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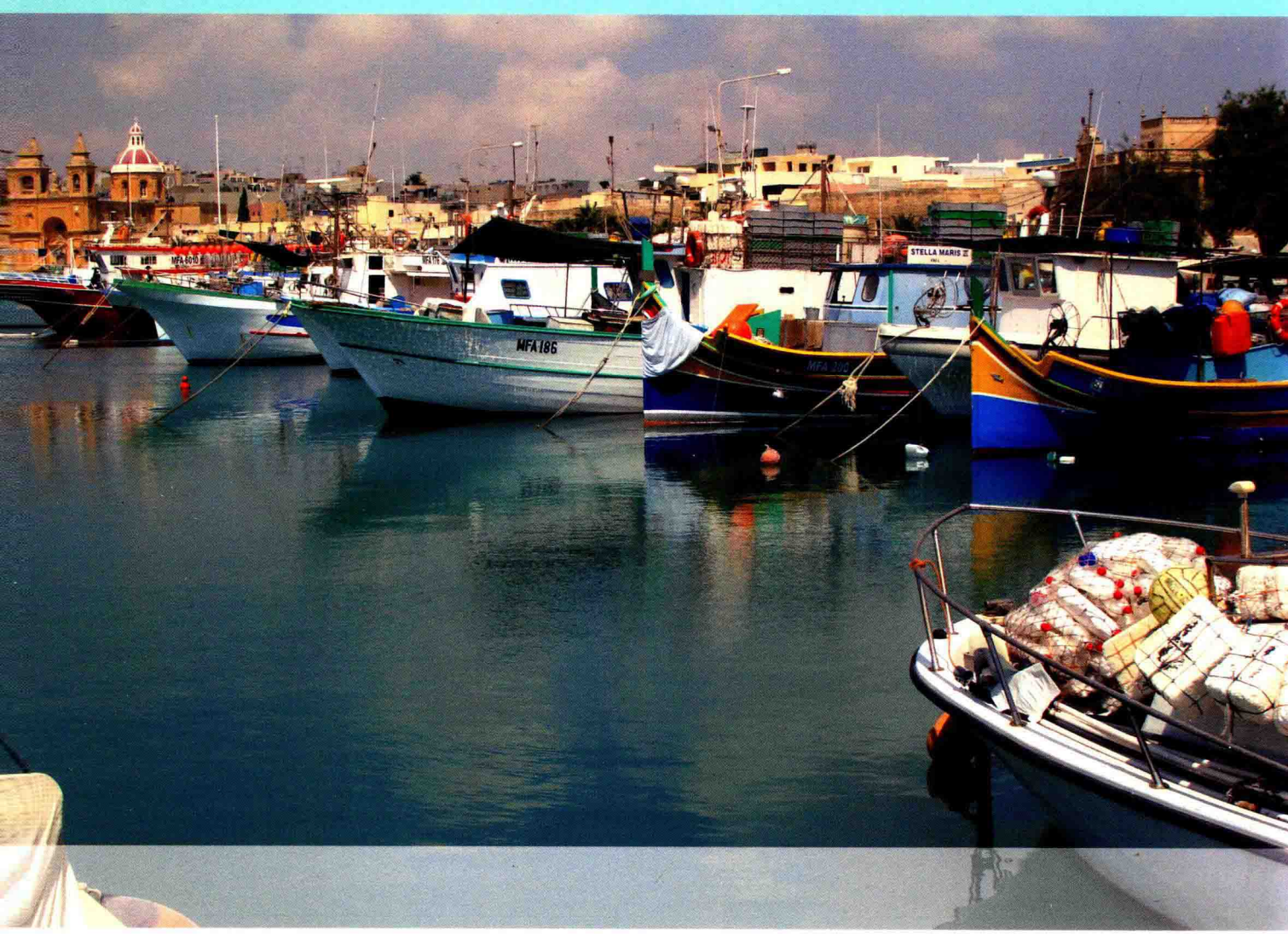

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Preparation of this document

This manual was prepared by Mr Joseph Alan Sciortino, MICE, M. ASCE, C. Eng., the Food and Agriculture Organization of the United Nations (FAO) Consultant on Harbour Design and Management. The manual reflects the provisions of the FAO Code of Conduct for Responsible Fisheries in relation to fishing harbours and is an extension of Annex VI, No. 1, in the series of FAO Technical Guidelines for Responsible Fisheries. It contains proposals and guidelines to be followed with regard to the design, development, management and maintenance of ports and landing places for fishing vessels. It also provides guidance on the conduct of environmental auditing in relation to new construction and the upgrading of existing facilities. It was based on a manual prepared in electronic format in 1999, and updated and revised to integrate new guidelines, ideas, experiences and lessons from projects in different parts of the world.

