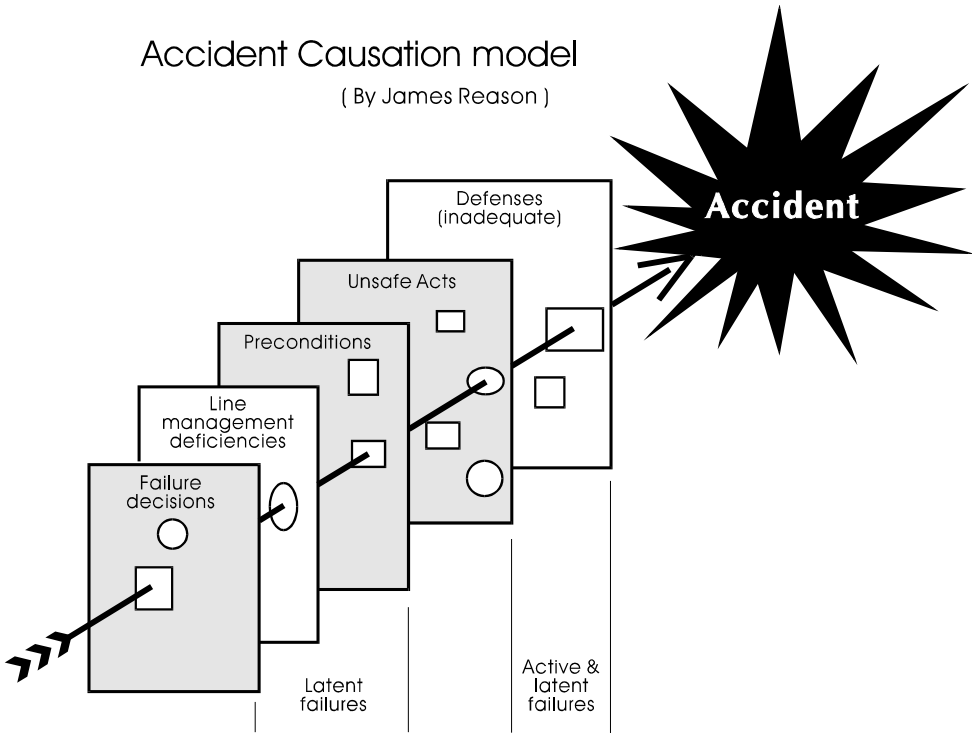
[7] Fishermen's attitudes towards safety. Unpublished report (in Icelandic), Fisheries Research Institute, University of Iceland, 1995.
[8] IMO FSI 7/6/2 1999.
[9] International Labour Organization: Note on the Proceedings of the Tripartite Meeting on Safety and Health in the Fishing Industry, Geneva Dec 1999.
[10] MacDonald, J.M. & Powers, G.D. Proceedings of International Symp. on Safety and working conditions aboard fishing vessels. Université de Québec, Rimouski, 1989.

Figure 2. Reason's model



Box 3. Reason's model

"In the model (see figure 2), the first layer (defences) represents defences that should mitigate the results of the unsafe act. The second layer (unsafe acts) and third layer (preconditions), include such conditions as fatigue, stress, operating practices, etc. The fourth layer (line management) includes such aspects as training, maintenance, etc. The fifth layer depicts all high-level decision-makers such as regulators, owners, designers, manufacturers, trade unions, etc. Dr. Reason suggests that these decision-makers frequently make "fallible" decisions and these resulting latent defects stay dormant waiting for someone to commit an unsafe act, and thereby trigger a potential accident scenario. If the system's defences function as intended, the results of the unsafe act are caught and the effects are limited. If the defences do not function, the accident could prove tragic. The model shows the importance of reducing or eliminating safety deficiencies. This can be represented as a reduction in the number or size of the holes, thus reducing the probability of an accident. Reason's model is particularly useful in illustrating how an accident can have a number of causes.

The following is a hypothetical example, drawn up by the (ILO)-Office, of how Reason's model might be used to describe an accident on a trawler leading to the loss of a fisherman's arm: (1) the regulations in a given country do not require new entrants to fishing to receive any safety training (decision); (2) the owner does not require this either (decision), neither does he require the skipper to conduct any training on board (decision or line management); (3) at sea, an experienced crew member becomes ill and the newcomer is asked to fill in, having spent very little time on deck and having received little or no guidance (line management); (4) the vessel is operating in fairly rough conditions (precondition); (5) everyone is fatigued (precondition) and the newcomer ventures too close to the deck gear (unsafe act) and loses his balance due to an unanticipated motion of the vessel; (6) he falls into a winch not fitted with proper guards (a possible defence) and his arm is severed before there is time to stop the winch. The fisherman has lost an arm not only due to deck gear or inattentiveness but also to a series of mistakes by himself, the skipper, the owner and the regulator—all the holes in the model were aligned.

The above example illustrates that measures to prevent accidents as well as to preserve the health of fishermen must be implemented at many levels. An additional consideration is how to reduce the severity of the consequences of an accident. For example, in the scenario described above, there are latent conditions and immediate actions which can mitigate the severity of the accident. The fisherman whose arm is lost faces permanent disability or even death from bleeding, shock or other causes. The latent condition "lack of training in first aid" could result in a death; conversely, immediate action by a crewmate with proper first-aid training may save a life.

Achieving the appropriate balance of responsibility and action among governments, fishing vessel owners, fishermen and others is one of the major challenges involved in improving the safety record. All those concerned must consider how they can reduce the number and size of the holes".

Report on Safety and Health in the Fishing Industry. International Labour Organization. Geneva, May 1999.

Inherent dangers in fisheries

The main reason for fishing being so dangerous is the fact that the human being is a terrestrial species. To humans, being immersed in water constitutes a lethal danger. People drown in swimming pools and even in bathtubs. Onboard a vessel, work is conducted under strenuous conditions on a moving, exposed and slippery platform where people often need to assume awkward work postures. These circumstances cause constant physical strain and contribute to long-term fatigue, which is further exacerbated by excessively long working hours. Fatigue in itself increases the danger of injuries.[11] Vessels carrying shifting loads increase risk of injuries and loss of stability, with consequent dangers of capsizing or losing people overboard. Fishermen are often obliged to perform multiple tasks for which they may have limited training. Certain gear types are inherently very dangerous, particularly when the weather is bad. Both vessel and gear require good maintenance, which is very often not provided, in spite of the fact that the fleet is becoming older. Statistics from Lloyd's show that the mean age of industrial vessels over 24m is 20 years.[12] No such data are available for small-scale fisheries, but there is no reason to believe that artisanal fishermen are in a position to renew their boats more often than the owners of larger vessels. The poor condition of artisanal vessels has indeed been documented in numerous field projects led by FAO and others.[13]

Fishermen depend on their vessels for their survival. If the vessel is lost, it is probable that some or all of the crew will lose their lives too. The most common causes of fishing vessel casualties include capsizing, foundering, fire/explosion and collision. From the fisherman's perspective, these causes have their roots in economic pressure, luck or fate, unexpected weather lack of knowledge about the equipment fatigue and stress. [14] The design, construction, maintenance and operation of the vessel all directly affect safety and health. Risks vary with each type of fishing, the fishing grounds and weather conditions, vessel size, equipment carried and the job of each fisherman. Bad weather and loss of engine power constitute a major risk to every vessel, perhaps greater to small boats, which are more easily damaged and flooded. On larger vessels, the fishing gear and other heavy equipment pose a considerable risk of death or injury to the crew. On small vessels, the risk of capsizing while pulling in a large catch, being flooded in heavy seas, run down by a larger vessel and even attacked by dangerous marine animals can be considerable. Where harbours and shelter are not available, crossing surf may be very dangerous. Thus, different safety problems are associated with each type of fisheries.

As mentioned above, the registration and classification of personal injuries varies between countries, making it difficult to compile and compare the data from different nations. However, it seems clear that the most common cause of fatality is the loss of the vessel, followed by man over board and being crushed by a heavy object. The danger of drowning in harbour is considerable too. Reported non-fatal injuries are most commonly fractures of arms or legs, injuries to the head and neck and amputations of fingers, hands, arms and legs. In addition there are a high number of injuries that are not reported, for a variety of reasons, one being that they do not lead to prolonged loss of work or form a basis for financial compensation. These injuries are obviously impossible to quantify or classify, but it is an

[11] IMO, MSC 69/INF.10 Seafarers fatigue: Wake up to the dangers.IMO, MSC 69/INF.15 Fatigue, groundings and collisions.
[12] Lloyd's fleet statistics 1996.
[13] Rayment. P. & Fossi A. Report into the Safety and Security of the Artisanal Fishermen of Senegal, a joint SSG and CCFD Mission, July 1994.
[14] Acheson, V. Fishermen's Attributed Causes of Accidents and Implications for Prevention Education, IFISH Conference, 2000.

accepted fact that they are very common and involve damages such as cuts and wounds, sprains and contusions. These health hazards seem to be accepted in fisheries, while most land-based professions would consider them as intolerable.

At the ILO Tripartite Meeting in Geneva in 1999, Dr. Kristinsson, Medical Officer to the Search and Rescue Helicopter Medical Group in Iceland reported on recent findings concerning injuries in the Icelandic fisheries, which can be generally regarded as highly mechanized and technically advanced. Considerable effort has been put into reducing the risk of injuries in recent years. While there is reason to believe that fatal accidents in Iceland are fewer now than ten years ago, the same is not the case with nonfatal injuries. Every year, 10% of fishermen in general, and 15% of fishermen on trawlers are subject to injuries. Accidents involving fishermen are more common the longer they have been on the job, and there is threefold risk of a fatal accident if the seaman has been more than ten years on the job.[15] Possible explanations might be that the more experienced are likely to be entrusted with the dangerous tasks and may be more prone to taking risks. Also, younger crew members are more likely to have received safety training than the older ones. This gives reason to hope that concerted efforts in improving safety education and training of fishermen may result in reduced accident rates, along with improved vessel design, construction and working conditions on board.

The US Coast Guard on behalf of the Fishing Vessel Casualty Task Force states that:

"Commercial fishing continues to rank at or near the top of the most hazardous occupations in the United States. The spate of recent losses of lives and vessels is not unique. A few advances in the long history of attempted voluntary and regulatory safety initiatives have modestly reduced losses. However, commercial fishing vessel safety standards are lower than standards for other domestic commercial vessels, and lower than international standards for fishing vessels. There have been many attempts to raise safety standards over past decades, however, the prevailing opposition to higher standards accepts the high risks of commercial fishing relative to the cost of those standards. The solutions are basic and straightforward: seaworthy boats, competent crews, adequate survival equipment, and safety conscious resource and industry management regimes."

http://www.uscg.mil/hq/g-m/moa/docs/fishing.htm

[15]Kristinsson, S. MD Search and Rescue Helicopter Medical Group, Iceland, in International Labour Organization: Note on the Proceedings of the Tripartite Meeting on Safety and Health in the Fishing Industry, Geneva, Dec 1999.

II. International conventions and guidelines on safety at sea

Improved safety at sea has for decades been of major concern to various institutions, national authorities, non-governmental organizations and individuals, who recognize that a functional legal framework is the prerequisite for concerted actions for improved safety. The model for such legislation has already been provided by various international organizations.

IMO – ILO – FAO

The International Maritime Organization (IMO), the International Labour Organization (ILO) and the Food and Agriculture Organization (FAO) are the three specialized agencies of the United Nations system that play a role in fishermen's safety at sea. IMO is the agency responsible for improving maritime safety and preventing pollution from ships; the adoption of maritime legislation is still IMO's best-known responsibility. ILO formulates international labour standards in the form of Conventions and Recommendations, setting minimum standards of basic labour rights. It also promotes the development of independent employers' and workers' organizations and provides training and advisory services to those organizations. ILO has adopted seven instruments specifically applying to fishermen: five conventions and two recommendations. These instruments cover the issues of minimum age, medical examination, articles of agreement, competency certificates, accommodation, hours of work and vocational training.

