Food and Agriculture Organization
of the United Nations

Achieving Blue Growth

Building vibrant fisheries and aquaculture communities

Contents

"Harnessing the power of the sea to improve social and economic development of populations, while simultaneously safeguarding marine resources and promoting environmental sustainability, is imperative as we move towards a world approaching 10 billion by 2050. We look forward to our continued collaboration with member countries in achieving Blue Growth through policies and implementation of development programmes in fisheries and aquaculture."

Árni M. Mathiesen,
Assistant Director-General,
FAO Fisheries and Aquaculture Department

The Blue Growth Initiative

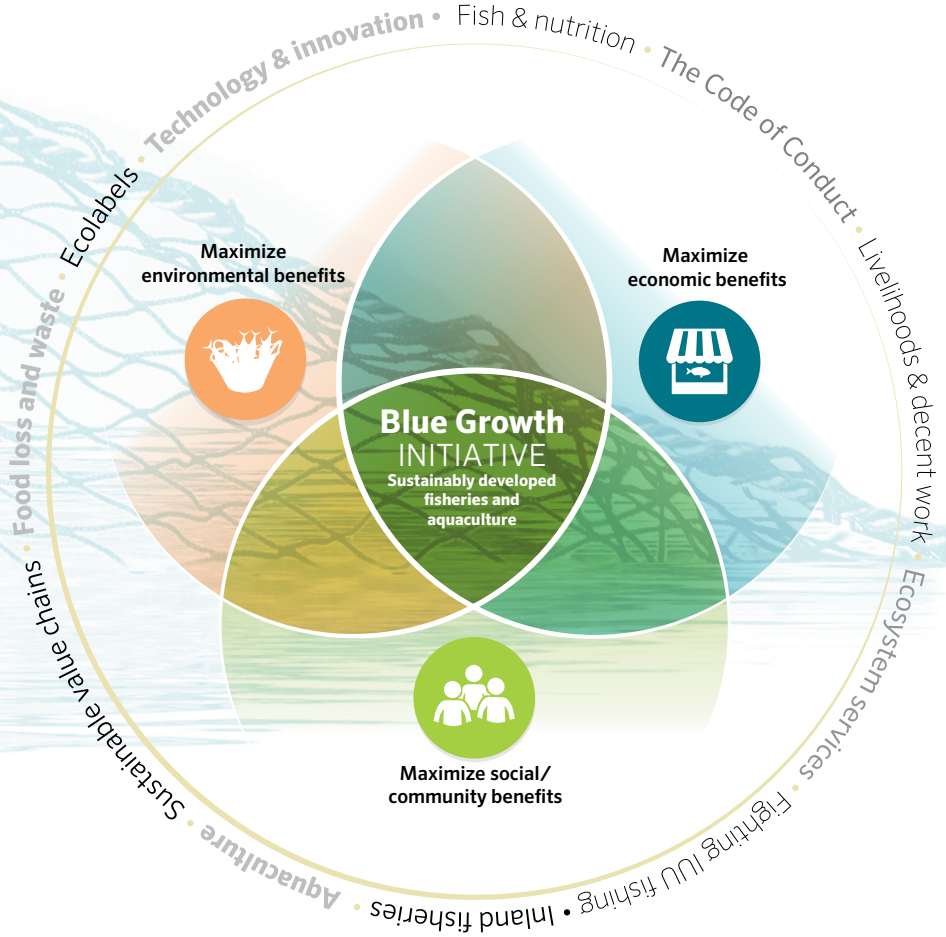
Fisheries and aquaculture support the livelihoods of millions of people around the world in rural and coastal communities, and often play a key role in a society's culture and identity. As these communities know well, fish is also a healthy and nutritious food, with the potential to feed our growing planet. But as the population grows, the demand for fish increases, and our natural resources are increasingly under pressure, sustainable management and development is crucial to preserving these resources for future generations.

Like the Green Economy principles that preceded it, FAO's Blue Growth Initiative emphasizes the three pillars of sustainable development– economic, environmental and social – so that fisheries and aquaculture contribute to the 2030 Agenda Sustainable Development Goals (SDGs). The Blue Growth Initiative is a strategic approach to improving the use of aquatic resources resulting in better economic, environmental and social outcomes. Blue Growth seeks to achieve this by emphasizing:

Blue Production - implementing ecosystem-based approaches to responsible fisheries and aquaculture management, in order to enhance sustainability and productivity

Blue Trade - supporting the economic development of countries, with an emphasis on developing countries improving their markets and products and access to trade;

Blue Communities - empowering communities to take full advantage of fisheries and aquaculture in order to enhance food security and nutrition, decent work and livelihoods and resilience to shocks.