The manual was technically edited by Mr John Fitzpatrick, C. Eng., C. Mar. Eng., MIMAREST, former Director of the FAO Fish Products and Industry Division. The draft of the manual was reviewed by Mr B.N. Krishnamurthy, FAO Consultant on Harbour Management and Institution Building and Mr V. Venkatesan, FAO Consultant on Community Participation in Fisheries, both under the Technical Cooperation Project on Capacity Building in Support of Cleaner Fishing Harbours in India; and Mr Simon Diffey, Chief Technical Advisor of the project on the Restoration and Improvement of Fish Landing Centres with Stakeholder Participation in Management funded by the Canadian International Development Agency in Sri Lanka.

The manual was edited by Maria Giannini. Susana V. Siar, Fishery Industry Officer, Fishing Operations and Technology Service (FIRO) of the FAO Fisheries and Aquaculture Department, provided overall supervision in the preparation and publication of this manual. The publication contributes to the achievement of the following organizational result: the operation of fisheries, including the use of vessels and fishing gear, is made safer, more technically and socio-economically efficient, environmentally-friendly and compliant with rules at all levels.

Abstract

The role of the fishing port may be considered as the interface between the netting of fish and its consumption. In many cases, the fishing harbour is also the focal point of pollution, both of the surrounding environment and the fishery products it produces. Many fishing harbours are also the source of major impacts on the physical and biological coastal environment.

Although the bulk of fish landed in fishing harbours in developing countries is destined for the local markets, it is every country's wish to improve the health hazard-free quality of its landed catch in order to increase exports of seafood products to more lucrative overseas markets. In the not-too-distant future, the growth in local consumer rights advocacy will also increase demand for health hazard-free fish.

In today's world of increased environmental awareness, a fishing port must be planned, designed and managed in harmony with both the physical and biological coastal environments. At each stage of the process, whether it is planning, design or management, both technical and non-technical persons become involved in the process. Within government departments, whether they be technical (fisheries or public works) or non-technical (budget or finance), it is not uncommon for non-technical persons to affect the outcome of technical decisions. Fisheries Departments worldwide generally have to manage and maintain harbours and landing places using non-engineering civil servants. The following manual was produced in order to tackle fishing harbours in a holistic approach.

This manual is useful to both technical and non-technical planners, both at national government level and at departmental level. It provides non-engineering staff within such departments with enough technical knowledge to better understand certain basic design requirements, which could otherwise be interpreted as superfluous and not cost effective.

The manual is of particular use to local independent consulting engineers and architects with no ports or fisheries experience involved in the design of locally tendered projects for the various international funding agencies. To technical staff of such firms, it provides a handy reference and the means for integrating Hazard Analysis and Critical Control Points (HACCP) and European Union Directive recommendations on hazard-free seafood directly into the fishing port's design.

The fishing industry as a whole can ill-afford the economic losses from lower prices received for contaminated fish. Recent European Union rulings have even gone one step further by banning outright all fish imports from certain countries.

Sciortino, J.A.
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Abbreviations and acronyms

AC	alternating current
AISI	American Iron and Steel Institute
BOBP	Bay of Bengal Programme
CFC	community fishery centre
CFCs	chlorofluorocarbons
COFI	Committee on Fisheries
DC	direct current
DGPS	Differential Global Positioning System
EC	European Community
EEZ	exclusive economic zone
EIA	environmental impact assessment
EIS	environmental impact studies
EPS	Electronic Positioning System
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FMO	fisheries management organization
GHG	greenhouse gases
GPS	Global Positioning System
GT	gross tonnage
HACCP	Hazard Analysis and Critical Control Points
HDPE	high-density polyethylene
HHWL	Higher High Water level
HHW	highest high waters
IALA	International Assocation of Marine Aids to Navigation and Lighthouse Authorities
IATA	International Air Transport Association
IEE	Initial Environmental Examination
IMO	International Maritime Organization
IPCC	International Panel on Climate Change
ISO	International Organization for Standarization
ISPS	International Ship and Port Facility Security Code
IUU	illegal, unreported and unregulated
LAT	lowest astronomical tide
LDPE	low-density polyethylene
LED	light-emitting diode
LLW	lowest low waters
LLWS	Lower Low Water Spring
LUX	1 lumen per square metre
MARPOL	International Convention for the Prevention of Pollution from Ships
MCS	monitoring, control and surveillance
MLLW	Mean Lower Low Water
m/s	metres per second
MSL	mean sea level
MSY	maximum sustainable yield
N/mm^2	Newtons per square millimetre