By virtue of their working methods, the results of IMO and ILO tend to have little impact on the safety of artisanal and small-scale fishermen. Most of the recommendations and conventions are aimed at large vessels, primarily the merchant fleet on international voyages. Some conventions explicitly exempt fishing vessels, and most do not apply to vessels under 24m thus leaving out the majority of fishing vessels and transport boats in the developing countries. The average size of decked vessels in 1995 was about 20GT. Those larger than 100GT (roughly equivalent to longer than 24m) amounted to about 37,000 or just about 1% of the entire world fishing fleet of both decked and undecked vessels.[16] (see also fig 1. Box 2)

FAO has the mandate to raise levels of nutrition by improving productivity and distribution of food, and to raise the standards of living and better the conditions of rural populations. On average, FAO has some 1,800 field projects operating at any one time, and since its inception, has implemented hundreds of fisheries projects in the field directly related to the establishment of fisheries training institutions, improving the quality of design, construction and equipment of fishing vessels, and above all, working directly with fishing communities.

In 1995, FAO completed the Code of Conduct for Responsible Fisheries, which encompasses the main elements of the various international conventions and legislation concerning fisheries and related environmental issues. The Code provides a comprehensive set of voluntary guidelines for responsible fisheries. FAO monitors the implementation of the Code among its member states biennially.

SOLAS

The first international convention concerning safety at sea was SOLAS (Safety of Life at Sea), prompted by the Titanic disaster in 1911. The convention was first adopted in 1914, with amendments adopted in 1929 and 1948. When IMO was founded in 1958, its first major

[16] The world fishing fleet, in The State of World Fisheries and Aquaculture 1998:66-69. FAO, Rome, 1999.

task was the amendment of SOLAS in 1960, and the Organization has subsequently ensured that its revision is an ongoing process.

SOLAS specifies minimum standards for the construction, equipment and operation of ships compatible with their safety. It is generally regarded as the most important of all international treaties concerning the safety of merchant vessels and is in fact embraced by the United Nations 1982 Law of the Sea Convention as a generally accepted international regulation. Apart from Chapter V, SOLAS does not apply to fishing vessels, wooden ships of primitive build and ships not propelled by mechanical means, thus leaving out most of the fleet in the developing countries; Chapter V deals with safety of navigation and identifies certain navigation safety services that should be provided by Contracting Governments and sets forth provisions of an operational nature applicable in general to all ships on all voyages. This is in contrast to the Convention as a whole, which only applies to certain classes of ship engaged on international voyages.

The international conference that adopted SOLAS 60, however, approved three resolutions related to fishing vessels. The first referred to the application of the SOLAS 60 stipulations to such vessels, and particularly to reasonable measures regarding rescue equipment on board. The second called upon governments to inform IMO about the degree to which they apply SOLAS to fishing vessels. The third concerned fishing vessel stability and resulted in extensive work carried out by subcommittees, with active participation of experts from FAO. In 1985, the IMO Maritime Safety Committee prepared recommendations for weather criteria with respect to intact stability.[17] This resolution is applicable to cargo and passenger ships of 24m in length and more, and to fishing vessels 45m in length or more. Yet again, these criteria do not apply to the majority of passenger and fishing vessels used in the developing countries.

Recognizing that a number of fishing boat accidents are caused by submarines, a resolution was adopted in 1987, recommending operational practices for submarines, in order to reduce this danger.[18]

UN Law of the Sea Convention[19]

The United Nations Conference on the Law of the Sea (UNCLOS III)[20] was completed in 1982, although its Convention did not enter formally into force until 1994 when it had been ratified by the required number of states.[21] The UN Convention on the Law of the Sea, 1982, (hereafter referred to as the 1982 UN Convention) had by May 2000 been ratified by 133 states. It is globally recognized as the regime dealing with all matters relating to the law of the sea and gives nations rights as well as responsibilities to utilize their living marine resources in a rational and sustainable way. Regarding safety, the 1982 UN Convention rules that every State shall effectively exercise its jurisdiction and control in administrative, technical and social matters over ships flying its flag. Further, the flag nation shall take such measures for ships flying its flag as are necessary to ensure safety at sea with regard to, *inter alia*: (a) the construction, equipment and seaworthiness of ships; (b) the manning of ships,

[17] IMO Resolution A.562(14) - Recommendation on a severe wind and rolling criterion (weather criterion) for the intact stability of passenger and cargo ships of 24m in length and over.
[18] IMO Resolution A.599(15) - Avoidance by submerged submarines of fishing vessels and their fishing gear.
[19] Considerable confusion exists as to the proper use of the acronym UNCLOS with reference to the United Nations *Conferences* and *Convention* on the Law of the Sea. For a useful discussion on the topic see The International Journal of Marine and Coastal Law, Vol 15, No 3, Kluwer Law Journal International, 2000-12-07.
[20] http://www.un.org/Depts/los/losconv2.htm
[21] The clause on 200 mile EEZs had been agreed upon in 1976 with the effect that a number of nations extended their EEZs without delay.

labour conditions and the training of crews, taking into account the applicable international instruments; (c) the use of signals, the maintenance of communications and the prevention of collisions. In taking such measures, each State is required to conform to generally accepted international regulations, procedures and practices and to take any steps necessary to secure their observance (Article 94(5)).[22]

Torremolinos Convention and the Torremolinos Protocol

The Torremolinos International Convention for the Safety of Fishing Vessels, 1977, was the first ever international convention on the safety of fishing vessels. It was intended as a more formal document than the Code and Voluntary Guidelines (see below), formulated more along the lines of the International Convention for Safety of Life at Sea, 1974 (SOLAS), and was adopted at a conference held in Torremolinos, Spain. The Convention contains safety requirements for the construction and equipment of new, decked, seagoing fishing vessels of 24m in length and over, including those vessels also processing their catch. Existing vessels were covered only in respect of radio requirements.

One of the most important features of the Convention was that it contained stability requirements for the first time in an international convention. Other chapters dealt with such matters as construction, watertight integrity and equipment; machinery and electrical installations and unattended machinery spaces; fire protection, detection, extinction, and fire fighting; protection of the crew; lifesaving appliances; emergency procedures, musters and drills; radiotelegraphy and radiotelephony; and shipborne navigational equipment.

It was agreed in 1977 by representatives of 45 countries, but subsequently the Convention has not received sufficient ratifications to enter into force, as many states claim it to be either too stringent or too lenient for their fishing fleets. It was therefore decided to prepare a Protocol to the Convention. The purpose of the Protocol is to overcome the constraints of the provisions in the parent Convention that have caused difficulties for States, and thereby enable the Protocol to be brought into force as soon as possible.[23] In several chapters, this was achieved by raising the vessel lower size limit from 24m to 45m. The Protocol also calls for the development of Regional Guidelines for those vessels between 24m and 45m, taking into account the mode of operation, sheltered nature and climatic conditions of that region.

Code of Safety for Fishermen and Fishing Vessels

The three organizations of the United Nations, ILO, IMO and FAO have jointly prepared a Code of safety for fishermen and fishing vessels. Part A, “Safety and health practices for skippers and crews” was adopted in 1968. It is an educational tool dealing with the fundamentals of safety and health. Part B, “Safety and health requirements for the construction and equipment of fishing vessels,” adopted in 1974, is intended to serve as a guide to those concerned with framing national laws and regulations. Its application is limited to fishing vessels of 24m in length and over, excluding recreational fishing vessels and processing vessels. The Code is currently being revised.

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[22] The United Nations Convention on the Law of the Sea, Part VII "High Seas", Section 1 "General Provisions", Article 94, "Duties of the flag State", paragraphs 1 and 3.

[23] The 1993 Protocol has been ratified by only six States (Cuba, Denmark, Iceland, Italy, Norway and Sweden), and it is unlikely that it will ever enter into force, which would occur one year after not less than 15 States, the aggregate number of whose fishing vessels of 24m in length and over is not less than 14,000, have ratified the Protocol.

FAO-ILO-IMO Voluntary Guidelines for the Design, Construction and Equipment of Small Fishing Vessels

Since neither the 1977 Torremolinos Convention nor the Part B of the Code for Safety is applicable to fishing vessels under 24m in length, and recognizing that the great majority of fishing vessels are smaller than this, voluntary guidelines were prepared in 1980 by the FAO, IMO and ILO covering the design, construction and equipment of fishing boats between 12m and 24m in length, based on the points outlined in the safety codes. As with the Code for Safety, these guidelines are not intended as a substitute for national laws, but to serve as a guide to those concerned with framing national laws and regulations. Two publications (FAO/ILO/IMO Code of Safety for Fishermen and Fishing Vessels and FAO/ILO/IMO Voluntary Guidelines for the Design, Construction and Equipment of Small Fishing Vessels) are being revised by the IMO Subcommittee on Stability, Load Lines and Fishing Vessels through a correspondence group led by Iceland. FAO has actively participated in the process.

Standards of Training, Certification and Watchkeeping for Fishing Vessel Personnel (STCW-F Convention)

The STCW-F Convention, which was adopted by IMO in 1995, contains requirements concerning skippers and watchkeepers on vessels of 24m in length and over, chief engineers and engineering officers on vessels of 750 kW propulsion power or more, and personnel in charge of radio communications. Chapter III of the Annex to the Convention includes requirements for basic safety training for all fishing vessel personnel. As of May 2000, the STCW-F Convention had been ratified by two countries.[24]

Document for Guidance on the Training and Certification of Fishing Vessel Personnel (FAO/ILO/IMO)

This Document for Guidance takes account of the Conventions and recommendations adopted by ILO and IMO and of the wide practical experience of FAO in the field of training for fishing vessel personnel. It is intended to provide guidance when national training schemes and courses are instituted, amended or developed for the vocational training of any category of fishing vessel personnel. It is stressed that the additional guidance on training is complementary to, and not intended to supersede, the knowledge requirements specified in these ILO and IMO Conventions and recommendations. The Document applies to the training and certification of both small-scale and industrial maritime fisheries. However, in the case of fishing vessels of less than 24m in length, or powered by main propulsion machinery of less than 750 kW propulsion power, certification is not prescribed, but may be introduced at the discretion of the competent administration. It is a revision of an earlier publication to take into account the STCW-F (1995), the FAO Code of Conduct for Responsible Fisheries, and recent developments in the fishing industry.

The Code of Conduct for Responsible Fisheries

The Code of Conduct for Responsible Fisheries was unanimously adopted by the FAO Conference in 1995. The Code is voluntary. However certain parts of it are based on relevant rules of international law, as reflected in the United Nations Convention on Law of the Sea of 10 December 1982. The Code also contains provisions that may in the future be given, or have already been given binding effect by means of other obligatory legal instruments among the Parties, such as the Agreement to Promote Compliance with Conservation and Management measures by Fishing Vessels on the High Seas, 1993. It is a unique instrument

[24] Denmark and Russia.

in its holistic approach, based on and bringing together key elements from the then existing international conventions and guidelines concerning fisheries and related environmental issues.[25] It offers guidelines for responsible fisheries, establishing principles and standards applicable to the conservation, management and development of all fisheries. The Code recognizes the nutritional, economic, social, environmental and cultural importance of fisheries and the interests of all those concerned with the fishery sector. It also recognizes the importance of the safety issue, and contains several separate references to the subject, addressing working and living conditions, health and safety standards, education and training, safety of fishing vessels, search and rescue, and accident reporting.[26]

The fact that the Code is to a great extent non-mandatory has proven to be more of an asset than a weakness. This renders the Code attractive as a model on which to base the management of fisheries and its adoption does not carry the same formal consequences as the conventions it is based on. The Code functions well as a model which can be applied under various conditions without the constraint of having to comply with standards that are not appropriate for the nation in question.

