



STRATEGIC BUSINESS PLAN

ISO/TC 234

Fisheries and aquaculture

EXECUTIVE SUMMARY

ISO/TC 234 Fisheries and Aquaculture is the responsible committee for development of Standardization in the field of fisheries and aquaculture. This includes but are not limited to, terminology, technical specifications for equipment and for their operation, characterization of aquaculture sites and maintenance of appropriate physical, chemical and biological conditions, environmental monitoring, data reporting, traceability and waste disposal.

The fisheries and aquaculture sectors, including government regulators and managers, industry and/or other interested parties, would benefit from international standards where:

- there will be common judgements on performance as assessed against specified benchmarks (e.g., under global sustainability market certification regimes);
- there is a desire amongst the sector to learn from each other's experience and develop best practices and to efficiently exchange knowledge and utilize international expertise in the field;
- there is a desire for food business operators to reduce workload by avoiding conflicting documentation requirements and re-using data;
- there is a desire to enable electronic data interchange and automatic translation of product and process parameters;
- there are global markets for equipment and technology, and sufficient similarity in operating conditions to warrant establishing, for example, minimum design, testing or performance standards;
- there is a desire for international transparency in import requirements used by various countries, in order to support fair trade;
- there is a desire for comparability of data; and/or
- there is a desire for consumers to have information on resource management through labeling.

1. INTRODUCTION

1.1 *ISO technical committees and business planning*

The extension of formal business planning to ISO Technical Committees (ISO/TCs) is an important measure which forms part of a major review of business. The aim is to align the ISO work programme with expressed business environment needs and trends and to allow ISO/TCs to prioritize among different projects, to identify the benefits expected from the availability of International Standards, and to ensure adequate resources for projects throughout their development.

1.2 *International standardization and the role of ISO*

The foremost aim of international standardization is to facilitate the exchange of goods and services through the elimination of technical barriers to trade.

Three bodies are responsible for the planning, development and adoption of International Standards: [ISO](#) (International Organization for Standardization) is responsible for all sectors excluding Electrotechnical, which is the responsibility of [IEC](#) (International Electrotechnical Committee), and most of the Telecommunications Technologies, which are largely the responsibility of [ITU](#) (International Telecommunication Union).

ISO is a legal association, the members of which are the National Standards Bodies (NSBs) of some 164 countries (organizations representing social and economic interests at the international level), supported by a Central Secretariat based in Geneva, Switzerland.

The principal deliverable of ISO is the [International Standard](#).

An International Standard embodies the essential principles of global openness and transparency, consensus and technical coherence. These are safeguarded through its development in an ISO Technical Committee (ISO/TC), representative of all interested parties, supported by a public comment phase (the ISO Technical Enquiry). ISO and its [Technical Committees](#) are also able to offer the ISO Technical Specification (ISO/TS), the ISO Public Available Specification (ISO/PAS) and the ISO Technical Report (ISO/TR) as solutions to market needs. These ISO products represent lower levels of consensus and have therefore not the same status as an International Standard.

ISO offers also the International Workshop Agreement (IWA) as a deliverable which aims to bridge the gap between the activities of consortia and the formal process of standardization represented by ISO and its national members. An important distinction is that the IWA is developed by ISO workshops and fora, comprising only participants with direct interest, and so it is not accorded the status of an International Standard.

2. BUSINESS ENVIRONMENT OF THE ISO/TC

2.1 Description of the Business Environment

The following political, economic, technical, regulatory, legal and social dynamics describe the business environment of the industry sector, products, materials, disciplines or practices related to the scope of this ISO/TC, and they may significantly influence how the relevant standards development processes are conducted and the content of the resulting standards:

2.1.1 Political and international dynamics

Aquatic organisms do not know national borders. As a consequence, commercial capture fisheries, especially in marine environment but often also in fresh water, are directed against species whose management should be based upon international agreements when species make up straddling stocks. This is due to the fact that the capture itself is performed in international waters or that national populations of a target species are often sub-populations of species with a much wider distribution.