NGO	non-governmental organization
PAH	polynuclear aromatic hydrocarbons
ppb	parts per billion
ppm	parts per million
PVC	polyvinyl chloride
PVN	Private Virtual Network
PV	photovoltaic
RO	reverse osmosis
SAR	search and rescue
SOLAS	International Convention for the Safety of Life at Sea (IMO Convention)
SWL	safe working load
UHMW	ultra-high molecular weight
UKC	under keel clearance
UNCED	United Nations Conference on Environment and Development
UNCLOS	United Nations Convention on the Law of the Sea, 1982
uPVC	unplasticized PVC
UXO	unexplored ordinance
W/C	water-cement ratio
WGS84	World Geodetic System 1984
WHO	World Health Organization

Executive summary

The unrelenting pressure on the world's coastal resources and its coastal ecosystems is threatening the viability of fisheries as an industry. By its very nature, an ill-conceived port or fish landing structure has the potential to place a disproportionately large demand on both the local physical and biological resources and, in today's world of increased environmental awareness, a fishing port or fish landing site must be planned, designed and managed in harmony with these environments.

Fishing ports and fish landing sites are complex dynamic interface zones involving the mixing of environmental, ecological, economic and social activities and problems. This heterogeneous mix of activities demands strong cross-sector interaction at the planning stage to ensure that the resulting infrastructure may be managed in a sustainable manner. This manual is not the first effort by FAO to set forth a set of cross-sector guidelines for the planning and/or management of a fish landing site or fishing port. In various forms, information related to fishing ports design has been available since 1976, the most recent being FAO Training Series 25 on the construction and maintenance of artisanal fishing harbours and village landings (1995).

In recent years, world fisheries have become a market-driven sector of the food industry and many coastal states have striven to take advantage of this new opportunity by investing heavily, and sometimes haphazardly, in fishing port infrastructure. When, in the early to mid-1990s various international conventions and importing country directives on food safety came into force, much of this same infrastructure was found to be non-compliant, requiring further investment. Also, in the intervening period, the requirement for proper Environmental Impact Studies became mandatory in most States, further complicating the added investments required to make such infrastructure compliant.

Why this manual? The manual builds on the earlier work by FAO and introduces for the first time the international conventions and importing country directives that have a direct influence on both the planning and design of fishing port infrastructure. It is intended as a reference not only for engineers and architects involved in the design and rehabilitation of fishing ports but also for non-technical staff at departmental level in government institutions that may influence technical decisions in the field. These institutions may comprise, directly or indirectly, policy and planning, budget and finance, export and public health authorities. It may also be of use to donor agencies and non-governmental organizations when planning fisheries-related investments.

The use of this manual should enable consultants, architects and contractors involved in any stage of design or construction of a fish landing or port to avoid the mistakes of old. This manual covers all the aspects of fishing port infrastructure, from inception to final design as well as the construction and management of the fishing port or landing once constructed. This manual does not replace the textbooks required to design the single elements that constitute the fishing port, such as the breakwaters, the quay walls, etc. Any costs quoted in the manual refer to United States dollars and generally apply to any country with good connections. Operational costs in some developing countries may differ significantly due to logistics. To technical staff in general, it provides a handy reference and the means for integrating HACCP and importing country directive recommendations on hazard-free seafood directly into the fishing port's design.

The previous version of this manual was the basis of a distant-learning course. This edition is a good handbook based on the author's extensive experience in the design, construction and operation of fishing ports in many developing countries.

There are twelve chapters and five reference annexes in this manual. Each chapter deals with a particular topic and is a stand-alone document.

The first chapter presents the technical guidelines to the Code of Conduct for Responsible Fisheries. It also lists the relevant international conventions to which a State may be a party, together with third country directives that jointly will have a direct bearing on the overall design of the port and its components. These include compliance with basic engineering principles regarding the morphological degradation of the coastal zone in respect of erosion and siltation (UNCED 92), compliance with the relevant conventions concerning pollution of the aquatic environment (MARPOL 73/78) and the provision of adequate monitoring of the effects of operations on the environment (UNCED 92). The Code also addresses post-harvest practices setting out minimum standards for food safety and quality assurance.