Every other year, FAO monitors to what extent the member states comply with the Code of Conduct. A response rate of 60% (during the year 2000) of all FAO member states, including landlocked countries, must be regarded as quite encouraging. Several countries have adapted the Code to their fisheries and stage of development and it seems to serve well as a framework within which to build different types of management systems.[27] It may be added that the Philippine Fisheries Code of 1998 closely follows the principles enshrined in the Code of Conduct. In addition to the Code itself, FAO has prepared a series of Technical Guidelines for Responsible Fisheries, consisting at present of nine separate publications.[28]

IMO Code for the Investigation of Marine Casualties and Incidents

This Code aims to create a marine casualty investigation process that establishes the circumstances relevant to a casualty, publicizes the causes of the casualty and makes appropriate safety recommendations. It also applies to the investigation of injuries sustained by a person in a casualty resulting in incapacitation for more than 72 hours commencing within seven days from the date of injury. A set of guidelines to assist investigators in the implementation of the Code are included in its Appendix. It is expected that the ILO/IMO Guidelines on investigation of human factors in marine casualties and incidents (prepared by a joint ILO/IMO Working Group in 1997 and 1998) will be annexed to the Code through an IMO Assembly Resolution.

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[25] Certain parts of the Code are based on the 1982 UN Convention. It is to be interpreted and applied in conformity with the relevant rules of international law as reflected in the 1982 UN Convention, and in a manner consistent with the relevant provisions of 1995 UN Fish Stocks Agreement, as well as in the light of 1992 Declaration of Cancun, the 1992 Rio Declaration on Environment and Development, and Agenda 21, especially Chapter 17. The FAO Compliance Agreement is an integral part of the Code. See Articles 1 and 3 of the Code.

[26] Reference is made to issues directly pertaining to safety in paragraphs 6.17: 8.1.5: 8.1.6: 8.1.7, 8.1.8, 8.2.5: 8.3.2: and 8.4.1

[27] Personal communication Dr. D. Doulman, Senior Fishery Liaison Officer, Fishery Policy and Planning Division, FAO.

[28] FAO Technical Guidelines for Responsible Fisheries: No 1. Fishing operations; No 1. Fishing Operations (Supplement 1) Vessel Monitoring Systems; No 2. Precautionary Approach to Capture Fisheries and Species Introduction; No 3. Integration of Fisheries into Coastal Area Management; No 4. Fisheries Management; No 5. Aquaculture Development; No 6. Inland Fisheries; No 7. Responsible Fish Utilisation; No 8. Indicators for Sustainable Development of Marine Capture Fisheries.

Other related IMO Conventions

Other IMO Conventions that have particular relevance to safety and health in fishing include the International Convention on Maritime Search and Rescue, 1979, and the Convention on the International Regulations for Preventing Collisions at Sea (COLREGS), 1972 (as amended). Finally, the International Aeronautical and Maritime Search and Rescue Manual, whose purpose is to assist States in meeting search and rescue needs, contributes significantly to improving success rates in the rescue of fishermen.

This list of international conventions and recommendations shows that profound effort has already been invested at an international level in improving safety at sea. This work has been meticulously done, taking into account the design and construction of vessels, stability, load lines, mechanical equipment and gear, safety equipment, communications, effects of weather and icing, working conditions and hours, training of licensed personnel, etc. Thus, as has been repeatedly pointed out, there is no lack of regulations and administrative guidelines. What is missing is their effective enforcement at national level.

Regional arrangements

Some countries have included the issue of safety at sea in the workplans of regional bodies or organizations (such as the Organization of East Caribbean States (OECS)[29], the Sub Regional Fisheries Commission of North West African States[30], the South Pacific Commission (SPC)[31] and the Bay of Bengal Programme (BOBP)[32], and in some cases, they have linked these to fisheries management. Such arrangements will be of value during the formulation of standards intended to be adopted by all member countries through a programme for the harmonization of fisheries regulations.

Application of conventions and regulations to fisheries

Although many nations have adopted legislation concerning safety at sea, there is in fact no international convention in force that deals specifically with the safety of fishing vessels, largely because the great variations in design and operation between fishing vessels and other types of ships have always proved a major obstacle to their inclusion.

At the national level, this same reason has hindered the inclusion of fishing vessels in regulations formulated by maritime administrations, while at the same time, industry representatives have, in some cases with success, lobbied for exemption for a variety of reasons. This reflects reluctance on behalf of the fishing industry to be subjected to a comprehensive regulatory programme. Fisheries have a long tradition of independence; many regard fisheries as the last frontier of free enterprise and resent government involvement, which may be perceived by the industry as being inadequately informed of the risks and nature of fishing operations, or of the slim profit margins which might be eroded by the mandatory compliance with regulations on training, vessel construction and equipment. Additionally, legislators may refrain from imposing laws or regulations on the fisheries that lead to additional costs or may otherwise be perceived as repressive. The U.S. Coastguard for example has repeatedly advocated the licensing and training of commercial fishing vessel crews, to no avail. The U.S. Congress has indeed drafted such legislation, but not enacted it

[29] Antigua and Barbuda, Commonwealth of Dominica, Grenada, Montserrat, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines

[30] Mauritania, Cap Verde, Senegal, the Gambia, Guinea Bissau and Guinea.

[31] Australia, Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Nauru, New Zealand, Niue, Palau, Papua New Guinea, Republic of the Marshall Islands, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu.

[32] Bangladesh, India, Indonesia, Malaysia, Maldives, Sri Lanka and Thailand.

into law. Research in the area of safety at sea for commercial fishermen in the USA has largely focused on the implementation and effectiveness of safety regulations. Findings strongly assert that fishermen's perceptions regarding safety can vary greatly from those of the government, including the Coast Guard, and that there needs to be a better understanding of the fishing culture and ways in which safety is viewed. These findings underscore the need to involve fishermen in the safety regulatory process; the "human factor" associated with safety at sea coupled with the cognitions and input of fishermen all provide essential information needed to make safety regulations more effective.[33]

Government policy to regulate for safety at sea in the fishing industry must be accompanied by a total commitment to implement that regulatory regime, along with the necessary resources. Implementation encompasses a set of strategies which might include education, assistance, persuasion, promotion, economic incentives, monitoring, enforcement and sanctions, all of which are accompanied by the setting up or improvement of administrations and associated costs. Implementation must be considered at every phase of the regulation formulation, and not considered as a final consequence of regulation.

While it may be true that "legislation is only as good as its enforcement", legislation cannot be improved by enforcement. The quality of the legislation remains the limiting factor. In many parts of the world, additional regulations for fisheries are not required. The overriding need is for regulations to be reviewed and amended to reflect the problems and their root causes; the process of regulatory review must be as dynamic as the industry being regulated. Thus it is clear that the industry must be part of this process. The regulators and the regulated need the necessary training to ensure compliance and enforcement as well as a working relationship promoted by mutual respect and trust.[34] The establishment of National Sea-Safety Working Groups might be a step in the right direction. In some places the infrastructure necessary for enforcement hardly exists and would have to be built from scratch.

[33] Kaplan, M and Kite-Powell, HL: Safety at Sea and fisheries management: fishermen's attitudes and the need for co-management. Marine Policy, November, 2000.

[34] Turner, J. Factors Governing the Development of National Rules and Regulations for the Construction and Equipment of Small Fishing Vessels. IFISH Conference, 2000.

III. Safety training

Effective approaches to safety at sea everywhere in the world and at all levels, rely on three lines of defence:

1. Prevention (the most reliable and cost-effective component): Suitable equipment, training, experience, information and judgement to avoid getting into trouble in the first place.
2. Survival and self-rescue: The equipment, training and attitudes necessary to survive and effect self-rescue when things start to go wrong.
3. Search and Rescue (SAR) (the most costly and least reliable of the three levels): Systems of alert, search, and rescue which are called upon when the first two lines of defence have failed.

The importance of quality training in reducing loss of life through prevention and survival of accidents, as well as in reducing SAR costs, cannot be over-emphasized. The main constraints to the provision of good training are the costs involved and the lack of mandatory requirements. Further, institutions providing safety training are frequently faced with distrust and resistance from the industry, though experience has shown that these can be overcome if the training and the trainers are seen to have specialized relevance and knowledge not only of the safety issues, but also of the fisheries directly relevant to the trainees, of the local community and its particular problems.

Community participation

Even if all relevant international conventions were extended to include fisheries, ratified by sufficient numbers of countries and implemented and enforced in laws and regulations at national levels, a safe working environment could not be ensured without community participation. Measures to improve safety can only be truly effective where the motivation to apply them exists. To establish and maintain such a culture of safety is a never-ending task that demands the participation of the fishermen themselves and their families, the boat-owners, the legislators and the community at large. In many countries, fishermen's self-help groups or other NGOs have established fruitful cooperation with the authorities to promote safety in their communities.

Danger has always been an integral part of the working environment on merchant and fishing vessels, and, it seems, accepted as such. With the rapid expansion of the fleets during the nineteenth and twentieth centuries, and as vessels ventured further into unknown waters, catastrophes involving great numbers of seafarers occurred more often, forcing the public to become aware of the problem. Gradually, this led to organized efforts to remedy the situation: light-houses were erected, maps of coastal waters were improved, harbours were built and organized search and rescue systems were established. Emergency huts manned by members of voluntary coast guards, were erected in strategic places, containing a boat and the equipment necessary to come to the aid of ships in danger.

At the beginning of the twentieth century, safety equipment on board vessels was scant. Even on board an oceanliner like the SS Titanic, life rafts and boats were only provided for a fraction of those on board. The Titanic disaster continues to attract worldwide attention and led to the first international treaty to improve safety at sea, SOLAS. At national levels it also gave weight to the voluntary organizations that had been established in coastal areas, often promoted by the fishermen's wives and mothers and other women in the communities. Their aim was to promote safety culture, raise the necessary funds, and exert pressure on legislators to provide the legal framework for improved safety (see BOX 5).

Such voluntary organizations played a very important role in promoting safety in fisheries communities around the North Atlantic. In recent years, one of their major tasks in many communities has been to prepare and provide systematic safety training courses for fishermen.

Reluctance to attend safety courses

In spite of vigorous, well-organized, and widely promoted activities by course organizers, fishermen's reluctance to attend safety courses is a serious cause of concern.

Fishermen often seem neither aware of, nor willing to admit the risks inherent in their occupation. In addition to plenty of anecdotal evidence, there are scientific studies showing fishermen's disposition toward risk-taking,[35] some of which even report that fishermen are more prone to suffer fatal injuries on land than members of other occupations.[36] In a Canadian study, the "hierarchy of worries" among offshore fishermen showed that their greatest concerns centred on the depletion of the fishstocks and the potential loss of work, etc. Then came various other worries, and only toward the bottom of the list, if mentioned at all, were worries or fear of injury on the job.[37]

This attitude, combined with reluctance to spend valuable time ashore training and to accept the potential loss of income while attending safety courses, makes it difficult, if not futile, to offer safety courses for fishermen on a voluntary basis. It is interesting to note how speakers from different parts of the world at the international conference on safety and working conditions aboard fishing vessels, held in Rimouski, Canada in 1989,[38] agreed that because of fishermen's disposition, voluntary safety courses would be futile. Only if compelled to do so, would the fishermen attend such courses. Some examples are below.

[35] Polnac, R. & Pogie, J. The structure of job satisfaction among New England fishermen and its application to fisheries management policy. American Anthropologist 90: 888-901, 1988.
Polnac, R. & Pogie, J. Danger and rituals of avoidance among New England fishermen. Maritime Anthropological Studies I: 66-78, 1988.
[36] Rafnsson, V. & Arnadottir, H. Risk of fatal accidents occurring other than at sea among Icelandic fishermen. Br. Med. Journal 336: 1379-1381. 1993.
Rafnsson, V. & Arndottir, H. Mortality among Icelandic fishermen. International Journal of Epidemiology 23,4: 730-736. 1994.
[37] Binkley, M. Department of Sociology and Social Anthropology, Dalhousie University, Halifax Nova Scotia, Canada.
[38] International Symposium on Safety and Working Conditions Aboard Fishing Vessels. Université de Quebec, 1989.