2.1.2 Industrial dynamics

The industries, businesses and trades connected to aquaculture and capture fisheries are often of an international nature. While most capture fisheries are exploited to their limit (or beyond), the aquaculture industry continues to grow to cover the increasing demand for aquatic food organisms and products of these. The growth rate of global aquaculture production is higher than those of other animal based food production. Developing countries are responsible for the majority of the production, and fisheries are very important for the economy in many developing countries. Although both modern fisheries and aquaculture are highly industrialised, a considerable proportion of the industries can still be characterized as small scale activities. These small scale activities are of large regional and local importance, with socio economic impacts down to family level.

Increasing degrees of internationalisation and industrialisation of the fisheries and aquaculture sectors has increased the needs for regional and global systems for governance of both biological and physical resources (water and land).

In this business plan the word “seafood” is regularly used. It is important to stress that this word is used for all food of aquatic origin and that it should not be understood as food of marine origin. Both fisheries and aquaculture in fresh and brackish water are of great importance in most regions of the world (see 2.2 – Quantitative indicators of the business environment).

2.1.3 Economical dynamics

The economical dynamics is illustrated by the introduction of the book *The International Seafood Trade* (James L. Anderson, Ed.; 2003) which describes the economical and trade aspects of the seafood industries as follows: *“The seafood trade is one of the world’s largest and fastest growing international commodity industries. Worth more than \$ 60 billion (comment: now more than \$ 70 billion) a year, it exceeds the world trade in all grains combined and represents more than twice the combined world trade in all tea, coffee and cocoa. Almost 200 countries supply fish and seafood products to the global marketplace, consisting of more than 800 commercially important species of fish, crustaceans and molluscs, including 30 species of shrimps alone.”* Measured by value shrimps is the most important commodity, followed by groundfish, tuna and salmon.

2.1.4 Technical dynamics

2.1.4.1 Aquaculture

Aquaculture in industrialised countries has to some degree developed from small scale family driven businesses to a large scale international industry. The aquaculture farms and installations have grown concurrently and have developed into technically advanced constructions. This intensification has increased the need for competent personnel with specialised training and education. The same evolution is now seen, especially in countries where the producers are aiming to launch their products at the international markets.

Within marine aquaculture an increasing degree of farming on high energy sites is predicted. Further developments in equipment and technology for farming on high energy sites in cages may result in improved water quality and fish health. The use of high energy locations will necessitate improvements of cages, mooring systems, and feeding systems. Industrial farming on high energy sites will also require larger boats for servicing, and calls for new techniques for installation and daily operation. A higher degree of industrialisation will increase the needs for automation and electronic monitoring in order to secure the health and welfare of both personnel and farmed organisms. Challenging weather conditions make strict demands on facilities on high energy sites. Breakdown may result in escape of farmed organisms. This means economic losses for the fish farmers and potential negative impacts on the environment.

Due to restricted water and energy resources there is increased focus on recirculation systems, both in marine and freshwater aquaculture. This calls for new technical solutions. Parallel to the development of new equipment there will be an increasing need for international standards to ensure that the equipment are of satisfying quality and standard.

There are also small scale aquaculture aiming at local consumption and with possibly other technical and ecological challenges.

2.1.4.2 Fisheries

Increased focus on sustainability in fisheries, the always present demands for profitability and efficiency, and the search for new utilizable resources in more extreme environments, have brought and will bring about technical challenges for the fishing industry. International guidelines and standards may be needed for energy reduction, selectivity of fishing gear and fishing techniques and new resources.

Due to increasing fuel prices and general concern about energy use, it is expected that research on fuel saving technology and practices will continue with increased intensity.

International fisheries need to increase its selectivity of fishing gear and fishing techniques. Sustainability calls for new technological solutions making it possible to specifically catch predetermined species and, equally important, sizes of organisms. There is extensive research going on to develop technology reducing bycatch and catch of undersized fish. Innovative solutions on separator grids, new trawl design (escape trawls), and other technological devices saving undersized fish, no-target species, sensitive/threatened habitats, sea mammals, turtles, birds and other aquatic animals, should be adopted in international standards and guidelines. The energy use and carbon footprint of fishing activity calls for new technical solutions on gear and vessel design to reduce the consumption of fossil fuels.