The second chapter describes how to plan shore-based facilities and fishing ports that are commensurate with the targeted resources, within the exclusive economic zone (EEZ) of a coastal State and distant water fisheries, as the case may be, that would be environmentally sustainable and financially justifiable. It addresses the major issues that influence the size of a new port and describes in detail the classification of fishing ports, from artisanal beach landings to coastal fishing ports, offshore fishing ports and distant water fishing ports. Guidelines on the preferred siting of a fishing port vis-à-vis land use are also discussed. The chapter also dwells on post-conflict reconstruction procedures and on overcapacity (redundant vessels) and potential income diversification for fishermen faced with an ever-dwindling catch.

The third chapter tackles port management, from the simple fish landing on a beach to a proper deep water fishing port. It stresses the need for a stakeholder approach to port management whereby all the port users are represented on the management body. Typical port management bodies are described in detail covering all scenarios, from the simple village landing to a sophisticated fishing port. It also highlights the importance of a fish quality assurance regime inside the port and lists best management practices for port and boatyard operators and the prevention of pollution.

Chapter four reviews the environmental auditing procedures to be followed for all new designs. Degradation of the marine environment can result from a wide range of activities on land. Coastal erosion and siltation are of particular concern. Hence, rational use and development of coastal areas as well as conservation of the marine environment require the ability to determine the present state of these ecological systems and to predict future conditions. Systematic collection of data on marine environmental parameters is needed for an integrated management approach to sustainable development and to predict the effects of the construction of a port on the marine environment. This chapter should be of use to government institutions involved in fisheries-related development seeking international investment funds. The guidelines are also useful for the development or expansion of commercial ports which may impact fishing operations.

Hydrography is the foundation for all coastal work and chapter five covers the topic in great detail. In the past, many artisanal shelters and fishing ports were built at convenient locations, with no particular attention paid to the underwater environment. Many such ports are now plagued by erosion and siltation problems that could have been identified earlier had proper hydrographic surveys been conducted. This chapter should provide planners and engineers with cost-effective options when faced with tight budgetary restrictions and difficult logistics. It describes the amount of hydrographic detail required for a project from inception stage to construction phase.

Dredging and underwater excavation, chapter six, are an important aspect in the design and construction of key elements in a fishing port. Dredging may be required to develop a port basin or to maintain a navigation channel open, but may also be undertaken for other purposes such as land reclamation, beach nourishment and environmental remediation of contaminated sediments. Dredging may be of a permanent nature, also known as capital dredging, or of a transient nature, also known as maintenance dredging. The nature of the

material to be dredged determines the type of dredging equipment required or method to be adopted but, on the whole, dredging practice is site specific. Also, in recent years, the screening for the presence of potentially harmful chemical agents in the material to be dredged has become mandatory in many countries influencing not only the method of dredging but also the method of disposal. This chapter may be used as a guide to assist in the decision-making process for the selection of appropriate dredging and disposal techniques.

Chapter seven is dedicated exclusively to breakwaters. The sea is unforgiving and wave action continually degrades human-made structures erected in the sea and breakwaters form the bulk of this construction. Therefore, engineers are normally entrusted with the design and maintenance of large deep water breakwaters. However, cases also arise when artisanal structures are required at the local level and when engineering assistance is either not available or not with the right experience. This chapter is intended primarily for non-technical staff coming to terms for the first time with marine construction and purposely does not include advanced design aids for structures in deep water, the realm of professional engineers.

Chapter eight covers quays and slipways in detail and should provide the reader with a wide range of options for both quays and maintenance structures, such as slipways and boat gantries.

Chapter nine condenses the subject of materials knowledge and suitability into a single chapter while eliminating superfluous coverage. The chapter is confined to the properties of those materials and treatments or variations thereof that are applicable to port structures. Emphasis is placed on full coverage of the basic materials that have proved most durable in the highly aggressive marine environment inside port structures.

The tenth chapter is a comprehensive overview of all the mechanical fittings and quay furniture required to run a port efficiently, from bollards and fenders all the way to marker beacons, winches and fish boxes. It provides an ideal reference guide to both technical and non-technical readers.