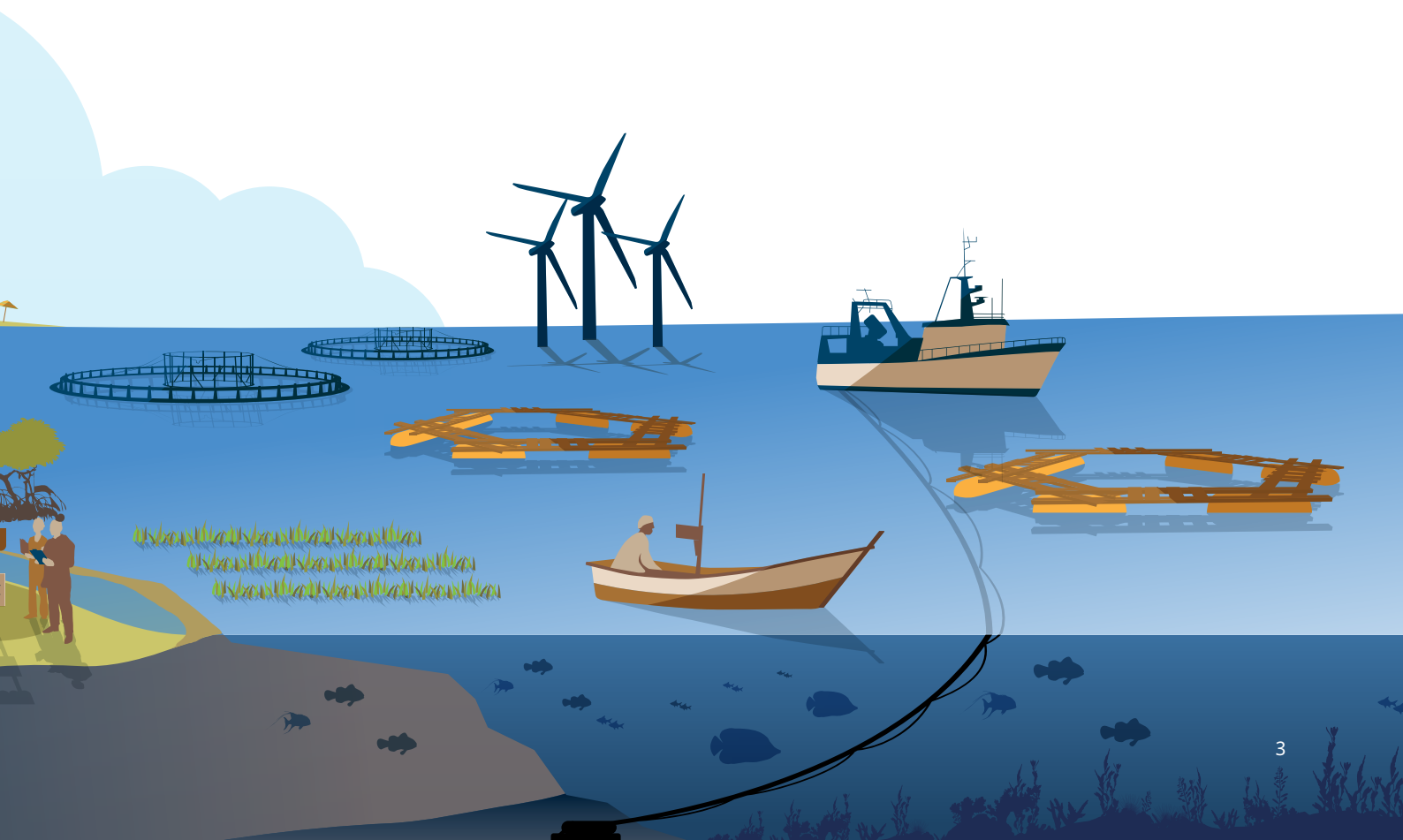
Supporting Blue communities

The Blue Growth Initiative is a dynamic approach to sustainable development of our natural aquatic resources. The approach can be adapted and shaped to meet the unique needs and priorities of each country, region or community. The constant factor of the Blue Growth Initiative is its emphasis on stimulating sustainable development for fisheries and aquaculture communities.

The key priorities that the Blue Growth Initiative seeks to achieve of particular relevance to Blue communities include food security and nutrition derived from aquatic resources, livelihoods and decent work generated from aquatic sectors, and aquatic ecosystems and related services. The various tools of Blue production and Blue trade to achieve those priorities are described below.

Empowering marginalized groups

The Blue Growth Initiative's focus on Blue communities is of particular relevance to understanding the needs and interests of marginalized women, youth, indigenous peoples, and migrant groups. The approach works alongside governments, communities and civil society to advance policies and incentives designed to empower these groups and ensure their access to decent work and social protection, all the while safeguarding the aquatic environment. Women, in particular, play a key role in fisheries and aquaculture throughout the entire seafood value chain, but often face discrimination in rights to access land or fishing grounds or have limited access to resources, including, credit, technology, and training. Blue Growth prioritizes the inclusion of these groups as vital engines to building more vibrant Blue communities.