Box 4. Voluntary safety training inadequate

***USA**: "The major problem faced by educators and organisations in charge of setting up safety program, is the lack of interest bordering on complete indifference manifested by fishermen. This lack of interest is not displayed by American fishermen alone – it is worldwide"*[1].

Norway: "*When the Safety Training got underway on a voluntary basis, it met with increasing interest, not least because the instructors found an alarming lack of knowledge, which the training was able to eliminate. In spite of this, the need to make the courses obligatory has its origin in the following factors: a) the safety training is no longer newsworthy. b) The fishermen feel that through discussion, films and television etc they have gained sufficient knowledge c) Some fishermen can not be motivated to train voluntarily. Experience has shown that many fishermen refuse to receive any form of training or education if they are not forced to do so. d) The fishermen consider the financial sacrifice too large. They only follow courses when they are required to have a certificate or when it is a condition for a licence to operate – there must be a direct economic benefit as a result of following a course. e) The vessel-owners have not motivated their crews or laid the necessary foundations for the courses"*[2].

USA: "*History has shown, that attendance at voluntary safety programs has been sporadic. Programs are often postponed or cancelled due to lack of interest or adequate participation from the fishing industry. Many have attempted to overcome this problem by providing incentives for attendance and by taking the program on the road. Programs have also combined efforts with other supporting associations (e.g. Fishermen's Wives) to increase safety awareness in the fleet"*[3].

Canada: "*Informational meetings could be arranged with various groups (of fishermen), but from past experience, we have found attendance is poor when vessel safety is the only topic. Existing training courses for fishermen have not been well attended. Without a regulatory requirement for training, there is probably little chance that fishermen would attend in significant numbers*"[4].

***Kenya**: "Fishermen of all types should take some courses orientated to equip them with knowledge of navigation and safety and working conditions aboard fishing vessels. Basic courses should include: 1. first aid 2. fire-fighting 3. elementary navigational and seamanship, including full knowledge of wind and current systems 4. swimming and diving, 5. making and using simple safety equipment e.g. rafts, old tyres and tubes etc....The courses should be compulsory to all fishermen so as to minimise occupational accidents caused by third parties....it should be mandatory that all crewmembers who can not swim should not be employed until they learn and master swimming and diving practices"* [5].

Canada: "*Fishing is one of the few industries in Canada for which there is no required training to enter the industry. Accordingly, in the area of training and education, the committee (Tripartite committee of Labour, Government and Industry, established in 1988) recommended that all fishermen be required to obtain a certificate of attendance at a safety training course by 1995, as prerequisite to obtaining an annual personal commercial fishing licence. The committee was sufficiently concerned with the level of safety in the industry that it was convinced that the situation could be redressed only by a system of training which is compulsory for all fishermen. The Committee was not persuaded that voluntarism in the field of training would materially alter the existing reality. Whether as a result of the rugged individualism, which typifies the industry, or an apparent discomfort with the educational setting, there seems to be a natural reluctance on the part of fishermen to submit themselves to a formal training process"*[4].

Quotations from the International Symposium on Safety and Working Conditions Aboard Fishing Vessels, Université de Quebec, Rimouski, 1989.

1. Armand Lachance, Rappoteurs report, p.434.
2. Halvard Aasjord Safety training and accident rates in the Norwegian fisheries, pp. 446-448.
3. Robert Moran, National Council for fishing vessel safety and insurance: Vessel safety programs for US commercial fisheries. pp.386-391.
4. John M. Carter, Federal/provincial initiatives on occupational safety and health in the fishing industry. pp 382-385.
5. James Siwo Ubaga. Vessel and occupational safety for fishermen in East Africa. pp 125-129.

Obligatory safety training

Offering courses on a voluntary, irregular "on again - off again" basis demands a lot of marketing effort and reaches comparatively few fishermen. Interest may be temporarily aroused by dramatic incidents, such as major losses of lives at sea, but when their effects wear off, the marketing effort has to be resumed. This sporadic approach is costly in terms of time and money and has limited impact. This has been recognized by most leading nations in safety at sea, which in the last decade have made safety training compulsory for all fishermen entering the profession, with some also including experienced fishermen. These include many countries in Europe as well as Canada, Australia and New Zealand.

The main elements of the training include: first aid, survival at sea, fire-fighting/smoke diving, and safety on board; hull, machinery and electrical equipment; and stability. In the United States and Canada, the training often includes radio and navigation equipment. The courses vary in length usually from 20 to about 40 hours.

Any mandatory programme is likely to be resented, resisted and probably to fail, unless it has the support and involvement of fishermen. It is important to offer the training in a realistic environment involving the fishermen in "hands-on" participation with active feedback. Therefore the training is either provided on board specially equipped training vessels or in training centres in the fishing communities. In some places, drills can be offered on board the fishermen's own vessels. The need to establish trust between trainees and trainers is recognized and experienced fishermen are appointed as instructors where possible.

Safety training for fishermen has been introduced at various levels with various requirements for the issue of a certificate. Some courses merely require attendance, while more comprehensive programmes require specific tasks to be undertaken by the trainee (e.g. extinguishing a fire or launching and boarding a life raft) and, at the higher levels, they require oral and written examinations to be completed satisfactorily. Many pre-sea safety courses in developed countries are identical, or very similar to courses agreed by international convention for trading vessels by IMO and described in IMO Model courses. These courses are designed to be adapted to various types and size of vessel and a fishing vessel is, in effect, just another vessel. The components of these courses are:

1. Personal survival techniques,
2. Fire prevention and fire fighting,
3. Elementary first aid,
4. Personal safety and social responsibilities.

The certificates from such courses have the added advantage of occupational mobility for the trainee and the rationalization of expensive training resources between the trading and fishing industries. The certificates from such approved basic training also have the added advantage that they are internationally recognized.

As in the more general field of fisheries training, there has been a change of emphasis in recent years to functional training where trainees have to demonstrate their competence to complete tasks, rather than prove their knowledge by providing oral or written answers to questions. This type of functional training requires more resources than theoretical training, particularly where trainees are exposed to dangerous situations, and safety during the safety training process becomes an issue. Under such circumstances, specialized facilities, where simulations of dangerous scenarios can be undertaken, but where a tight degree of control by highly trained, experienced instructors can be exercised are highly desirable. Where such

survival training centres and fire training centres are available, they should be utilized fully, even by artisanal fishermen. After all, an artisanal fisherman is going to face the same problems as a fisherman from the biggest vessel in the world in a survival at sea situation.

Despite increased safety legislation, mandatory courses and improved safety equipment, some European countries are concerned that the accident rate and fatality rate remain very high. These countries have looked to the Integrated Safety Management (ISM) system adopted by IMO for trading vessels to see if this could provide an answer to the problem. The ISM system requires that the master and crew of a vessel provide a written report, which analyzes and describes the hazardous areas and activities that take place during the operation of the vessel (termed a safety management system). They are also required to state which precautions they will take to reduce or eliminate such hazards. Hence the fishermen are guided in a process whereby they have to think about safety on their own vessel using their particular fishing method, rather than rely on the provision of equipment and training which is specific neither to the vessel nor the fishing method. However, there are reports that the objective of this measure is being circumvented by owners hiring consultants to draw up the ISM reports for their vessels. There are also concerns about such a system causing excessive paper work and it being inappropriate for crew with limited literacy skills.

The effect of obligatory training on fatality rates

For several reasons, nothing can be said with certainty about the effect obligatory training may have had in reducing injuries and fatalities in the fishing industry. Firstly, such studies must be done over a longer span of time than the few years that have passed since safety training became obligatory. In fact, obligatory training in many countries is still in an adaptive phase, and is to be fully implemented in a few years time. Secondly, fatality rates must be normalized against comparable data on the number of fishermen with respect to workdays, hours underway, total fish landed, or some other suitable figures in different types of fisheries. Such data are not available.

Thirdly, the effects of training need to be isolated from other factors. General technical improvement in fishing, increased safety awareness, preventive actions, better search and rescue services, etc. combine to reduce injuries and fatalities. Improved records of injuries may coincide with this, increasing the number of reported accidents. Thus the effects of training are masked by several other factors.

It may nevertheless be informative to look at the trends in fishermen fatalities reported by some of the countries that have introduced compulsory safety training for fishermen. In Norway and in Iceland, only half as many fatalities occurred among fishermen between 1995-99 as during the preceding five-year period (1990-94). In Denmark, the trend is in the same direction but not as marked. Figures on the number of man-hours at sea during these periods are not available. The trend has been a gradual reduction in the number of fishermen, but the fall in numbers alone is nowhere near enough to explain the marked drop in fatal accidents.

	Fatalities 1990-1994	Fatalities 1995-1999	Sum 1990-99	Reduction	% Reduction
Iceland	**48**	**23**	**71**	**- 25**	**- 52%**
Norway	**132**	**62**	**194**	**- 70**	**- 53%**
Denmark*	**45**	**38**	**83**	**- 7**	**- 15,5%**

* 1989-98

One of the arguments against compulsory safety training is the cost that has to be carried by the fisherman and/or the community. The total cost varies from one country to another, as does the state subsidy. These costs, however, have to be measured against the multiple benefits of fewer accidents. The total cost in 1997 in Iceland of accidents at sea was estimated to be US$45-60 million, which constitutes 0.6 – 0.8% of the GDP. This includes the cost of marine insurance, search and rescue, medical treatment, social security compensation and personal cost estimated by the "willingness-to-pay method".[39] The cost of safety training involving 1,272 fishermen in that year was US$650,000, roughly 1% of the cost of accidents. These examples illustrate the point that it pays the community to invest in safety.

There is every reason to believe that safety training has positive effects on the rates of injuries and fatalities, although, for many reasons, this is difficult to prove with concrete figures.

[39] Cost of Accidents at Sea in Iceland. Institute of Economic Studies, University of Iceland, 1998. http://www.ioes.hi.is/publications/cseries/c9807.html

IV. Fisheries management and safety

It has often been speculated whether and in what way different fisheries management systems may have an effect on safety at sea. Co-management in the regulatory process, in which stakeholders/user groups have the formal opportunity and the power to participate in the design and implementation of fisheries regulations, is especially important given the impact that fisheries management regulations have on reducing or increasing dangers at sea. Such an impact is not a new concept, but unfortunately, it is not one that has been widely studied.[40]

In open-access fisheries, competition is the order of the day. Getting to and from the fishing grounds as fast as possible and carrying home the largest possible catch, calls for increasing engine power, vessel size and gear efficiency. Although working conditions and efficiency have improved in many ways with increased mechanization, new dangers have been introduced and the strain on the crew is still considerable, not least because of the reduction in numbers to cut costs. Safety regulations accepted by the merchant fleet met with reluctance in the fisheries, where people resented any infringement that might affect their income.

Fisheries management systems

Under the open-access fisheries, the capacity of the fleets was bound sooner or later to exceed the yield of the fishable stocks. In many countries, this coincided more or less with the advent of the 1982 UN Convention, which divided the former "high seas" into EEZs for coastal states, allowing each nation to control the fisheries up to 200 miles off its shores. Different management systems have subsequently been developed to control the fisheries. These are outlined below.

Access limited by size (and type of gear)

This type of control is meant to prevent vessels over a given size from entering an area, usually in order to reserve it for smaller inshore boats. The unintended result has often been that owners change the construction of their vessels to fit the criteria. These changes may severely affect the stability and seaworthiness of the vessels, which gained a reputation as "rule-beaters" or "sea-monsters". This has been difficult to prevent, as measures to intervene on behalf of the authorities are often lacking.

From a safety point of view, however, it is also important to bear in mind that when large vessels and small ones are fishing in the same areas, dangers of collision and damaging gear arise. Similarly, if fishing grounds close to shore are depleted, the small vessels are forced further out than their capacity and construction warrant. This is a real problem, quite commonly seen in industrialized as well as developing countries.

Total Allowable Catch (TAC)

Setting an upper limit to the TAC without further regulations, invariably leads to a rush for the fish, resulting in even fiercer competition than under the open-access fisheries.