Chapter eleven reviews the shore-based infrastructure typical in a port operation, from water supply, power, refuelling, ice, port buildings and paved areas. Any reader will find this chapter useful, either as a reference or as a guide on how to integrate HACCP and third country directives into a port's infrastructure design.

Chapter twelve provides a holistic approach to public health issues in fisheries ranging from water and water-borne contaminants to sewage and sewage treatment options. The comprehensive detail of this chapter will enable the reader to better understand the ease with which fish, meant for human consumption, is contaminated. The chapter will also assist port planners in dealing with the prevention of pollution in fishing ports.

The manual also has a list of annexes for use as reference material. Annex 1 reproduces the text from the FAO Technical Guidelines, No. 1, Fishing Operations, on the procedures for the development and management of harbours and landing places for fishing vessels. Annexes 2 and 3 are checklists for port hygiene and port hygiene deficiencies, respectively. The fourth annex is a training manual on seafood handling prepared by Francisco Blaha, formerly FAO Fishery Industry Officer for the Technical Cooperation Project on Capacity Building in Support of Cleaner Fishing Harbours in India. The fifth annex is a useful tool already used with success in public awareness campaigns on the prevention of pollution in fishing harbours.

Contents

1. Code of conduct, conventions and importing country directives

SUMMARY

There are a number of instruments both voluntary and binding that have a bearing on site selection, construction, facilities, operation, and management of harbours and landing places for fishing vessels, as well as prevention of pollution and port security. The intention within this chapter is to set forth basic principles, some of which are binding, that will be expanded upon in greater technical detail in successive chapters and annexes. In this regard, the Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing adopted by the Conference of FAO in November 2009 will, on entry into force, add to the responsibilities of port managers and departments of fisheries alike.

In addition, countries that export seafood and seafood products may also have to address directives of importing countries regarding post-harvest care, levels of hygiene and general cleanliness within work and storage areas and, in particular, the application of the Hazard Analysis and Critical Control Point (HACCP) principle.

CONTENTS

1.1 FAO CODE OF CONDUCT FOR RESPONSIBLE FISHERIES

In accordance with the recommendations of the Committee on Fisheries (COFI) at its Nineteenth Session in March 1991 and the subsequent International Conference on Responsible Fishing, held in Cancun (Mexico) in 1992, the Twenty-eighth Session of the Conference of FAO unanimously adopted the FAO Code of Conduct for Responsible Fisheries, 1995 (hereinafter referred to as the Code). The Code was formulated so as to be interpreted and applied in conformity with the relevant rules of international law, as reflected in the United Nations Convention on the Law of the Sea, 1982 (UNCLOS), as well as with the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, 1995, in the light of, *inter alia,* the 1992 Declaration of Cancun and the 1992 Rio Declaration on Environment and Development, in particular Chapter 17 of Agenda 21.

Whereas the Code is voluntary certain parts of it are based on relevant rules of international law, including those reflected in the United Nations Convention on the Law of the Sea of 10 December 1982. The Code also contains provisions that may be 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 International Conservation and Management Measures by Fishing Vessels on the High Seas, 1993.

With regard to harbours and landing places for fishing vessels, Article 6.17 sets out that States should ensure that fishing facilities and equipment as well as all fishing activities allow for safe, healthy and fair working and living conditions and meet internationally agreed standards adopted by relevant international organizations. More specifically, Article 8.9 addresses harbours and landing places for fishing vessels.

In adopting the Code, the Conference called for the production of technical guidelines for the implementation of the provisions of the Code. In this regard, this manual draws on the first in the series of FAO Technical Guidelines for Responsible Fisheries, entitled Fishing Operations, and in particular, Section 7, Energy Optimization and Protection of the Ozone Layer, and Section 8, Design, Construction and Modification of Harbours and Landing Places for Fishing Vessels.

In developing the guidelines and its annexes, FAO drew on experience gained over many years of field activities, and in the case of harbours and landing places, how increasing problems associated with the construction of new harbours and landing places for fishing vessels and, in particular, their operation and maintenance, had reached critical levels in some parts of the world. In many instances, the adverse effects of harbour pollution from the activities of fishing vessels as well as those of vendors and processors had been exacerbated by the almost total lack of reception facilities.

Matters had become more serious in the late 1980s with an ever increasing demand for assistance from developing countries to solve specific problems with existing harbours as well as for help in designing new installations.