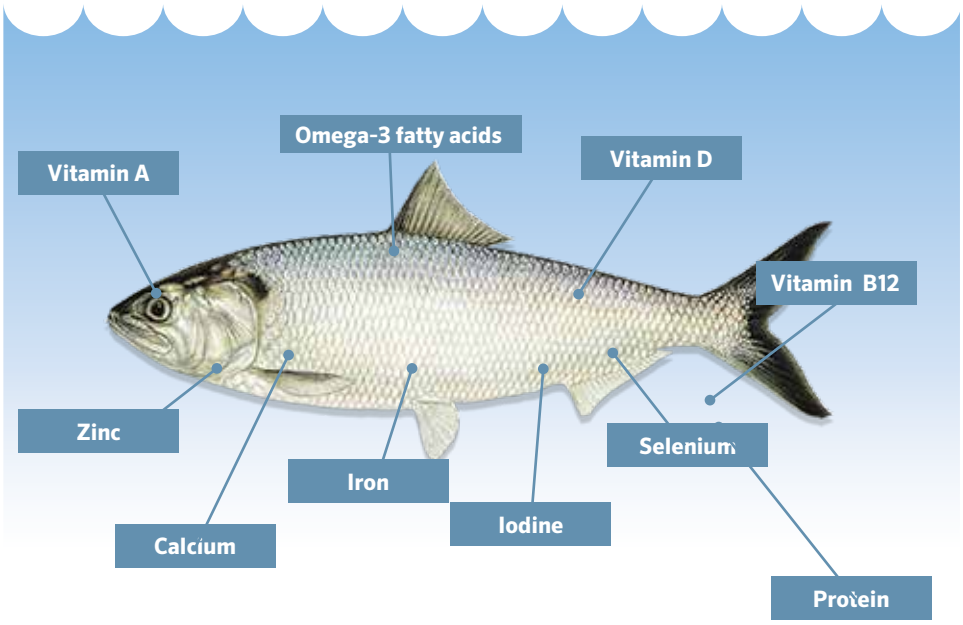


Fish and nutrition

Fish plays an important role in fighting hunger and nutrition. Fish is not only a source of proteins and healthy fats, but also a unique source of essential nutrients, including long-chain fatty acids, iodine, vitamins, minerals and calcium. The multiple benefits of fatty fish high in Omega-3 fatty acids and small fish eaten whole, containing nutrients in the skin and bones, clearly illustrates seafood's irreplaceable nutritional value.

An increased focus on fish and nutrition aids both developing countries and the developed world. In many developing countries, fish is the main or only source of animal protein, and is essential for providing micronutrients to food insecure populations. Dietary patterns are also shifting in developed and middle-income countries, and an increasing emphasis on coronary and overall health has led to an increased demand for fish among those populations.

Fish: Nature's superfood



Seafood and crucial nutrients for healthy development

Throughout the world, expectant mothers face demanding nutritional needs. The so-called 1 000 day window – spanning from pregnancy to the child's second birthday – is now understood as a crucial time to promote proper nutrition for development, transforming the infant's future prospects and promoting proper physical and mental development. Fish has a key role to play in this development.

*Fish consumption figures refer to apparent fish consumption

Key facts & figures

Fish provide more than 3.2 billion people with almost 20% of their average per capita intake of animal protein, and more than 50% in some less developed countries.

Often undervalued parts of the fish, like the head, viscera, and back-bones make up 30-70% of fish and are especially high in micronutrients.

Fish consumption has increased from 9 kg per capita in 1961 to approximately 20.3 kg per capita today.

Over half of the fishery products destined for consumption originate from aquaculture.

Key nutrients in seafood:

Long chain omega-3 fats
Mainly found in fish and fishery products, these fatty acids are essential for optimal brain development.

Iodine
Seafood is in practice the only natural source of this crucial nutrient. Iodine serves several purposes like aiding thyroid function. It is also essential for neurodevelopment.

Vitamin D
Another nutrient crucial for mental development, this vitamin also regulates the immune system function and is essential for healthy bones.

Iron
During pregnancy, iron intake is crucial so that the mother can produce additional blood for herself and the baby.

Calcium, zinc, other minerals
Diets without dairy products often lack calcium, and zinc deficiency slows a child's development.


©FAO/Gonsalves

FAO has been collaborating with countries on projects to improve child nutrition through the use of supplemental natural fish bone powders rich in protein, vitamins, minerals and calcium. For example, filet preparation in Chile's salmon industry currently disposes of wasted bones. The industry has begun experimenting, grinding those bones into a powder providing a nutritional supplement for regions suffering from poor nutrition. Half a world away, in Africa, school feeding programmes in Ghana and Uganda have collaborated with FAO to create fish powders from bones or from small lake fish ground together with their bones. These nutrient-rich powders are added to traditional stews and meals, and have received thumbs up from the young tasters.

Waste not, want not: How fish bones can supplement traditional diets

The composition of some amino acids, vitamins and minerals in tuna bones used for fish powder, in comparison with maize flour

Nutrient	Tuna bones per 100 g	maize flour per 100 g	daily requirement for children
Calcium	10.2 g	7 mg	700 mg/day
Iron	36 mg	2.4 mg	8.9 mg/day
Zinc	8.6 mg	1.7 mg	3.7 mg/day
EPA + DHA	3.1 g	N/A	150 mg/day

Fish products are ideal complements to starch-based diets lacking these nutrients.