[40] Kaplan, M. & Kite-Powell, H.L. Safety at Sea and fisheries management: fishermen's attitudes and the need for co-management. Marine Policy, November, 2000.

These are aptly described as “Derby” or “Olympic”-fisheries and are bound to inflict great pressure on the captain, crew and the vessel until the TAC is exhausted.

TAC with restricted days at sea

In order to mitigate the “Olympic-fisheries effect”, the number of days allowed at sea is stipulated along with the TACs. In some cases, the authorities decide beforehand which days of the season will be open to fisheries. This is an unfortunate system from a safety point of view, as it cannot take into account important factors such as the weather.

On the other hand, stipulated days ashore, particularly if combined with minimum wage insurance, make it possible for the authorities to plan boat inspections and educational activities such as safety courses ahead of time.

Individual Quotas (IQs)

The idea behind Individual Quotas (IQs) is to divide the TAC beforehand between a given number of vessels or parties. The element of competition for the highest possible share of the allowable catch should thereby be eliminated, taking with it time-pressure in fishing and transit. The success of this system obviously depends on how realistically the TACs can be set. If, in the fishermen’s opinion the TAC is too extravagant, they will set out to fish their share as quickly as possible. If, on the other hand, the TAC is considered realistic, the fisheries can be planned for the entire fishing season without undue pressure. But the fisheries are still subject to the pressures of fluctuating prices on the market that apply to fisheries in general.

Individual Transferable Quotas (ITQs)

From a fisheries management point of view, IQs should provide a tool to prevent further increase in the national fishing fleets, but they do not provide an incentive to *reduce* the existing overcapacity of the fleet.

By making the quotas transferable, however, an incentive is provided to reduce the fleet by amalgamating the quotas onto fewer vessels and getting rid of the rest. But this, in turn, reintroduces the pressure of maximum performance and productivity for each vessel, as in open-access fisheries. Having to pay for the right to fish, which formerly was free, increases both the financial pressure on the owners and the performance pressure on the vessel and crew, with obvious negative effects on safety.

These examples show that, even though fisheries management systems are not meant to regulate safety at sea, they inevitably have an effect in this respect. It is important to keep safety at sea in mind when fisheries management regimes are being evaluated; where these have a direct impact on fishing operations, management systems should provide fishermen with sufficient flexibility to enable them to choose the safe option. Preferably, safety should be an integral part of the management system from the very beginning.

Effect of remuneration and command patterns

In addition to the factors mentioned above, there have been speculations as to whether the system of remuneration may affect safety at sea. The basic types of remuneration prevailing in the fishing industry are the share system and the system of wages plus a catch bonus. The first is the more widespread and is often combined with a minimum wage assurance, while the second is restricted to vessels over a certain size administered by

structured companies, and often involves agreements that regulate working hours among other issues.

In the former case, the fisherman is usually an entrepreneur or co-adventurer and the normal employer-employee relationship upon which the system of occupational safety and health in industry tends to be based, is largely absent. In many countries, this means that fishermen do not enjoy the same social security benefits as employees on land.

As with any payment system, "catch-share" has both advantages and disadvantages. Those in favour of it say that it increases motivation, creates team spirit and gives every seaman a stake in the results achieved. It also distributes the risk between the owner and crew members during spells of poor fishing and, when things go well, the crew benefits directly. The "Klondike-spirit" that this system breeds is an integral part of the work environment and incentive in the non-industrial fisheries. There is no doubt that the catch-share motivates fishermen to work harder and for longer hours, which in itself contributes to risk through fatigue. It also increases the motivation to go fishing under adverse weather conditions, to take risks while fishing in the hope of increasing the catch and to overload the vessel when the fishing goes well.

Here the responsibility of the skipper must be kept in mind. He decides where, when, how, and for how long the fishing operations are carried out. How he goes about controlling the work on board depends on his disposition and temperament, his commitments (e.g. loans), age, experience, etc. In a survey on safety done among Icelandic fishermen, the most important safety factor singled out was the disposition of the captain.[41] The skipper is not exempt from the incentives and pressures of the catch-share system. On the contrary, not only his own, but everybody else's wages depend on how well he performs.

In this respect, it is interesting to note that even though fishermen may officially have the right to refuse unsafe work, allegedly allowing them the same rights as onshore workers, their situation is very different and it is unlikely that they will exert this right. First of all, it is the traditional, primary rule at sea that the captain decides and that insubordination may lead to retribution on part of the captain or company, perhaps to loss of wages for the voyage or even to losing one's workplace on board. Then there is the pervasive notion that physical risks are a part of the job. Thirdly, the crew looks upon itself as co-adventurers who share both risks and benefit. This exerts peer pressure on each crew member not to let the others down. Last but not least, there is no controlling agent on board the vessel, to whom the crew member can turn and who protects his rights. On land such agents can be summoned, and in compliance with safety regulations this may lead to closure of the plant.

Thus, it can be argued that the catch-share system carries with it certain risk elements. However, catch-share is so ingrained in fishing tradition, that attempts to replace it with an alternative system, by changing from a modified bonus-system and co-risk status to a true wage-employee status, seem highly unlikely to succeed. [42] This does not mean, however, that the authorities, vessel-owners and fishermen can not scrutinize the system with the aim of reducing elements that contribute to risk-taking.

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[41] Fishermen's view on safety (in Icelandic) Öryggismál sjómanna. Fisheries Research Institute, University of Iceland, 1995.

[42] Binkley, M. Department of Sociology and Social Anthropology, Dalhousie Unviersity, Halifax Nova Scotia, Canada. International Symposium on Safety and Working Conditions Aboard Fishing Vessels, Université de Quebec, Rimouski 1989.

The inevitability of fisheries management

The fact that the oceans and their living resources constitute an interactive global biosystem is gradually becoming more widely understood. No nation can escape affecting others by its actions or lack of action to manage its fisheries. Overfishing may not only destroy one stock but also lead to the collapse of other species feeding upon it. Destroying breeding grounds in one area may affect fisheries in totally different waters. Disrupting migratory routes in the high seas may have widespread effects in coastal zones, etc. The sea, which was regarded until recently as the cornucopia of food for all, is emerging as a sensitive and limited resource which must be carefully administered by all who exploit it.

This is such a revolutionary concept that it will take considerable time for its consequences to be realized in full: free access to fisheries is bound to disappear, be it on the high seas or within national waters. All nations will have to find ways to manage their fisheries, collect information on the size and composition of their fleets and adjust them to the capacity of the fish-stocks within their jurisdiction. If this is to be achieved, even artisanal fisheries in the developing nations will have to be contained and controlled in some way. Because of the small size of the vessels and the relatively ineffective fishing gear, the importance of controlling artisanal fisheries tends to be underestimated. Yet, on a global scale, artisanal craft are probably over 2.5 million in number, and have been estimated to fish half of the yearly capture fisheries for human consumption, which amounts to about 30 million tons.[43] So, by force of sheer numbers, artisanal vessels are major players in world fisheries and, as such, cannot be exempted from the regulatory regime.

Alternatively, the fate of fisheries will be determined biologically, by the collapse of the stocks. This would obviously have disastrous consequences for those who depend on fisheries for their living.

To varying degrees, most coastal industrialized nations, as well as some developing ones, are already employing some sort of control on their fisheries. In some countries, the management regimes are comprehensive and effective, while in others the control is only fragmentary and the infrastructure to carry it out almost non-existent. In some regions, as mentioned above, the countries have successfully formed coalitions to cooperate on fisheries management issues such as monitoring, control and surveillance (MCS).

One example is the cooperation of the Small Island States of the Caribbean who are working towards harmonizing their Fisheries Legislation. The legislation of each country will contain minimum standards for inspection and safety equipment to be provided on ALL sizes of fishing vessels. This is quite different from legislation in most industrialized fishing nations which, as indicated above, tends to apply only to vessels over a certain size.

Cooperation of this kind has often been instigated and supported by international institutions, first and foremost FAO, which has also upon request provided individual countries with assistance in developing fisheries management schemes.

The structural adjustments that are required in many fisheries will take a long time to become effective. Fisheries management is a process that evolves over time in response to changing circumstances. It is clear that in many developing countries, fisheries have a long way to go before they can be brought under formal control. Fisheries have been open access, the fleet poorly controlled and often operated directly from the shore with few or no harbours which might act as control points. As fisheries are often the employment of last resort, either for wages or at least to provide food for the family, restricting access to fisheries may prove a

[43] Ben-Yami, M. Safety at sea, the tragedy of official default. Samudra 23:24-28, Sept 1999.

politically and practically daunting task. Nevertheless, all fisheries will have to accept the inevitability of management, and experience shows that the benefits of such a regime may in fact compensate for the costs.

Namibia is an example of a successful transformation from uncontrolled to well-managed fisheries. In the decades preceding Namibia's independence in 1990, the hake in Namibian waters was severely overfished and its biomass reduced by over 80%.

> "Five years after taking control of its fisheries resources at independence, Namibia had created 6,000 new jobs, doubled wage-employment in the fisheries sector, tripled foreign exchange earnings, generated tax-revenue thrice the Fisheries Ministries budget, and integrated the fisheries sector more fully into the wider Namibian economy. This has been achieved against a background of adverse environmental conditions (the "Benguela Nino" of 1993-94 in the fishery) a major reduction in the total allowable catch (to promote stock recovery) and a 30% reduction in fish landings."[44]

It may be argued that Namibian fisheries differ from those in most developing countries by being modern and industrialized with relatively few artisanal fishermen. Nevertheless, the Namibian example shows that fisheries can be managed in such a way as to recover the cost of management and its implementation.

While Namibia introduced rights-based fisheries with good results, the People's Republic of China replaced to a large extent State control of the inshore fleet with private ownership, as a part of its open-door policy. This was done without the necessary accompanying management measures and has led to thousands of new entrants into the marine fisheries, many of whom are not licensed. Smaller and smaller vessels are replacing large vessels in Chinese fishing grounds. This puts tremendous pressure on the enforcement machinery, which is basically designed to cater for fisheries with large vessels. The authorities also have problems in controlling indiscriminate fleet expansion and obtaining reliable statistics on fishing operations. Fishing pressure in Chinese waters is being reduced by displacing the large vessels into distant waters, fishing upon agreement within the EEZs of other nations, while fisheries in coastal waters are managed mainly by closed-season for two or three months per year. However, this method does not provide an incentive to reduce the fleet nor does it in any way control the working conditions on board the vessels. A moratorium on building new vessels, except to replace older ones, is meant to prevent further increase in the fleet, but is difficult to enforce, partly because of lack of coordination between State and local authorities. A comprehensive management regime covering both the capacity of the fleet and working conditions on board needs to be introduced if the Chinese fisheries are to avoid a major crisis in the near future.[45]

Safety as an integral part of fisheries management

From the above, it is clear that the global fisheries situation has changed dramatically in recent years. The United Nations Convention on the Law of the Sea, which came into force in 1994, states not only the rights but also the obligations of coastal states to manage their 200 mile EEZs. Thus it is to be expected that all coastal nations will take measures accordingly over the next few years.

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[44] Brandt, H. Namibianisation, An example to follow? Samudra Report, 23: 41 Sept 1999.
[45] Mathew, S. Marine Fisheries, Chinese puzzle. Samudra 24: 45-49, Dec 1999.

This will open the way for the creation of regulations ensuring the safety and well-being of fishermen that are inherently compatible with those promoting the sustainable utilization of fishstocks. The industrialized countries have spent decades trying to improve safety at sea on a voluntary basis. There is now general consensus amongst safety promoters that obligatory safety training is the prerequisite for any success. Linking safety requirements to fishing permits is a practical way to overcome the lack of motivation that has been a barrier to improved safety at sea for fishermen for so long. Safety at sea must be integrated into the general management of fisheries in all coastal states if safer working conditions for fishermen are to become a reality.