In order to find new unutilized resources, it is an industry trend to seek out extreme oceanic locations (further out, deeper down or at higher/lower latitudes). There is an increasing activity in Antarctic regions, and the general vulnerability and global importance of Antarctic

environment and resources calls for international guidelines of how not previously utilized and thus unregulated resources should be explored/protected. The relatively new commercial fisheries for krill (*Euphausia superba*) in the Antarctic are an example. Other examples are increasing fishing activity on deep sea species that have not yet been subjected to international management.

It is important to be aware that the technical evolution seen in the fishing industry is not present in all regions. In many developing countries, small scale fishing activities is still performed using traditional and less industrialized methods.

2.1.5 Biological dynamics

2.1.5.1 Organisms

With increasing aquaculture activity, an increasing number of species are subjected to domestication. In addition, genetic selection is under progress for species already domesticated. In many developing countries, there is a shift in the aquaculture production from low value species to high value species. This especially applies to countries producing for the international market. New techniques and principles for breeding and husbandry are under development. Following the domestication of new species, new diseases emerge. This accelerates the need for knowledge and opens opportunities for research on selective breeding, new vaccines, medications and preventive measures. This also applies for species that are already domesticated.

The climate changes might contribute to increase aquaculture and also influence on the species selected for aquaculture. Farmed aquatic species emit no methane. Aquaculture of molluscs and the expanding seaweed culture make a minimum contribution, to the carbon dioxide emissions. Seaweed culture can on the contrary contribute to carbon sequestration to some extent.

Within capture fisheries there is a major challenge in increasing the knowledge of target species and bycatch/non-target species in order to improve the fish stock management tools. An increasing number of researchers are recruited to such work, but in this field there is a considerable gap between regions and countries regarding the resources devoted to this work.

2.1.5.2 Feed

The fish feed industry is perhaps the most obvious and important link between traditional capture fisheries and modern aquaculture.

There is an extensive use of fish meal and fish oil in the production of fish feed and today the aquaculture industry uses most of the world production of fish oil and around half of the fishmeal production. A continued growth or even maintenance of today's production of finfish presupposes that fishmeal and oil is replaced by other protein and fat sources and that the race for an efficient feed conversion should continue. This means large challenges for the feed industry, producing feed that also carnivorous fish can eat, and at the same time uphold its nutritional properties, and feed that does not have any large impact on the environment. An important issue for many regions and countries is also the use of oil from genetically modified sources (GMO).

2.1.6 Societal dynamics

2.1.6.1 Employment

The employment trend in the seafood business is that the number of fish farmers increase. Mainly in developing countries but also in many industrialized countries. The same applies to

fishermen in developing countries, while the number of fishermen in industrialized countries tends to decrease. Thus, the relative importance of the seafood business increases in developing economies, especially in Asia. International guidelines and standards contributing to the removal of technical barriers to trade with seafood products will therefore have great importance for these countries.

As global populations rise and the demand for fish and seafood continues to outstrip production from traditional wild fisheries, production of food through sustainable aquaculture will be of growing importance to ensure an adequate supply of affordable protein. The potential for significant growth in aquaculture is substantial as is the number of jobs it could sustain in rural and coastal communities.

Employment figures in aquaculture are hard to come by. Most countries do not disaggregate aquaculture from agriculture or from fisheries. Estimates on the total number of workers involved in aquaculture are as high as 4.3 million in China, 4.36 million in Bangladesh, and 2.38 million in Indonesia.

Specifically, because aquaculture is practiced almost entirely in rural areas and at significant levels in developing countries, it has had an important impact on the economy of such less-privileged communities throughout the different regions, having created opportunities for employment and contributed to the availability of food.

Aquaculture offers diverse livelihood opportunities for self-employment, professionals, mid-level technicians, administrative personnel, field labourers, small-scale producers, lake fishers and workers in production and related activities such as processing plants, feed mills, research, equipment and other provisions of goods and services.

2.1.6.2 Animal welfare and sustainable production

Among the general public and public interest groups, especially in the major industrialized countries, there is an increasing concern about animal welfare and sustainable seafood production. In addition, the catch and production should be sustainable. Until recently this has mainly been a concern regarding mammals and poultry, but animal welfare is increasingly mentioned in connection with fish farming. At the moment, there are few generally accepted criteria for fish welfare, but health is obviously one of those criteria that also should be included.