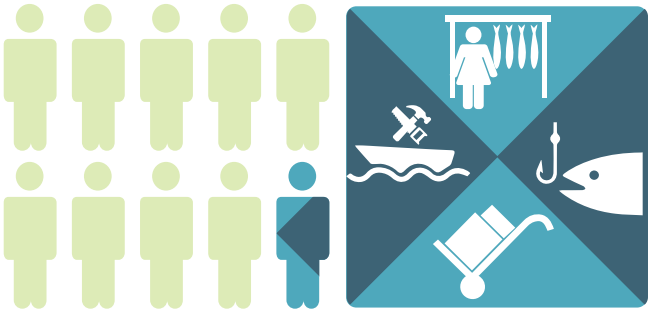

©FAO/Kambou

Livelihoods and decent work

Fisheries and aquaculture generate employment and support livelihoods for people around the world, but particularly in developing countries. The fisheries and aquaculture sectors employ over 200 million people worldwide and feed billions. With so many people employed directly and indirectly in these sectors, tackling social issues is essential, including:

- Dangerous work environments and violations of human and labour rights, including child labour;
- Widespread poverty particularly in small-scale fisheries in which over 5 million fish workers earn less than one dollar a day;
- Social inclusiveness—despite being responsible for over 90 percent of processing and 20 precent of primary fishing activities, women receive limited access to the credit, training, technology and markets that would make their work more efficient.

Approximately
1 in 10
PEOPLE
rely on fisheries and aquaculture for their livelihoods.



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Key facts & figures

Around 200 million people are employed along the value chain from harvesting to distribution, of which 59.6 million are directly employed in fisheries and aquaculture.

Women account for more than 14% of all people directly engaged in the fisheries and aquaculture primary sector, with the proportion of women exceeding 20% in inland water fishing and 50% when secondary activities, such as processing are included.

Employment in small-scale fisheries is several times higher per ton of harvest than in large-scale fisheries.

The four pillars along the path to decent rural employment:

FAO operationalizes the International Labour Organization's decent work agenda in rural areas through the concept of decent rural employment. Here is how FAO works across the four pillars of decent work to fisheries and aquaculture in rural areas.

1

Standards and rights at work – FAO promotes the human rights-based approach particularly in small-scale fisheries.

2

Social dialogue – FAO facilitates multi-stakeholder dialogues, such as the Vigo Dialogue on Decent Work in Fisheries and Aquaculture.

3

Social protection – Protecting fishers and their families especially in motherhood, childhood, old age, injury, sickness or work accidents is essential considering rural communities' dependence on seafood production.

4

Employment generation and enterprise development – FAO is leading a number of projects aimed at developing entrepreneurial skills and employment, in particular for youth and women.

©FAO/Kambou

Coastal Fisheries Initiative

FAO is implementing a five-year Western Africa project that is part of a larger GEF-financed Coastal Fisheries Initiative led by multiple partners around the world. FAO's activities are piloted in Cabo Verde, Côte d'Ivoire, and Senegal. The work examines ways to improve both fisheries management and post-harvest processes throughout the entire value chain. However, each country's pilot activities carefully examines the role of women in fisheries, too often considered to be 'invisible'. In Cabo Verde, the project is working to empower women selling the fish, providing them with the necessary business training to help them to better negotiate with local hotels and restaurants. In Côte d'Ivoire and Senegal, the long hours worked by the fish smokers and sellers are rendered even more difficult by the time required to undertake household duties. Women's cooperatives have joined to form daycare and after-school centers, where children can be cared for and receive a nutritious meal while their mothers work, thereby easing some of the burden of competing responsibilities for these women in fisheries.

Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries

The Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication is the first internationally agreed instrument for the small-scale fisheries sector. The small-scale fisheries sector serves as an economic and social engine, providing food and nutrition security, employment and other multiplier effects to local economies, and is rooted in local communities, traditions and values. The Guidelines support investing in health, literacy, and technological education, eradicating forced labor, promoting social security protection, mandating gender mainstreaming, and building fisheries' resilience to climate change and extreme weather. FAO works with member countries to implement the Voluntary Guidelines.

©FAO/Catanzaro

Safeguarding ecosystems and services

Blue Communities depend on aquatic ecosystems and the wide range of services they provide - protein, water for drinking and growing crops, and regulating climate. The Blue Growth concept recognizes that Blue Communities and their use of aquatic ecosystems is interconnected, and optimal outcomes for sustainable development require coordinated management.

While provisioning ecosystem services (e.g., fish, water) provide direct inputs for Blue Community well-being, regulating and supporting services are equally important as they provide for healthy ecosystems that support economic activities and provide societal benefits Aquatic ecosystems also provide tourism and education opportunities and cultural significance to many Blue Communities. As such, aquatic resource management needs to encompass the importance and use of ecosystem services across all four services.

Area-based management for protecting ecosystem services

The economic value of Gökova Special Environmental Protection Area in Turkey is estimated at around 31.2 million USD per year (Bann and Başak, 2011). This value incorporates provisioning services (fish and salt marsh succulents for food), regulating services (carbon sequestration, erosion protection and waste treatment), and cultural services (tourism and recreation). Tourism and recreation accounts for approximately 55 percent of the total economic value, making it the most economically important activity, and highlighting the need for managing the tourism industry sustainably.