This applies no less to developing countries than developed ones. In many developed countries, the infrastructure for such a project, that is, the legal and institutional framework, already exists, although it may belong to different administrative sectors. In most developing countries however, such infrastructure is nonexistent. Therefore, in some countries, integration of safety into the general fisheries management will require revision of the existing management rules, while in countries initiating resource management, safety standards must be built in from the start.

In time, the governance of fisheries will include direct involvement of fisheries participants, conferring user rights along with responsibilities. The management regime should not only aim to match the fishing fleet to the potential yield of the resource, but also to control the seaworthiness of the vessels, the working conditions on board, and to ensure that the crew members have the necessary training and know-how. This is in full accordance with the Code of Conduct for Responsible Fisheries:

"States should enhance through education and training programmes the education and skills of fishers and, where appropriate, their professional qualifications. Such programmes should take into account agreed international standards and guidelines".

and further:

"States should, as appropriate, maintain records of fishers which should, whenever possible, contain information on their service and qualifications, including certificates of competency, in accordance with their national laws".[46]

[46] Code of Conduct for Responsible Fisheries paragraphs 8.1.7 and 8.1.8.

V. Safety at sea in developing countries

In many developing countries, the fisheries are low budget and of low national priority because they are not considered a significant part of the country's economy.[47] Consequently, funds to improve the conditions of the fisheries are not readily available.

The problems encountered in safety at sea by fishermen in the developing countries, particularly on small islands, are also quite different from those encountered in developed ones. The main differences can be listed as follows:

1. The fishing fleet consists mainly of small, simple and often unmotorized vessels, (including canoes, pirogues and dhows), with limited equipment for navigation, communication and safety. Many of these fleets operate from beaches and shelters, far removed from, and frequently not visited by, fisheries administrations. Lack of contact and data collection frequently results in a lack of awareness by the administrations of sea-safety problems. Even where awareness does exist at the local level of administration, it is rarely reported as a priority item to the central administration.
2. There are not enough technically trained personnel to serve as crew members, trainers or inspectors.
3. SAR can be very costly and needs to be organized in the most rational way possible in each area. This may call for cooperation between different governmental agencies, e.g. those organizing Monitoring, Control and Surveillance (MCS) and Safety at Sea.
4. The infrastructure necessary for enforcement of laws and regulations is lacking in many developing countries, not least where the fishing communities are dispersed along the shore, harbour facilities are limited and beach landing is common.
5. The basic perception of the value of human life is culturally determined. This affects the motivation of each society to invest resources in life-protecting measures. In many developing countries, there is hardly any political pressure to invest in safety at sea. This situation is complicated further by the absence of organized representation, such as unions and pressure groups, which makes coordinated action difficult.

Although the basic problems of safety are common to all developing countries, the local conditions vary considerably. Many of the most basic problems resulting in high loss of life can be solved at low cost; the challenge is to educate the responsible authorities to the existence of these problems, and to translate recognition of the problems into effective remedial action. Public safety awareness campaigns, programmes for education/training and improving the availability of lifesaving aids, and the organization of SAR, need to be tailored specifically for each country.

The fishing fleet

The bulk of the fleet in the developing countries is made up of small, often undecked and unmotorized vessels. As Figure 3 shows, more than four out of five undecked vessels are

[47] There are exceptions to this, e.g. Bangladesh, Mozambique, Namibia and Eritrea and many small island states.

either in Asia or Africa.[48] These proportions did not change markedly during the dramatic increase in the undecked fleet, which grew by about 60% or one million vessels from 1970 to 1995.

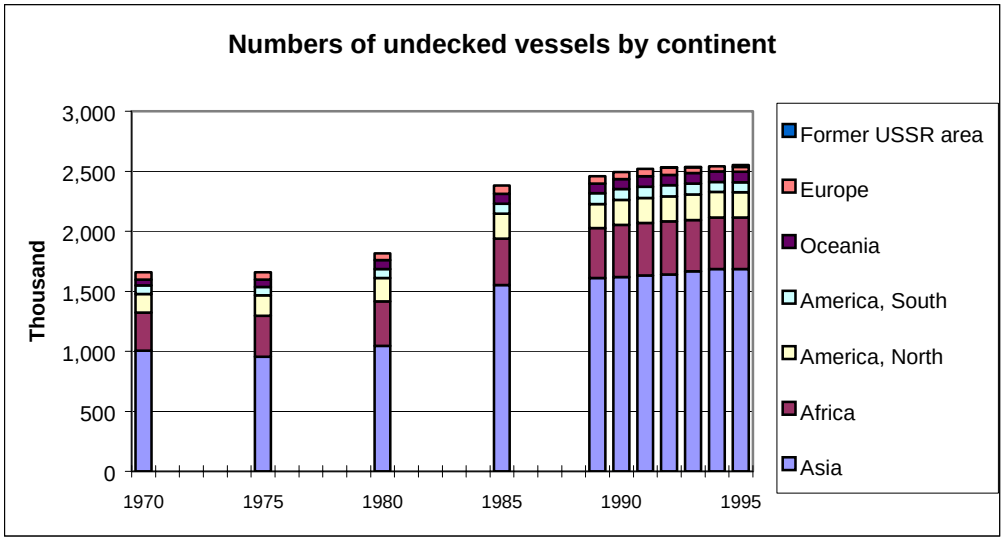
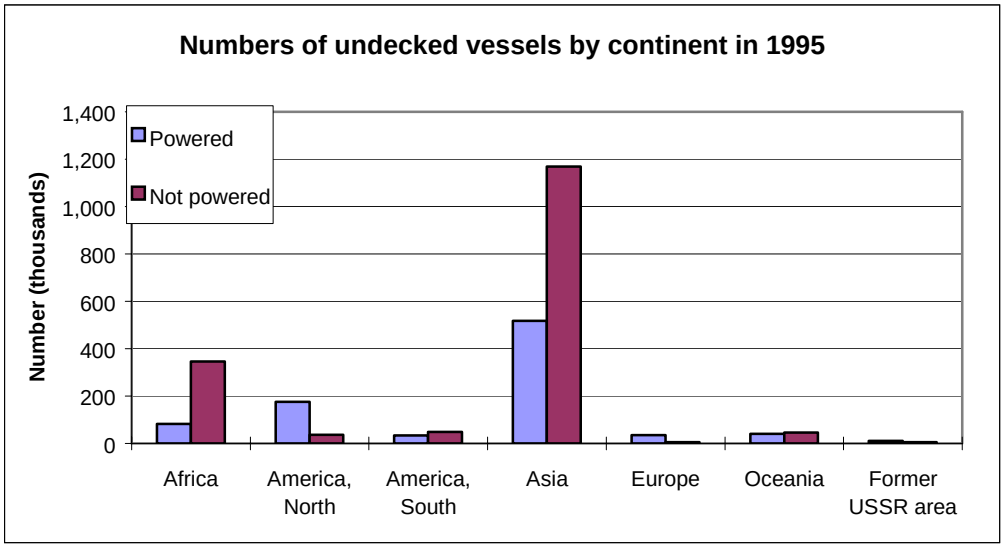


Figure 3. Numbers of undecked fishing vessels by continent

Figure 4 shows that only one out of five undecked vessels in Africa is powered by engine, while in Asia, one out of three undecked vessels are motorized. In Europe and North America, undecked and unmotorized fishing vessels are very rare.

Figure 4. Numbers of undecked fishing vessels powered and not-powered by engines by continent



Building standards and inspection

Often, vessels are built by untrained builders who copy traditional or imported craft but, because of cost-cutting practices, inadequate building material and lack of experience, they end up building vessels that are basically unsound. Frequently, these vessels do not comply with national regulations (where they exist) because of lack of enforcement. This is

[48] Figures 3 and 4 are from The world fishing fleet, in The State of World Fisheries and Aquaculture 1998: 66-69. FAO, Rome, 1999.

related to the competence of vessel inspection services (where they exist). Most of the inspectors have not had any training in the conduct of condition surveys of vessels of any sort at the level normally required for classification or insurance purposes. Furthermore, very few of the individual inspectors attached to Fisheries Divisions can boast of a background in boatbuilding, marine engineering or naval architecture.[49]

In some places, boat inspection simply means that fishermen who cannot afford the equipment prescribed, resort to corrupt practices, such as bribery. Another way out is to borrow the equipment just for the inspection period. Where fishing licences are required, seaworthiness, safety inspection and the certification of skippers are not always stipulated.[50]

Insurers and financers

Accident rates are very high and as a consequence of the risks involved, insurers are reluctant to provide coverage, even at high premium rates. This also affects fishermen's ability to attract loans for new vessels, as banks hesitate to make loans against vessels whose quality, in the absence of boatbuilding standards or accredited inspection, is uncertain. Insurers and bankers in developing countries often have limited knowledge about fishing operations, the importance of fishing seasons and the need for flexible repayments, etc. and therefore tend to turn down the applications, or demand high premiums or collateral other than the boat (which are not available). Consequently, fishermen are seldom insured and if lost at sea the families suffer loss of income in addition to the personal loss.

The institution of *mutual insurance schemes* implemented through fishermen's cooperatives for life insurance and/or vessel insurance would alleviate the long-term financial loss suffered by the immediate family in the case of a mishap. Additionally, members of the mutual scheme, in seeking the minimum of claims against their funds, could be expected to cooperate to ensure that their boats were well maintained and equipped to avoid accident.

Insurance programmes for fishers in developing countries are still at an early stage of development and face a number of institutional, financial and technical constraints. These include high administrative costs, inadequate coverage of insurance needs and high loss ratios. Among the factors identified as crucial to the success of fisheries insurance schemes are the active participation of fishermen's organizations in design and implementation of the schemes, as well as the incorporation of insurance requirements into fisheries regulations and management, and Government financial contribution to re-insurance and in covering losses due to natural calamities.[51]

Small boats venturing far out

With the high concentration of fishing effort close to shore, the inshore resources are generally overfished and highly stressed. The need to diversify fishing is acute, but, in some cases, lack of necessary skills and equipment has not permitted this to happen.

Motorization has made it possible for fishermen to venture much further from the shore than before, often in fishing craft that are unsuitable because they were based on designs for inshore fishing. In many cases, fishermen are unfamiliar with the offshore

[49] Turner, J. FAO Technical Cooperation Programme Draft, Regional Project Proposal, Development of Standards for the Construction and Survey of Small Fishing Vessels. May 1999.
[50] Ben –Yami, M. Safety at sea, the tragedy of official default. In Samudra, 23: 24-28, Sept 1999.
[51] Regional Conference on Insurance and Credit for Sustainable Fisheries Development in Asia, Tokyo, 1996. summarized in Fisheries Insurance Programmes in Asia , FAO Fisheries Circular No. 948.

fisheries and cannot draw upon the experience of past generations who themselves have only fished in inshore waters. The fishing trips may last for several days, whereas the vessels may be designed for day-trips only. In Sri Lanka, however, the offshore fishery has been growing considerably in the last decade. In 1998, about 1,100 small, decked boats of 9-13m ventured out as far as the coast of Somalia and stayed at sea for up to one month in search of tuna, shark and billfish.

Inshore fishermen who are forced to venture offshore run the additional risk of colliding with large domestic or foreign fishing or trading vessels.

Engine breakdown due to poor engine maintenance and lack of spare parts is recognized as a major cause of distress, especially when it occurs far from the shore with limited means of communication. In many crafts, sails and paddles have been discarded, leaving the craft without any physical means of propulsion in case of engine breakdown. Ensuring the ready availability of spares and equipment for reasonable maintenance of the engines is a priority task. Many developing countries have foreign currency problems, which means that spares and equipment have to be purchased with “hard currency”, involving a great deal of bureaucracy and loss of time if the purchase has to be imported. Under these circumstances, it is not unusual for vessels to be used with equipment that is known to be defective on board, even though the owners have the money in local currency to pay for the required item. This also applies to safety equipment, such as fire extinguishers and life-jackets.[52]

Safety equipment

In many places, there are no minimum requirements for carrying navigational equipment, such as a compass, charts or even a transistor radio, which may be used to take bearings on radio stations. Under these circumstances, navigation depends solely on visibility, and even where they are available, weather forecast services cannot be utilized.