The call for sustainable seafood production has produced a paradox not seen in terrestrial meat production. The need for intensive production of terrestrial livestock is viewed as a necessity since the wild resources (bush meat) is too scarce to meet the demands from an increasing world population. The same acceptance has not yet been admitted to intensive aquaculture. FAO have concluded that the increased global demand for seafood has to be met by increased aquaculture production.

The demand for sustainable seafood has created a pressure to promote responsible fishing and aquaculture activities.

2.1.7 Ecological/environmental dynamics

The environmental awareness is increasing and a maintained or increased production presupposes that the environmental compatibility of fisheries and aquaculture is focused upon. The dynamics between aquaculture and fisheries and the environment in which they operate are multidirectional with activities affecting the environment and vice versa, and are assessed as positive, neutral or negative.

2.1.7.1 Aquaculture

Many ecological/environmental issues have been raised in various fora with respect to aquaculture. Included are issues related to various types of pollution from aquaculture farms; potential impacts on wild populations from captive bred populations; depletion of natural resources; and social issues such as health and welfare of farmed organisms and occupational health and safety of farm employees. These issues are discussed in more detail in 3.2.1.

2.1.7.2 Fisheries

Issues that have been raised in various fora include (see also 3.2):

- overfishing;
- bycatch (of undersized specimens, non-target species, species at risk);
- destruction of sensitive habitats by harvesting techniques;
- lost, but still actively fishing equipment, so-called “ghost” nets.

2.1.7.3 Environmental impact assessment

The demand for sustainability in both sectors means that the complete value chains need to be in focus. Key words in this aspect are:

- lifecycle assessment;
- social responsibility;
- fisheries/aquaculture interactions;
- food safety/bio security;
- energy use;
- carbon footprint;
- resource consumption - land/freshwater/salt water;
- risk assessment.

Environmental impact assessment calls for an increasing need for a variety of surveys, registrations, inspections, measurements, monitoring, etc. For industries where international trade is so prominent as it is in fisheries and aquaculture, it is of vital importance that the requirements to these environmental impact assessment tools are based on international agreements, guidelines and standards.

2.2 Quantitative Indicators of the Business Environment

The following list of quantitative indicators describes the business environment in order to provide adequate information to support actions of the ISO/TC:

The business environment in order to provide adequate information to support actions of the ISO/TC 234 is described in the The State of World Fisheries and Aquaculture (SOFIA) publication of the FAO Fisheries and Aquaculture Department which provide a comprehensive, objective and global view of capture fisheries and aquaculture, including associated policy issues. In addition is the FAO database which contains annual series of global fishery production (capture and aquaculture) since 1950. At present separate data sets for [Global Capture Production](#) and [Global Aquaculture Production](#) are available from 1950. Total production time series, starting from 1997 onwards, are obtained from the Global Capture production and the Global Aquaculture production collections.

The FAO Yearbook of Fishery Statistics Summary tables present e.g.

- FAO World aquaculture production by species groups
- FAO Fish, crustaceans, molluscs, etc..capture production by groups of species

As a relatively new area for standards work, there is no data on use of ISO standards. Over time, the ISO/TC 234 expects to add quantifiable indicators related to the work of this technical committee.

3. BENEFITS EXPECTED FROM THE WORK OF THE ISO/TC

The fisheries and aquaculture sectors, including government regulators and managers, industry and/or other interested parties, would benefit from international standards where:

- there will be common judgements on performance as assessed against specified benchmarks (e.g., under global sustainability market certification schemes);
- there is a desire for common quality grading of raw material;
- there is a desire amongst the sector to learn from each others' experience and develop best practices and to efficiently exchange knowledge and utilize international expertise in the field;
- there is a desire for food business operators to reduce workload by avoiding conflicting documentation requirements and re-using data;
- there is a desire to enable electronic data interchange and automatic translation of product and process parameters;
- there are global markets for equipment and technology, and sufficient similarity in operating conditions to warrant establishing, for example, minimum design, testing or performance standards;
- there is a desire for international transparency in import requirements used by various countries, in order to support fair trade; and/or
- there is a desire for comparability of data.