Key facts & figures

Marine ecosystem services in particular provide more than 60% of the economic value of the global biosphere.

Oceans provide us with 50% of the oxygen we breathe.

The estimate for the value of total global ecosystem services in 2014 was 125 trillion USD/yr

Some 30% of the world's coral reefs are of value to tourism, estimated at nearly 36 billion USD, or over 9% of all coastal tourism value in the world's coral reef countries. (Marine Policy, Vol 82)

Ecosystem services key to Blue Growth

Provisioning
- Food
- Raw materials
- Biochemical and medical resources
- Energy

Regulating
- Biological control
- Regulation of water flow
- Climate regulation
- Moderation of extreme events

Supporting
- Maintenance of life cycles
- Maintenance of genetic diversity

Cultural
- Recreation and tourism
- Scientific advancement
- Inspiration for culture, art and design
- Spiritual experience

Restoring habitats and preserving biodiversity can help to improve these ecosystem services and provide numerous benefits in terms of food, revenue and jobs. For example, in Viet Nam, mangrove replanting by volunteers at the cost of 1.1 million USD saved 7.3 million annual expenditure on dyke maintenance and benefited the livelihoods of an estimated 7 500 families in terms of labour and coastal protection. In Mexico, restoration of 50 ha of mangroves resulted in a six-fold increase in fisher folk daily income.

The importance of freshwater ecosystem services

Freshwater ecosystems can also provide extremely important ecosystem services. For example, flooding affects more people globally than any other natural hazard. In the European Union, large areas of land are being set aside to help protect cities from flooding. Initiatives also include restoration of wetlands and floodplains, along with investment in blue or green infrastructure (e.g., floodplain restoration, natural flood defences, and conservation of vegetated habitats that are highly effective at sequestering carbon). Restored habitat may also form important refuges for wild fish. Such areas also provide refuge for other aquatic wildlife and birds, or provide opportunities for aquaculture.

The enhancement or stocking of recruitment-limited human-made freshwater bodies can also increase their fishery productivity. These water bodies also provide space for aquaculture. Together, these approaches increase local availability of fish and open up economic opportunities in areas where the creation of such water bodies may have resulted in the loss of other livelihoods.

BLUE GROWTH TOOLS

The Code of Conduct for Responsible Fisheries

There are a number of tools to support countries in transitioning to blue economies and fostering Blue Growth. Many of these tools are preceded and underpinned by FAO's Code of Conduct for Responsible Fisheries.

The 1992 United Nations Conference on Environment and Development, more commonly known as the Rio Summit, was instrumental in focusing international attention on achieving sustainable development, with a new interest in safeguarding our natural resources for future generations.

The resulting shift in public debate prepared the way for a long-discussed improved integration of conservation and environmental considerations into fisheries management. The Code of Conduct for Responsible Fisheries was drafted, negotiated, and adopted by FAO member countries to serve this purpose. It served as the basis for the development of the Ecosystem Approach to Fisheries and Aquaculture. The Code recognizes the nutritional, economic, social, environmental and cultural importance of fisheries and aquaculture, and the interests of all those concerned with the fishery sector.

The Code of Conduct of Responsible Fisheries provides principles and standards applicable to the conservation, management and development of all fisheries, including:

- Relationship with international instruments
- Implementation & monitoring
- Requirements of developing countries
- Fisheries management
- Fishing operations
- Aquaculture development
- Coastal area management
- Post-harvest
- Trade
- Fisheries research

Key facts & figures

In March 1991, the FAO Committee on Fisheries called for development of new concepts for responsible, sustained fisheries.

The Code of Conduct for Responsible Fisheries was drafted by 170 FAO member countries.

The Code of Conduct was adopted unanimously at the FAO Conference on 31 October 1995.

Numerous technical guidelines for responsible fisheries and aquaculture and International Plans of Action produced to support countries with implementing the Code.

20 YEARS of the CODE OF CONDUCT for RESPONSIBLE FISHERIES 1995 - 2015

1215 Magna Carta (*Magna Charta Libertatum*) Includes several articles on fishing access

1982 Convention on the Law of the Sea (UNCLOS)

1992 United Nations Conference on Environment and Development (Rio Summit)

1993 Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas

1995 United Nations Fish Stocks Agreement

Adoption **Code of Conduct** for Responsible Fisheries

1996 World Summit on Food Security

1999 Rome declaration implementation Code of Conduct

2000 Establishment of the Millennium Development Goals

2001 Reykjavik Conference on Responsible Fisheries in the Marine Ecosystem

2005 Rome Declaration on Illegal, Unreported and Unregulated Fishing

2009 Port State Measures Agreement

FAO ecolabelling guidelines for marine capture fisheries

2011 FAO ecolabelling guidelines for inland capture fisheries

Technical Guidelines on Aquaculture Certification

2012 Voluntary guidelines on the responsible governance of tenure of land, fisheries and forests in the context of national food security