Lack of equipment is very widespread and often acute. Sometimes boats are not even visible because there are no lights or radar reflectors on board.

In case of engine breakdowns or other mishaps, the first step towards rescue is to be able to contact other boats or shore stations. Near the shore, very high frequency radios (VHF) can be used, with a typical range of 30 miles (if the reception station is placed high up). In many countries, the VHF radio station network is poor or non-existent. Nevertheless, VHF radio can be useful for direct communication between boats that can operate together for increased safety. Although VHF radios may be within the financial means of artisanal fishermen, the problem is that they need electrical/battery power, which in many vessels is not generated by the outboard engines.

The fate of channel 16, the universal VHF distress channel presently monitored by all vessels and shore-based monitoring stations, is currently being debated in view of the new Global Maritime Distress and Safety System (GMDSS), which, in the absence of the prescribed shore-based radio facilities will be based on satellite communication. This has caused concern for the safety of small-scale fishermen, who cannot afford expensive

[52] Prado, J. & Smith, A. Les accidents a bord de petits bateaux de peche dans les pays en developpement, quelques mesures preventive. International Symposium on Safety and Working Conditions on Fishing Vessels. Universite de Quebec, 1989.

equipment. Yet, technical advances and lowering prices may lead to dramatic changes in the means of communication available to small-scale fishermen before too long.

While it may seem obvious that fishermen would wish to carry basic life-saving equipment on board their vessels – such as first-aid kits, life-buoys and life-vests, spare water and food supplies, spare parts for the engine and oars or a sail in case of engine breakdown – fishermen are very practical and many object to carrying and paying for items that they believe are unnecessary. On small vessels, space is precious and designing multi-purpose safety equipment may be worthwhile. For instance, a sail that can also serve as a sea anchor, spray dodger or to protect the catch from the sun, is more likely to be taken along. A life jacket that is not too bulky and can be worn at work, does not take up extra space, and the radar reflector that can also be a heliograph is more readily accepted. Cost is also important. Many fishermen barely break even financially and safety equipment may simply seem too expensive. When money does become available, the fisherman may decide that it is better spent on new gear that will increase the catch, rather than on some safety equipment which may never be used.

The gap between the internationally approved standards for safety equipment such as life-jackets, and the financial means of fishermen in the developing countries, creates a dilemma. Sometimes the choice seems to be between "substandard" equipment or none at all. In any case, providing the safety gear is often a problem. In many places, it is necessary to support or establish a system that ensures the local manufacture or ready importation of appropriate safety equipment together with efficient channels for its sale to fishermen, ensuring ready availability at all times.[53]

The cost of better safety equipment should be assessed against the high costs of SAR operations that have to be undertaken when boats are reported missing.

Technical advances have resulted in great improvements in safety equipment, particularly in navigational and radio communication equipment and survival craft. However, there are a significant number of casualties resulting from the misuse of such equipment on board vessels, from which it may be concluded that although modern technology has an important part to play in the safe navigation of vessels, in untrained hands, it can lead to disaster. System handbooks are often difficult to understand. Hands-on training is most strongly recommended for watchkeepers to ensure that they can use autopiloting equipment correctly, know its limitations and, above all, are familiar with the procedure to override it to alter course.[54]

Training of trainers, inspectors and fishermen

In designing training programmes for inspectors, new trainers or the fishermen themselves, several questions have to be answered.

1. What is the framework within which the training programme will operate?
2. Who is responsible for standards and certification?
3. Who is to be trained?

[53] Johnson, J. Outline of actions which can be taken to improve artisanal safety at sea. Report of FAO Mission for the Gambia Fisheries Department, 1995.
[54] Safety Bulletin 3/99 MAIB, November 1999.

4. Where will the training be conducted?
5. Who will decide on the content of the training curriculum?
6. Who will do the training?

Framework

The framework within which the training programmes operate is often dictated by the legal provisions for vessel safety and inspection in each country. If the legal framework does not exist, it needs to be created, preferably as an integral part of fisheries management in a broader context. The framework for such legislation could be worked out by international, intergovernmental and national bodies, to be used by national governments in close cooperation with the stake-holders, such as vessel-owners, fishermen's associations and other appropriate user groups, and adapted to the specific needs of each country.

It is essential to ensure that regulations take into account the varying nature of different types of fisheries. Rules that may be appropriate for a particular type of vessel do not necessarily apply to other types of boats or fisheries. Inappropriate legislation is counterproductive as it is perceived as unrealistic and unenforceable and results in non-compliance with the rules. If some obligatory regulations are not appropriate or cannot be readily adhered to, they will seriously detract from the confidence which boat-owners and fishermen will have in the other, perhaps fully justified regulations, and reduce the overall levels of voluntary compliance.

Training programmes exist in most countries where there is enough demand and certification for crew is required. Difficulties arise where there is very little demand for such courses and the means and motivation to provide them are lacking. Before training institutes are set up, a thorough investigation should be made into the continuing demand, and if this is less than a given minimum, e.g. 20 full-time equivalent students, then other methods of training should be considered, e.g. by offering courses at appropriate intervals (every five years), or by training in an adjacent country. Setting up regional networks or training centres should encourage such cooperation.[55]

Authority responsible

The authority responsible for training and certification has to be designated. Given the low numbers of personnel in public service, this responsibility might fall on services that are not normally involved in training or education (e.g. Coast-Guard, Harbour Master, Navy, etc), or conversely, it may fall on someone within the educational system who is normally not involved in fisheries. This may cause problems as it requires collaboration between different administrative units and departments.

Who will be trained

Although the primary target groups are small-scale fishermen, other groups would also benefit from training. These include: inspectors and future trainers; fishery officers, whether acting in the capacity of extensionists or ensuring that fisheries regulations are followed; fishery protection officers; boat designers and builders; and search and rescue officers. In addition, it might be useful to provide information or courses for bankers and insurers, who in

[55] Turner, J. A guide for the implementation of safety programmes in fisheries, in International Symposium on Safety and Working Conditions aboard Fishing Vessels, University of Québec, Rimouski: 397- 403, 1989.

many cases have limited knowledge about fisheries and thus find it difficult to offer suitable financing or insurance schemes to fishermen.

Training sites

The training should be conducted as close to the fishermen's workplace as possible, both for economic and educational reasons. The need for centralized facilities with radar simulators, fire-fighting centres, etc. for training in larger vessels, does not exist for artisanal craft. Wherever possible, the training should be based on a well-defined group, such as a fishermen's cooperative, and the timing should be off-season, or during non-working hours. Quite often, successful classes are conducted in the early evening in the local school.

Currriculum

The curriculum should be tailored to the local situation and at a level that all trainees can follow. Educational standards in some developing countries are very low and illiteracy rates among practising fishermen in rural areas are high. This means that dissemination of material written for inspectors or small-scale fishermen in developed countries, even though it is translated into local languages, is inappropriate. Illiterate they may be, but fishermen are seldom innumerate and "hands-on" training, combined with the use of pictures and common sense can render good results.

Within the foreseeable future, the Internet will probably become the key source of teaching material. Safety courses are already being offered on the Internet and similar training material could be developed for use in different developing countries as a teaching aid.[56] This task could be undertaken by FAO, with its knowledge of local conditions in the fisheries of so many developing countries.

Trainers

The number of people in the developing countries who have the maritime background to train inspectors and/or fishermen is limited. Usually, the harbourmaster, coast-guard or fisheries extensionist are the natural choices. Yet the trainers themselves need to be properly prepared to be able to provide the appropriate training. It is essential that mutual trust is established between the trainer and trainees, and that the training is tailored to meet the needs of each particular group. It has been pointed out that "the big boat mentality" should be avoided and the instructors should be able to empathize with the fishermen and understand that it is the fishermen's problem that has to be tackled.[57]

Search and Rescue

Irrespective of the methods employed, Search and Rescue (SAR) is always a costly operation. In many developing countries it may seem a daunting task, especially where the sea area is very large in proportion to the land. Under such circumstances, search by air is most effective, but the costs involved are prohibitively high and constitute a heavy unforeseen financial burden on government departments that can ill afford it.

"Northern" sea-safety programmes and equipment have evolved in working environments where sea conditions are harsh and equipment is relatively cheap compared with the expensive manpower. Thus, the northern approaches are designed around robust

[56] Krisnhnan, O.G. Web-based information: Safely in the net. In Samudra 23: 34. 1999.
[57] Fitzpatrick, J. & Smith, A. The Training of Fishermen: a Small island Approach. Second International Symposium on Safety and Working Conditions abord Fishing vessels. Bamio, Spain. 15-17 Sept 1992.

equipment operating under very harsh conditions. These solutions need not be copied in developing countries. In tropical artisanal fisheries, labour is cheap, but, relatively speaking, equipment is extremely expensive. Sea conditions, on average, are not so difficult. Sea safety programmes in developing countries could make a virtue of necessity, by evolving approaches that rely more on their inexpensive manpower, making the best possible use of modest equipment that has to withstand only relatively moderate sea conditions.[58]

In order to facilitate SAR, a system should be established at each landing site under which, before departing, all vessels indicate the general zone where they expect to be fishing and the time when they plan to return to home base.[59] Where possible, regular radio contacts with all participating coastal centres should be made at specific times of day in order to be sure that the alert system is functioning and to receive messages concerning local conditions.

It is important to coordinate the efforts of existing institutions, NGOs, the families of fishermen, and others who may take part in organizing and carrying out SAR and other safety-at-sea activities, by forming local safety-at-sea organizations that can also convene on a national basis. Such organizations help provide the continuity that is vital to effective safety-at-sea activities, such as awareness campaigns, safety courses, fund-raising and lobbying. Last but not least, they also provide large numbers of volunteers to take part in SAR when the need arises.

By involving volunteers, the official cost of SAR is dramatically reduced. In Norway, for example, the state-operated Stand-By/Rescue fleet for the offshore industry of 3,600 workers had an annual operating cost of approximately NOK500 million in 1989. The corresponding NGO service (Norwegian Society for Sea Rescue) served 30,000 fishermen with an annual operating cost of NOK350 million (in 2000). The NSSR's statistics show that on average the sea rescue cutters have saved 30 – 40 lives every year for the past 25 years. Based on the lives and property saved, the Norwegian Institute of Transport Economics estimates that the NSSR's contribution to the national economy is in the range of NOK1 billion per year. [60]

[58] Johnson, J. Intermediate technology MCS and appropriate technology for artisanal sea safety: a solution in common. Draft version. February 2000.
[59] Johnson, J. Outline of actions which can be taken to improve artisanal safety at sea. FAO report to the Gambia Fisheries Department. 1995.
[60] The Norwegian Society for Sea Rescue http://www.nssr.no/Engelsk.htm

Box 5. Voluntary safety-at-sea organizations

An example of how a voluntary organization was established and grew to become a mass movement and one of the national pillars of sea safety, is the Icelandic Association for Search and Rescue (IASR). When the IASR was established in 1929, the bulk of the Icelandic fleet consisted of small (less than 20m long), decked and motorized vessels operating under very harsh weather conditions. From the very beginning, women – the wives, daughters and mothers of fishermen – were very active members of the organization. The first goal was to establish SAR groups in all the fishing communities around the coast. These consisted of the men, but alongside, the women formed their own affiliates. Their main tasks were to raise funds to buy SAR equipment, erect shelters in places prone to shipwrecks, and to build rescue vessels which were placed in strategic harbours along the coast. The IASR has taken an active part in formulating recommendations for safety regulations and in lobbying for their promotion with the authorities.

Another major task of the IASR was to organize and carry out safety instruction in the fishing communities. At first this was done by visiting instructors, who offered lectures to voluntary listeners, but over time the scope broadened and the IASR now runs the official obligatory 40-hour safety training for fishermen on vessels over 12m. The courses are offered on board a well-equipped teaching vessel, which pays regular visits to the communities around the coast.