3.1 *International trade*

FAO describes e.g. in its SOFIA 2006 report, the impact of market-based standards and labels on international fish and seafood trade. The increased development of market standards may have negative impacts on international trade affecting:

- the possibilities for developing countries to gain market access;
- the risk of anti-competitive behaviour of powerful stakeholders;
- the boundary between public regulations and private market standards.

It is expected that international harmonisation will aid in addressing these impacts and FAO has suggested further development of standards under the auspices of WHO, CAC, FAO and ISO and points out that this will benefit developing countries and small enterprises.

Standardization contributes to fairness and transparency in international trade. By being open to representation from all countries, through the collaboration of international experts, and through its transparent standards development process, ISO facilitates the development of pertinent and fair international standards.

3.2 *The environment*

Technical standards in environmental management could complement the ISO 14000 Environmental management series which is designed to minimize effects on the environment caused by its activities, and to achieve continual improvement of its environmental performance. TC standards, for example, could lead to:

- Agreement on processes to identify core environmental effects to be managed and/or reported on;
- Agreement on the identification of core environmental effects to be managed and/or reported on;
- Agreement on test methodology allowing meaningful comparisons of environmental performance; and
- The use of standards to define desirable characteristics of products and services in terms of environmental friendliness.

Overall the benefit of standards in the environmental area would be increased sustainability of fisheries and aquaculture activities – reducing environmental impacts and risks at a sustainable cost to governments and industries. The following sections summarize specific environmental areas of current concern for each of aquaculture and fisheries, and list specific opportunities for standardization work.

3.2.1 Aquaculture activities

Aquaculture activities influence the environment in different ways, and the scale, performance and location of the activity determines the degree of influence.

Mariculture can be a very efficient way of producing food for human consumption, and Asia has cultured shellfish, fresh/warm water finfish and marine plant products for hundreds of years. Asia has recently moved into larger scale, more intensive culture particularly for shrimp. Modern marine finfish and molluscan aquaculture is primarily a European and North/South American experience. The expansion of offshore/high energy production has raised new economic opportunities and environmental challenges.

As global populations rise, and the demand for fish and seafood continues to outstrip production from traditional wild fisheries, production of food through aquaculture will be of growing importance. Ensuring the sustainability of this supply requires consideration of environmental, economic and social considerations.

With respect to the economic and social pillars of sustainability, the issue raised most frequently by the aquaculture industry, environmental groups and others, is the potential for challenges with other users of land and/or water resources. Normally such conflicts of interest can be addressed through various mitigation processes that consider the needs and characteristics of the resource users.

With respect to the environmental pillar of sustainability, a number of potential challenges have been identified in different fora, for example:

- **Pollution** - Discharge of feed and faeces may lead to water quality degradation and sediment accumulation. Where there are low currents, in severe cases, deposition can exceed the capacity of the local environment to absorb. This may have negative effects on the farmed fish, and depending on the quantity, geographic extent and habitat impacted, there may be negative effects on the surrounding biological and physical environment. Waste that is carried farther afield may influence various elements such as dissolved oxygen and assimilated wastes.

In addition, the use of chemical, including antibiotics and anti-fouling agents, in aquaculture farms have the potential to leak into the natural environment if not properly managed. This could lead to issues such as antibiotic resistance in bacteria close to aquaculture facilities and the transference of this resistance to bacteria of human or veterinary medical interest.

- **Wild populations and communities** - Interactions of farmed fish with wild species can also be of concern. With respect of fish health, uncontrolled movement of fish from one location to another could spread diseases, particularly where fish escape disseminating the diseases or infectious organisms. The concentrated populations of fish in cages may also amply pathogens, and in the case of pests such as sea lice, this may lead to transmission to wild populations in poorly managed situations. Use of therapeutants (e.g., drugs, vaccines) along with other health management strategies can reduce these risks; use of these products need to be carefully managed, however, to ensure efficacy and avoid other environmental effects.

With respect to other interactions with wild fish, if farmed fish, often the product of selective breeding, escape, there may be potential biological influences on wild populations.