2014 Voluntary Guidelines on Flag State Performance

Voluntary Guidelines on Securing Sustainable Small-Scale Fisheries

FAO launches the Blue Growth Initiative at the Global Oceans Action Summit in the Hague

2015 20th anniversary of the Code of Conduct celebrated during the 1st International Stakeholders Forum in Vigo

BLUE GROWTH TOOLS

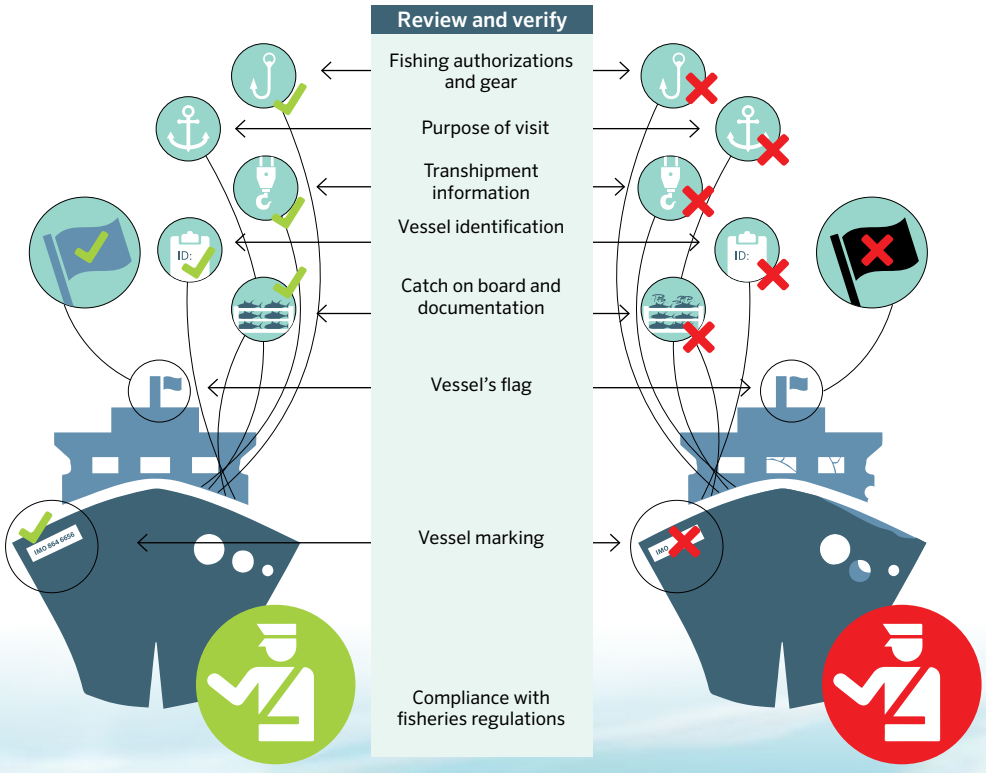
Fighting Illegal, unreported and unregulated (IUU) fishing

Illegal, unreported, and unregulated (IUU) fishing is believed to represent 20 percent of total catches per year and undermines national and regional efforts to manage fisheries sustainably. IUU fishing is found in all types and dimensions of fisheries, on the high seas and in areas under national jurisdiction, at all stages of capture and utilisation of fish, and may sometimes be associated with organized crime. It is well known that IUU fishing has escalated in the past 20 years, especially in high seas fisheries.

FAO and global initiatives to combat IUU fishing

Ending illegal fishing is clearly a daunting challenge. However, for the first time ever, there is the necessary international momentum to move this issue forward, coupled with the legal instruments and initiatives that brings us closer than ever to ending the illegal fishing that threatens our ocean resources and the communities that depend on them for their food security and livelihoods.

FAO Port State Measures Agreement



Authorize use of port for all port services. Fish can be landed and transshipped

Deny use of port, prompt notification to flag state, coastal states and regional fisheries management organizations and take other measures / prosecute.

Key facts & figures

IUU fishing is estimated to affect 11–26 million tonnes of fish.

Estimates place the financial value at up to 23 billion USD annually.

IUU fishing disproportionately affects the small-scale fisheries communities in developing countries that depend on fisheries for their livelihoods and food security

5 June marks a new International Day in the Fight Against IUUU Fishing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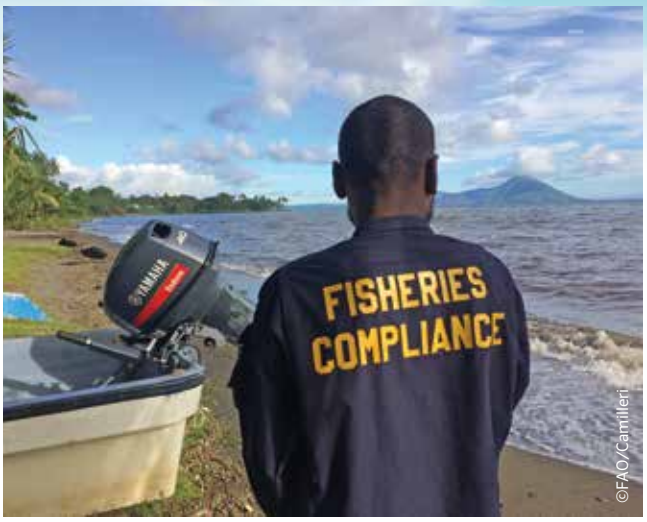