A classic example was within the Bay of Bengal subregion, where the Bay of Bengal Programme (BOBP), with the cooperation of the International Maritime Organization (IMO) (within its cleaner seas programme) and FAO, commissioned a series of important studies. The results of these studies were presented at a workshop hosted by the Government of Malaysia at Penang, 9–11 December 1991, at which developments with regard to the International Convention for the Prevention of Pollution from Ships (MARPOL) were highlighted by IMO.

In parallel, the United Nations Conference on the Environment and Development (UNCED) deliberated the need for a precautionary and anticipatory approach rather than a reactive approach to prevent degradation of the marine environment. Consequently, in June 1992, UNCED recommended, *inter alia*, the adoption of environmental impact assessment procedures.

Thus, the Code and its Technical Guidelines underline the importance of environmental auditing, attention to the provisions of MARPOL and Article 21 of UNCED.

1.2 FAO TECHNICAL GUIDELINES FOR RESPONSIBLE FISHERIES NO. 1

The first in the series of FAO Technical Guidelines for Responsible Fisheries (FAO, 1996) refers to fishing operations and in Section 8 it states that, in general, competent authorities should adopt acceptable standards and follow guidelines for the design, construction, maintenance and management of harbours and landing places for fishing vessels (*reference 8.9 of the Code*) to ensure, *inter alia*:

- safe havens for fishing vessels;
- that freshwater supplies are available;
- the provision of adequate sanitation arrangements;
- that waste disposal systems (including for oil and oily water) are provided;
- that there would be no pollution from external sources (non-fisheries activities);
- that there would not be any pollution arising from fisheries activities;
- the provision of adequate servicing facilities for vessels, vendors and buyers;
- that maintenance programmes include the monitoring of the effects of operations conducted at the facility on the environment;
- compliance with relevant conventions concerning pollution of the aquatic environment;
- integration with other users as in the case of a non-exclusive facility for the fishing industry; and
- that arrangements are made to combat the effects of erosion and siltation.

The Technical Guidelines also expand on the provisions of the Code in relation to the participation of users in the management of ports, harbours and landing places (Section 8, paragraph 115), as well as the removal of offshore structures (Section 8.10 and Annex V) and the development of artificial reefs (Section 8.11).

1.3 ANNEX VI OF THE FAO TECHNICAL GUIDELINES FOR RESPONSIBLE FISHERIES NO. 1

1.3.1 General provisions

Annex VI expands on the principles set out in the Code and the Technical Guidelines, covering procedures for the development and management of harbours and landing places for fishing vessels. In addition, within the concepts of responsible fishing operations and the integration of fisheries into coastal area management, it also provides guidance on the conduct of environmental auditing with regard to proposal for new construction and the upgrading of existing facilities.

The annex provides a technical framework for the implementation of procedures as an aid to the management and development of harbours and landing places for fishing vessels.

1.3.2 Scope and objectives of Annex VI

The proposed procedures are global in scope and directed towards all persons, whether in government or the private sector, involved in the planning, design, construction, maintenance and management of harbours, harbour infrastructure and landing places for fishing vessels.

The objective is an enhanced capacity of States to ensure the adoption of environmentally sound development, management and conservation practices through:

- better standards of management in harbours and landing places for existing and future facilities;
- the establishment of environmental auditing procedures and design criteria related to future fisheries infrastructure projects; and
- appropriate training and education in environmental awareness.

It should be recalled, however, that although the Code is voluntary, some provisions of it may be or have already been given binding effect by means of legal instruments. The same statement effectively applies to this annex, since it contains references to legally binding instruments such as UNCLOS 82, the Montreal Protocol and MARPOL 73/78.

The full text of Annex VI is set out in Annex I.

1.4 INTERNATIONAL CONVENTIONS

1.4.1 United Nations Convention on the Law of the Sea, 1982

The United Nations Convention on the Law of the Sea (UNCLOS) sets up a legal regime for the sea and oceans and thus represents the attempt by the international community to regulate all aspects of the resources of the sea and uses of the ocean. In terms of the environment, UNCLOS establishes material rules concerning environmental standards and enforcement provisions regarding pollution of the marine environment.

The convention addresses ports, baselines, roadsteads and charts, as well as standards, criteria and indicators for assessing protected areas.

1.4.2 Montreal Protocol to the Vienna Convention for the Protection of the Ozone Layer

The Convention recognizes that worldwide emissions of certain substances can significantly deplete and otherwise modify the ozone layer in a manner that is likely to result in adverse effects on human health and the environment.