- **Other ecological effects** - The use of natural resources, in particular the alteration of coastal areas for aquaculture, can have environmental and social impacts if

development is not carried out in a sustainable manner. A good example of this is the destruction of mangrove forests for shrimp aquaculture. Historically, mangroves were considered an ideal site for brackish water fish ponds. The extensive clearing of mangrove forests, particularly in South East Asia, can contribute to significant environmental problems such as shoreline erosion, siltation, nutrient loss, decreased water quality, etc. The issue of clearing mangroves for fish and shrimp ponds has largely abated over the years for many reasons. In most of Asia, not only has the further clearance of remaining mangrove areas for aquaculture been banned, but also many countries have embarked on replanting and restoration.

Mangrove is not the only coastal ecosystem that may be affected by aquaculture. Untreated pond effluents can also potentially impact on coral reefs and sea grass communities - organic wastes from improperly located fish cages can rain down and smother such sensitive ecosystems. Freshwater marshes and wetlands that are often home or feeding grounds of birds are potential areas which might be improperly used for aquaculture without strict government controls.

- **New technology** - The movement towards offshore/high energy sites not only for coldwater marine finfish and molluscs, but for species in Asia, South America and other continents may have unique environmental costs and benefits that need to be considered, measured, managed and/or reported on.

3.2.2. Sustainable fisheries

There are considerable and increasing concerns about the sustainability of many fisheries world wide. This is also reflected in the consumers desire to have information on resource management through labeling. Along with the concerns come several initiatives to certify fisheries against existing sustainability/eco standards. The FAO Code of conduct is also an essential guideline in this aspect. It is believed that ISO/TC 234 best can support these initiatives by developing specific standards supporting more generic sustainability standards and guidelines. ISO/TC 234 takes account of these issues and is developing a standard that aims to give a common harmonized and consensual framework at an international level for any sustainability standards/labels already on the market. Such standards will work independently and will not favor any sustainability standards already on the market.

3.3 Technical/economical

Standards in this field will serve as benchmarking tools enabling technical and economical production improvements. In general, standardization in technical areas such as equipment and its manufacture can provide benefits by:

- Setting performance requirements of equipment to make sure that users' needs are met while allowing individual manufacturers the freedom to design their own solution on how to meet those needs;
- Leading to agreement on a sufficient number of variations of a product to meet most current applications allows economies of scale with cost benefits for both producers and consumers;
- Leading to agreement on test methods allowing meaningful comparisons of products;
- Supporting consensus on common reference for suppliers and clients in business dealings;
- Ensuring desirable characteristics of products and services such as quality, environmental friendliness, safety, reliability, efficiency and interchangeability - and at an economical cost.

Establishing an international consensus on terminology making technology transfer easier and safer and advancing new technologies and dissemination of innovation.

Over the years, aquaculture in developed countries has shifted from being dominated by small and medium sized family business to being highly industrialized with international owners. Developing countries have a mix of artisanal and large, international production companies with most exporting being done by the later.

Issues with particular technical aspects include areas such as:

- **Inventory control** - Farms for fish experience total losses from stocking to even if there are no specific negative incidents. Standards could reduce the risk for escapes from aquaculture installations due to technical failure or wrong operation of the equipment. There is considerable room for improvements in terms of containment (cage, net and mooring design), stock handling for efficient operation of aquaculture farms, and monitoring the production e.g. methods for quantifying biomass, number of individuals, average weight, distribution of weight, batch origin, daily weight gain/growth, loss, mortality and escaping.
- **Emerging technology** - There are also emerging opportunities in offshore/high energy sites and recirculation. These opportunities may be hampered from a business risk perspective without access to, for example, standards outlining site considerations to take into account in design and equipment selection;
- **Feed and feeding** - Feed formulation, consistency, etc. can have an important influence on the costs of operation as well as the environmental performance of farms.
- **International reporting** - There has also been an identified need through various fora to standardize reporting in support of internationally comparable statistics on production volume and value, escapes, therapeutant use, etc. While the FAO has done some work in this area, ISO/TC 234 could lead on further standardization.