©FAO/Camilleri

FAO Agreement on Port State Measures to Prevent, Deter and Eliminate, Illegal, Unreported and Unregulated Fishing

In 2009, FAO member countries adopted this key measure that aims to prevent vessels engaged in IUU fishing from using ports and landing their catches, thereby reducing the incentive of such vessels to continue to operate and blocking fishery products derived from IUU fishing from reaching national and international markets. On 5 June 2016, the Port State Measures officially entered into force as an international treaty aimed at ending IUU fishing.

FAO Voluntary Guidelines on Catch Documentation Schemes

A number of importing countries have begun to implement the FAO Catch Documentation Schemes in their fight against IUU activities to tackle the problem of harmonized traceability of fish from a market and trade perspective. In order to ensure that these schemes do not constitute an unnecessary barrier to trade, FAO successfully facilitated a five-year negotiation process with member countries that resulted in the Voluntary Guidelines with their official adoption at the 40th session of the FAO Conference in July 2017.

Voluntary Guidelines on Marking Fishing Gear

There is greater international attention focused on marine debris. The UN's 2030 Agenda for Sustainable Development also focuses attention on the issue with its Sustainable Development Goal 14.1, which urges a significant reduction of marine pollution of all kinds by 2025. Made predominantly of plastic, fishing gear when lost or abandoned at sea, is a critical component of marine debris that the global fishing industry and governments have a responsibility to address. International consultations have agreed on voluntary guidelines for fishing gear marking and are being piloted in fisheries communities. The Guidelines will now be presented to FAO governing bodies for adoption.

The Global Record of Fishing Vessels, Refrigerated Transport Vessels and Supply Vessels (Global Record)

The Global Record is a voluntary, phased and collaborative global initiative intended to make information available on vessel identification and other relevant data with the aim of providing a reliable and rapid way to compare data with other sources. Fishing vessels along with other vessels involved in fishing operations are included. The Global Record aims to increase transparency, traceability and the dissemination of data on the global fishing fleet and its operations..

Common Oceans – global sustainable fisheries management and biodiversity conservation in areas beyond national jurisdiction (ABNJ)

The GEF-funded Common Oceans Areas Beyond National Jurisdiction (ABNJ) Program, coordinated by FAO and in close collaboration with other implementing partners, aims to promote efficient and sustainable management of fisheries resources and biodiversity conservation in ABNJ to achieve internationally agreed global targets. It is focused on tuna and deep-sea fisheries, with an emphasis on creating valuable partnerships and enhancing global and regional coordination on ABNJ issues.

International Day for the Fight against IUU Fishing – 5 June

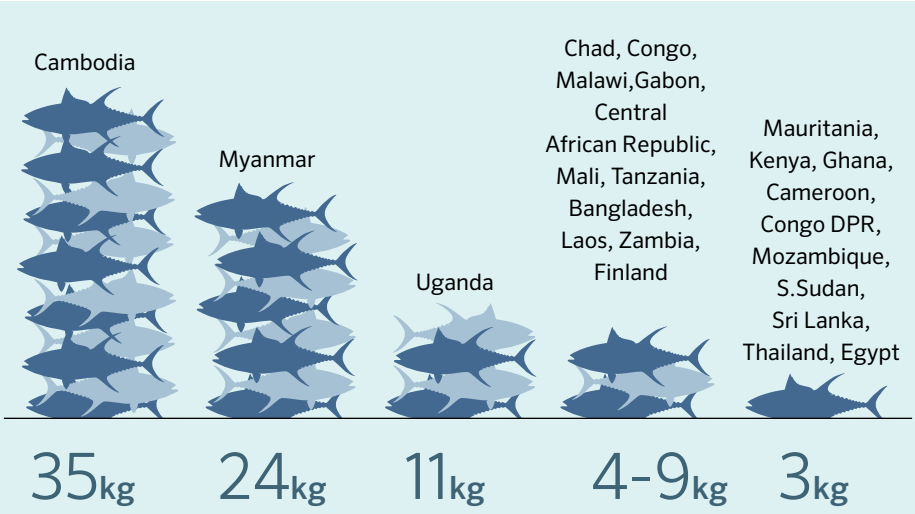
In 2017, the UN General Assembly recognized 5 June as the International Day for the Fight Against IUU Fishing. The day was selected because it is the day the FAO Port State Measures went into effect as the first international treaty designed to combat illegal fishing. FAO is the lead agency for celebrating the day, and works with member countries and partners to coordinate activities for the day and to bring international attention to this important issue.