The IASR has grown to be an indispensable part of safety at sea in Iceland, a respected consultant and close cooperator with the authorities, able, at a moment's notice, to call out hundreds of well-trained volunteers, both men and women, for SAR at sea or on land, with the most up-to-date equipment and ready to operate under any circumstances, be it wrecked or stranded ships, volcanic eruptions, avalanches, or other unforeseen natural catastrophies.

Control and enforcement

The very nature of the fishing communities in developing countries makes it difficult to implement rules and regulations concerning the seaworthiness of both vessels and crews. Huge numbers of fishing units are spread over long coastlines and numerous, often remote, islands. In many places, harbours are few and far between and beach landing is common. Harbours provide a natural point of control and enforcement, and where they do not exist an alternative system needs to be built up in cooperation between official agencies and the users, such as the vessel owners and fishermen's organizations.

Most developing countries have some form of Monitoring, Control and Surveillance (MCS) in place. MCS is basically defined for fisheries management and covers fisheries research, data collection, statistics, etc. However, MCS is generally interpreted as a policing operation, where vessels are checked at sea so the emphasis is on Surveillance.[61] MCS does not control safety aspects, i.e. the seaworthiness of the vessel and the training/certification of the crew. MCS is generally under the auspices of the Ministry of Fisheries (or equivalent) or the Ministry of Justice, whereas safety at sea is generally managed by the Ministry of

[61] FAO Report on an Expert Consultation for Fisheries Management. Rome, FAO, 1981.
Monitoring - the continuous requirement for the measurement of fishing effort characteristics and resource yields
Control - the regulatory conditions under which the exploitation of the resource may be conducted
Surveillance - the degree and types of observations required to maintain compliance with the regulatory controls imposed on fishing activities.

Transportation. It therefore requires interdepartmental cooperation to use the framework of MCS for control and enforcement of regulations concerning safety at sea.

An interesting proposal is being prepared by FAO for the West African region linking the services for MCS, SAR and safety at sea in order to maximize their efficiency for as low a cost a possible. Many of the services offered in these three areas can be shared, and, in order to increase efficiency, it is proposed that they be administered as a single unit by one national coordinating committee.

Box 6. Joint MCS, artisanal safety at sea and SAR – A common solution

In the West African region, 80% of the artisanal fleet is unmotorized, the yearly fatality rate for fishermen is about ten times higher than in the developed countries (around 1,000 per 100,000), and most of the countries have opened their EEZ to foreign industrial fleets. Although a 3-12 nautical mile coastal zone is reserved for artisanal fishers, keeping the industrial vessels out of these waters poses problems for the local MCS services.

The main elements of the proposed solution lie in the mutual benefits of cooperation between the artisanal fishermen themselves and the authorities responsible for controlling their activities.

It is suggested that a proportion of artisanal craft be equipped with VHF radios and act as the detection system that reports industrial vessel incursions into waters reserved for the artisanal sector. These radio-boats could also serve as a part of the fishermen's safety group, by alerting the shore stations in case of emergency and taking part in SAR actions.

Another part of this intermediate technology (IT) MCS would consist of a chain of low-cost shore site radar stations, equipped with 12 volt yacht-quality radars on tall telephone poles, to provide day-and-night monitoring of the positions of the industrial fishing vessels near the coast. The shore stations would be manned jointly by a team of naval officers and personnel from the national fisheries department and equipped with a motorized, slightly modified and strengthened fishing canoe enabling them to react to suspected incursion by boarding and examining the vessel in question, thus serving as MCS. Similarly, they would have an SAR function, reacting to distress signals, organizing and going out on SAR operations in cooperation with the fishermen's safety groups.

Keeping the industrial fleet out of coastal waters and serving as SAR teams should create trust and good will, which would facilitate the third function of the IT MCS system, namely to carry out MCS on the artisanal fishery itself by actively patrolling and supervising their operations.

Registry of vessels

Forming and maintaining a record of fishing vessels is of central importance for the management of fisheries for economic, biological and social reasons. In order to be able to relate the size and capacity of the fishing fleet to the expected yield of the resource, it is necessary to issue fishing licences to registered vessels. Records of vessels are also central to controlling their seaworthiness through a formal inspection system, preferably linked to the issuing of fishing permits. Keeping track of the vessels through registration provides the necessary base for collecting various types of statistics, be they related to the catch, the number of people employed or safety issues. Records are central to vessel monitoring and being able to identify vessels is a key element in SAR. For safety and management reasons, all vessels should be kept on record and have the boat name and/or registration number painted or engraved on their hull. Additionally, there remains a requirement for the marking of all fishing vessels under Article III (Flag State Responsibility) of the Compliance

Agreement.[62] Life jackets, ring buoys and other floating equipment on board should have the name of the boat and its home port printed, painted or written on the equipment.

Obviously, building up and maintaining up-to-date records of vessels and crew is a task that demands a sustained effort and coordination on part of the administration. To facilitate this, guidelines providing the framework for such registration systems in developing countries would be useful. An outline of guidelines for a permanent register of accidents on board fishing vessels is provided in the FAO Missions Report for the Gambia Fisheries Department, 1995. FAO has issued Technical Guidelines intended to provide support for the implementation of the Code of Conduct for Responsible Fisheries. The data requirements listed as desirable for implementation of a management plan[63] include information on the name and type of vessel, date and place built, length of vessel, vessel markings, type of gear, international radio call sign, address or port of registry, name and address of owner (see table 3 in the Technical Guidelines). These items would also be useful for safety management purposes, confirming yet again that fisheries management and safety management go hand in hand and should not be administered as separate issues.

[62] Each party shall ensure that all fishing vessels are marked in such a way that they can be readily identified in accordance with generally accepted standards, such as the FAO Standard Specifications for the Marking and Identification of Fishing Vessels, FAO, 1989.

[63] FAO Technical Guidelines for Responsible Fisheries no 4, Fisheries Management. Rome, 1997.

VI. FAO and safety at sea in developing countries

Many developing countries face the need to design and implement a system to manage their fisheries and may look for external advice and aid to help them meet this need. FAO is the obvious UN agency to promote a holistic approach to fisheries management, including safety at sea, in the developing countries. This is in full accordance with FAO's mandate to raise levels of nutrition and standards of living, and follows naturally from the Organization's formulation of the Code of Conduct for Responsible Fisheries and its mandate to monitor the application and implementation of the Code and its effects on fisheries worldwide.

From its creation in 1945, FAO has taken an active part in the composition and implementation of international fisheries standards and instruments to further its aims, often in close cooperation with other UN agencies concerned, primarily the IMO and ILO.

One of FAO's major strengths stems from the thousands of field projects that the Organization has run over the years. Working in cooperation with local experts and together with project beneficiaries, FAO has built up an extensive body of knowledge about local conditions and a network of contacts at local, national and regional level. Since its inception, FAO has implemented hundreds of fisheries projects directly related to the establishment of fisheries training institutions, improving the quality of design, construction and equipment of fishing vessels, and above all, working directly with fishing communities; all these have a bearing on safety at sea.

Local networks and the knowledge of local conditions in different developing countries and regions are of supreme importance, and should be regarded as a valuable resource that has been created through the efforts of FAO over more than half a century.

As increasing numbers of developing nations rise to the new responsibilities placed upon them by the 1982 UN Convention and other international agreements concerning the management of fisheries and other natural resources, they are likely to seek external advice on how to set up appropriate management systems. These systems must be worked out by legislators and stakeholders cooperating in each country, taking account of biological, economic and social conditions. These conditions vary from one country to another and the management system must be tailored accordingly. FAO has the experience and expertise to deal with the various issues that arise when countries request advice in such matters, be they legislative and legal questions, the assessment of fishstocks or technical know-how on the construction of boats and application of appropriate gear. The Organization also has a long tradition of cooperation with local people in developing countries from the community level to the highest authorities in civil service and government.

As stressed throughout this study, fisheries management schemes should aim to promote both the sustainable harvesting of living marine resources, and acceptable working conditions for fishermen. Safety at sea should be regarded as an integral, indispensable component of fisheries management.

With the Code of Conduct for Responsible Fisheries and the accompanying Technical Guidelines, FAO has provided a framework on which different fisheries management systems can be built. The Code seems to meet with general approval and has already been used as framework for a new fisheries management legislation.[64]

[64] The Philippine Fisheries Code of 1998.

Although it is generally quoted that the Code of Conduct refers to safety in four paragraphs, if training and certification of competency are recognized as important for safety, it is, in fact, dealt with in at least eight paragraphs (see Box 6). This means that FAO can use the Code of Conduct as a vehicle to promote various issues relating to safety at sea. This can be done when monitoring the implementation of the Code. The questionnaire that is sent out biennially to all member states serves not only to gather information, but also to highlight key issues. It is therefore important as a tool to raise awareness of safety as an integral part of fisheries management.

Box 7. The Code of Conduct and safety at sea

6.17 States should ensure that fishing facilities and equipment as well as all fisheries activities allow for safe, healthy and fair working and living conditions and meet internationally agreed standards adopted by relevant international organizations.

8.1.5 States should ensure that health and safety standards are adopted for everyone employed in fishing operations. Such standards should be not less than the minimum requirements of relevant international agreements on conditions of work and service.

8.1.6 States should make arrangements individually, together with other States or with the appropriate international organization to integrate fishing operations into maritime search and rescue systems.

8.1.7 States should enhance through education and training programmes the education and skills of fishers and, where appropriate, their professional qualifications. Such programmes should take into account agreed international standards and guidelines.

8.1.8 States should, as appropriate, maintain records of fishers which should, whenever possible, contain information on their service and qualifications, including certificates of competency, in accordance with their national laws.

8.2.5 Flag States should ensure compliance with appropriate safety requirements for fishing vessels and fishers in accordance with international conventions, internationally agreed codes of practice and voluntary guidelines. States should adopt appropriate safety requirements for all small vessels not covered by such international conventions, codes of practice or voluntary guidelines.

8.3.2 Port States should provide such assistance to flag States as is appropriate, in accordance with the national laws of the port State and international law, when a fishing vessel is voluntarily in a port or at an offshore terminal of the port State and the flag State of the vessel requests the port State for assistance in respect of non-compliance with subregional, regional or global conservation and management measures or with internationally agreed minimum standards for the prevention of pollution and for safety, health and conditions of work on board fishing vessels.

8.4.1 States should ensure that fishing is conducted with due regard to the safety of human life and the International Maritime Organization International Regulations for Preventing Collisions at Sea, as well as International Maritime Organization requirements relating to the organization of marine traffic, protection of the marine environment and the prevention of damage to or loss of fishing gear.

VII. Conclusions

The international community has entered a new age with regard to the perception of natural resources and their utilization. Global understanding about the importance of sustainable and ecologically sound harvesting of depletable resources is growing, and so too is the concept that all nations share the ensuing responsibility. This is both the result of and the root for the development in international agreements and legislation concerning the utilization of natural resources, which took place in the last decades of the twentieth century– in particular the United Nations Law of the Sea Convention (The 1982 UN Convention) and the United Nations Convention on Environmental Development (UNCED).

The new legal regime of the oceans gives coastal states rights and responsibilities for the management and use of fishery resources within their EEZs, which embrace some 90% of the world's marine fisheries. This coincides with clear indications of overexploitation in many waters, motivating national governments to bring fisheries under proper control. One obvious instrument of control is the issuing of fishing authorizations to both vessels and crew.

This opens up new possibilities for promoting safety at sea. Throughout the twentieth century, safety issues were promoted almost exclusively on a voluntary basis, with limited results. By making safety requirements prerequisites to fisheries authorization, progress is guaranteed. To fish legally will be to fish safely. Such a step will require a change of attitude within the fisheries, and consequently a firm motivation on behalf of the legislators, but, given that fishing is one of the most dangerous occupations known on earth, this progress seems inevitable.

When giving advice, FAO will advocate a holistic approach to fisheries management for developing countries and include safety at sea as an integral part of the management regime. This will be reflected in the active use of the Code of Conduct to promote and monitor issues pertaining to safety at sea.