3.4 Summary of Fisheries and Aquaculture Standardization Opportunities

3.4.1 Aquaculture and fisheries opportunities

International standards may be useful in areas such as:

- Traceability of products to support emerging product labelling and certification requirements related to:
 - International governance protocols (ensuring products are not black market, e.g., from illegal harvests); and/or
 - Market-driven certification schemes (e.g., ensuring products come from the certified source);
- Handling and disposal of waste, e.g sludge, used/scraped equipment/components, dead fish, guts and trimmings from harvesting plants etc. (both aquaculture and capture fisheries);
- Biological/chemical analysis outside the scope of ISO/TC 34 Food products, ISO/TC 207 Environmental management and Codex Alimentarius;
- Standards improving modern disease diagnostics and supporting the OIE Aquatic Animal Health Code;
- Characteristics, and parameters for a label to certify a fishery or an aquaculture site standards for sustainability assessment;
- Terms and definitions.

3.4.2 Aquaculture specific opportunities

International standards for sustainable aquaculture may be useful in areas such as:

- Environmental management, for example:
 - process to assess and prioritize risks to be managed;
 - development of monitoring protocols for key environmental effects (e.g. sediment accumulation; carrying capacity);

- development of environmental risk biological indicators and critical thresholds for management actions in key risk areas to guide the aquaculture industry to a precautionary approach;
 - development of guidelines for other risk mitigation protocols;
- Environmental monitoring of fish farms, such as:
 - monitoring of sediments as a result of aquaculture, with regard to composition, thickness, chemical conditions and impacts on biological systems;
 - monitoring of other biological (and chemical/physical) impacts within the recipient (including water bodies);
- Technical infrastructure, for example:
 - containment of valuable fish in floating cages (cages and/or mooring structures), in-shore;
 - containment of inventory (fish, shellfish) in other rearing situations;
 - system integrity in offshore/high energy standards;
 - technical specifications for equipment in order to ensure safety for workers (excluded: personal protective equipment, PPE);
 - operations of equipment in order to reduce environmental impacts and increase profitability:
 - reduce risk of excess feeding;
 - improve inspections and maintenance of equipment;
 - implement efficient routines for surveillance of aquaculture;
 - develop wastewater treatment systems;
 - making the equipment fit for the biological circumstances and conditions, such as:
 - seeking to prevent fish from being stressed, injured or killed as a result of physical contact with the equipment;
 - seeking to prevent intruding biological organisms, e.g. predators, to get into a fish farm;
 - seeking to prevent intruding organisms from being injured or killed by equipment used in aquaculture; and
 - seeking to prevent fouling of equipment used in aquaculture.
- Identifying, and then identifying means to maintain appropriate physical, chemical and biological conditions for farmed aquatic organisms, e.g. appropriate current, oxygen and hydrogen sulphate levels as well as a low level of parasites;
- Characterization of areas most suitable for aquaculture, among other things amount of available water resources, currents, waves, wind, temperature conditions, risk of ice covering, sea bottom topography and substrate;
- Develop of sterilization's methods of farmed animals in order to introduce in the environment only sterile animals;
- Encouraging the development of methods to diagnose the more risky diseases in order to select diseases free spawners/seed fishes, to produce healthy fry and to introduce in an open environment only animals which aren't likely to spread diseases;
- Standardization of reporting information (production data, escapes, therapeutic use, etc.).

3.4.3 Fisheries specific opportunities

International standards for sustainable fisheries may be useful in areas such as:

- Lost fishing gear (unfortunately lost fishing equipment doesn't stop fishing): how loss of equipment should be reported, how it should be marked, and how it should be rescued or neutralized;
- ISO standard for bio degradable fishing gear; fishing nets, long lines etc. made of materials that disintegrated after continuous submersion for a given period the problem with "ghost" equipment would be greatly reduced;
- ISO standard for how to utilize "new" resources; information any commercial participants/interests should provide before any "new" resources can be utilized. This

will help to secure sustainable harvest before international regulations have been developed and accepted;

- ISO standards improving the possibilities for better stock assessment;
- Monitoring of (marine) resources, connected to captured fish, e.g. monitoring of (marine) stocks, damages to certain biotopes/habitats, effects on certain levels/parts in the food chain etc;
- Specifying methods to evaluate selectivity of fishing gear and their impact on the environment:
 - ISO standard for trawler's separator grids; the use of grids in front of trawls greatly reduces bycatch. There is a need for how such grids should be designed, installed and operated;
 - ISO standard for trawl design to minimize habitat contact. There is lot of work going on to construct trawls that are allowed to be dragged in close proximity to the bottom without being in contact with the bottom substrate;

4. REPRESENTATION AND PARTICIPATION IN THE ISO/TC

4.1 Membership

[Countries/ISO member bodies that are P and O members of the ISO committee](#)

4.2 Analysis of the participation

Developing countries and countries with economies in transition are underrepresented in the committee.