Substances that are required to be controlled, referred to as "controlled substances", are listed in Annexes A, B, C or Annex E to the Montreal Protocol, on Substances that Deplete the Ozone Layer, whether existing alone or in a mixture, and provisions are made for the gradual phasing out of such substances, for example, certain refrigerants.

1.4.3 International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 (MARPOL 73/78)

The Convention desires to achieve the complete elimination of intentional pollution of the marine environment by oil and other harmful substances and the minimization of accidental discharge of such substances. Of particular interest to harbours and landing places for fishing vessels is Annex V and its guidelines, particularly in relation to shoreside facilities for operational waste including fishing gear.

1.4.4 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972 and 1996 Protocol Thereto (London Convention)[1]

The Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972, the "London Convention" for short, is one of the first global

[1] The Joint Group of Experts on Scientific Aspects of Marine Environmental Protection (GESAMP) is an advisory body, established in 1969, that advises the United Nations (UN) system on the scientific aspects of marine environmental protection. At present it is jointly sponsored by eight United Nations organizations *(IMO, FAO, UNESCO-IOC, WMO (since 1968), IAEA (since 1969),* UN *(since 1971), UNEP (since 1977), and UNIDO (since 2006)* with responsibilities relating to the marine environment as a mechanism for coordination and collaboration among them. GESAMP functions are to conduct and support marine environmental assessments, to undertake in-depth studies, analyses, and reviews of specific topics, and to identify emerging issues regarding the state of the marine environment. GESAMP itself consists of ideally 25–30 experts, drawn from a wide range of relevant disciplines, who act in an independent individual capacity.

conventions to protect the marine environment from human activities and has been in force since 1975. Its objective is to promote the effective control of all sources of marine pollution and to take all practicable steps to prevent pollution of the sea by dumping of wastes and other matter.

In 1996, it was agreed to further modernize the Convention and, eventually, replace it. Under the Protocol all dumping is prohibited, except for possibly acceptable wastes on the so-called "reverse list". The Protocol entered into force on 24 March 2006.

1.4.5 United Nations Framework Convention on Climate Change

The convention on climate change is important in that, along with ozone loss, climate change is the embodiment of global environmental change. Global warming is what most scientists currently think will happen as the effect of the additions humankind has made to the natural mixture of the atmosphere. The International Panel on Climate Change (IPCC) has presented a series of research reports on the mechanisms of climate change and the likely rate of future warming. The IPCC has indicated that one likely result of global warming is an increase in the rate of sea level rise. This is not the result of melting of the major ice caps, but of the melting of the smaller glaciers and the thermal expansion of the warming oceans. These two effects will cause the sea level to rise by about 5 mm per year in the future compared with a rate of a little more than 1 mm per year today. The predicted contribution of the melting ice caps is only about 12 percent. The cumulative predicted sea level rise of about 300 mm by 2050 is not large, but it will make the problems of erosion and tidal flooding more difficult to solve and should be addressed when planning harbours and landing places for fishing vessels.

1.4.6 International Convention for the Safety of Life at Sea, 1974

The Conference of Contracting Governments to the International Convention for the Safety of Life at Sea (SOLAS), 1974 (London, 9 to 12 December 2002), adopted amendments to the Annex to the Convention, as amended, in particular, new chapter XI-2 on special measures to enhance maritime security; and, the new International Ship and Port Facility Security Code (ISPS Code).

1.4.7 International Ship and Port Facility Security Code

The International Ship and Port Facility Security Code (ISPS Code) is a two-part document describing minimum requirements for security of ships and ports. Part A provides mandatory requirements; Part B provides guidance for implementation. The ISPS Code applies to ships on international voyages (including passenger ships, cargo ships of 500 gross tonnage (GT) and upwards, and mobile offshore drilling units) and the port facilities serving such ships.

The main objectives of the ISPS Code are to:

- detect security threats and implement security measures;
- establish roles and responsibilities concerning maritime security for governments, local administrations, ship and port industries at the national and international level;
- to collate and promulgate security-related information; and
- to provide a methodology for security assessments so as to have in place plans and procedures to react to changing security levels.

Whereas the ISPS Code does not specify specific measures that each port and ship must take to ensure the safety of the facility, it outlines a standardized, consistent framework for evaluating risk, enabling governments to offset changes in threat with changes in vulnerability for ships and port facilities.