4.2.1 Regional balance of participation

The regional balance of participation could be improved as some main production and exportation areas are underrepresented (such as Central and South America, Africa etc.).

4.2.2 Lack of participation

Some leading fisheries and aquaculture countries listed in the SOFIA reports are not yet represented in the ISO/TC 234.

4.2.3 Liaison organization

[Organizations in liaison with ISO/TC 234.](#)

4.2.4 Lack of participation – important stakeholders

International Maritime Organization (IMO)

4.2.5 Efforts to improve participation

All current members are encouraged to seek additional participation from other countries as referred to in section 4.2 and 4.2.1.

5. OBJECTIVES OF THE ISO/TC AND STRATEGIES FOR THEIR ACHIEVEMENT

5.1 *Defined objectives of the ISO/TC*

ISO/TC 234 has a primary purpose to design standards within its agreed scope that are in accordance with the ISO directives and the ISO/TMB Global relevance. The standards should be market driven, and based on sound science.

ISO/TC 234 work may include standards development related to:

- international trade;
- environmental management;
- technical standards and /or
- consumers information and certification scheme.

More specific objectives, consistent with ISO targets, will be developed as the committee matures.

ISO/TC 234 should also:

- ensure that ISO/TC 234 is aware of relevant international policy developments and trends within its scope;
- ensure cooperation with other standardization groups dealing with the fisheries and aquaculture industries of products of these;
- ensure that as many as possible of relevant stakeholders are aware of and participates in the work of the technical committee;
- ensure that the work is in line with ISO/TMB Global Relevance;
- ensure that the work is conducted according to the ISO/IEC Directives; and
- ensure that any standards developed are in consistency with the FAO code of conduct for responsible fisheries (Rome, FAO, 1995. 41 p. – ISBN 92-5-103834-4, and that there is alignment with the expected direction of the FAO Technical Guidelines on Aquaculture Development

5.2 *Identified strategies to achieve the ISO/TC's defined objectives*

National, regional and international standards that have proved their existence through use and demand should be considered as basis for ISO standards within the same field.

The ISO committee will connect with nations, international organizations, companies and experts in order to best identify standardization projects and to accomplish them.

Since the second plenary meeting of ISO/TC 234, the structure of the committee and its programme of work are discussed at each annual meeting. The main body of work by technical experts is conducted as necessary in working groups between the TC meetings. Where no relevant working group exists for a project, a new working group will be created.

The established Advisory Group in ISO/TC 234 assists in identifying areas that would most benefit from standardization under this committee; and develop recommendations for ISO/TC 234 consideration. Ad hoc groups can also be established at TC meetings to take care of specific tasks identified by the ISO/TC 234 to e.g. provide technical advice.

Committees and groups will work thru email, with one physical meeting each year as necessary before the ISO/TC 234 annual meeting. Work language of the groups will be English.

6. FACTORS AFFECTING COMPLETION AND IMPLEMENTATION OF THE ISO/TC WORK PROGRAMME

No such factors are identified at this stage.

7. STRUCTURE, CURRENT PROJECTS AND PUBLICATIONS OF THE ISO/TC Information on ISO online

The link below is to the TC's page on ISO's website:

[ISO/TC 234 Fisheries and aquaculture on ISO Online](#)

Click on the tabs and links on this page to find the following information:

- [About \(Secretariat, Secretary, Chair, Date of creation, Scope, etc.\)](#)
- [Contact details](#)
- [Structure \(Subcommittees and working groups\)](#)
- [Liaisons](#)
- [Meetings](#)
- [Tools](#)
- [Work programme \(published standards and standards under development\)](#)

Reference information

[Glossary of terms and abbreviations used in ISO/TC Business Plans](#)

[General information on the principles of ISO's technical work](#)