BLUE GROWTH TOOLS

Inland fisheries

Inland capture fisheries are a key component of Blue Production and Blue Communities, with the potential to provide quality nutrition, food security and income from large to small freshwater bodies across the world. In many cases these water bodies are not achieving their full potential for food production. In other cases, agricultural food production systems (especially irrigation) are missing opportunities for improved integration with inland fisheries, which would boost the system's overall nutritional performance. This is typically achieved though capturing synergies in water manage-ment, as well as innovative designs that improve ecosystem services of inland fisheries.

Inland Fisheries Production per Capita



The top 24 per capita inland fisheries producing countries represent 11% of the global population

Key facts & figures

Inland fisheries are crucial to the livelihoods of more than 60 million people worldwide, including roughly 35 million women.

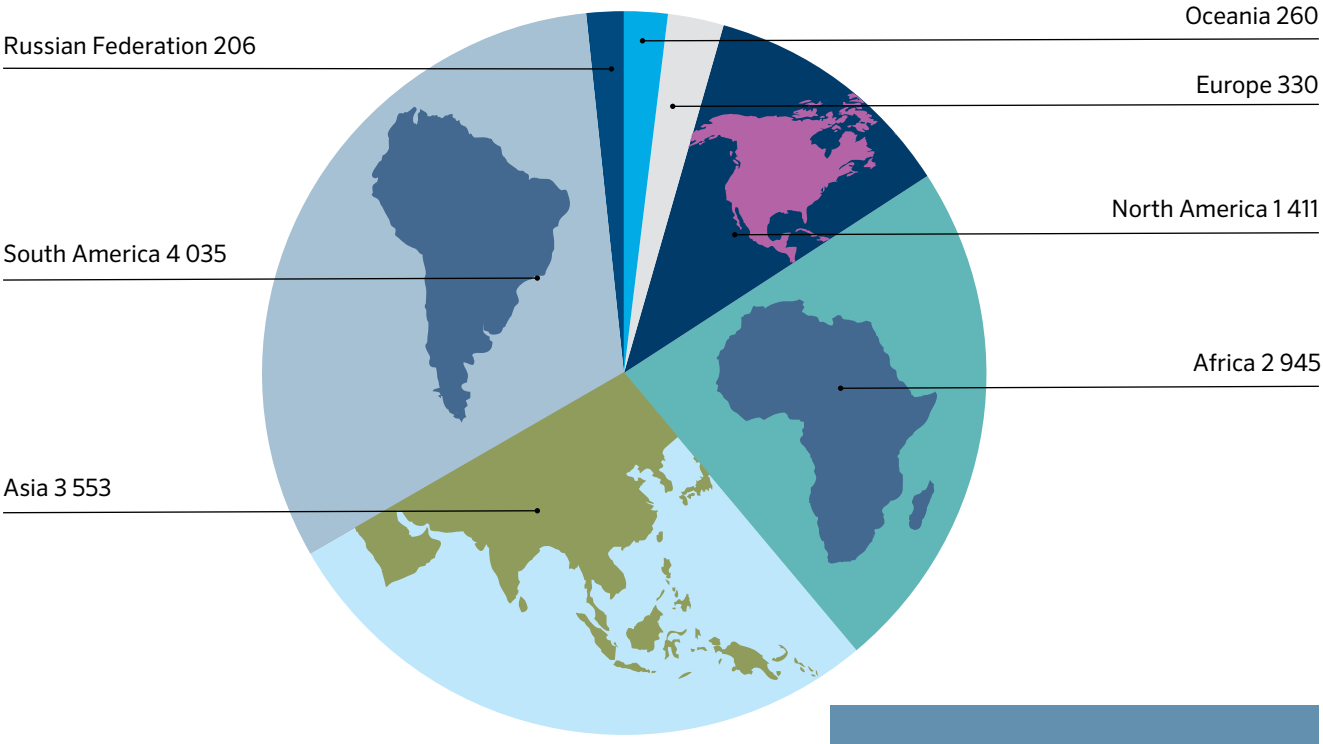
Inland fisheries are especially productive in Asia and Africa.

At a minimum, there are likely 11.6 million tonnes of harvests from inland fisheries, globally.

A conservative estimate of the total use value of reported global inland fisheries is 26 billion USD, a figure that increases to over 43 billion USD with the inclusion of shellfish, crustacean and estimated, unreported production.

The Blue Growth Initiative can play a critical role in promoting inland and small pelagic fisheries, especially in bringing together the various stakeholders in integrated water management policies, improving value chain quality control from processing to trade, and fostering public and private investments. A key action to secure inland fisheries will be to focus on greater appreciation of their role in high-quality protein-rich nutrition and livelihood resilience and how this may be secured particularly in vulnerable countries.

Freshwater Fish Species by Region



Small Pelagics

Within the context of inland capture fisheries and of relevance to Blue Production are the landings of small pelagic fish, particularly in African lakes and reservoirs, including small herring, carp, bream and characin species that have steadily increased in the last thirty years. Even though small pelagic fish species have always been an important part of local subsistence fisheries, they have conventionally been regarded by fisheries managers as low value resources with corresponding neglect, low research efforts, and monitoring priority. But from an ecosystem perspective, the fishing pressure on most of the small species is only a fraction of the pressure on large fish, thereby providing potential for increased yet sustainable production.

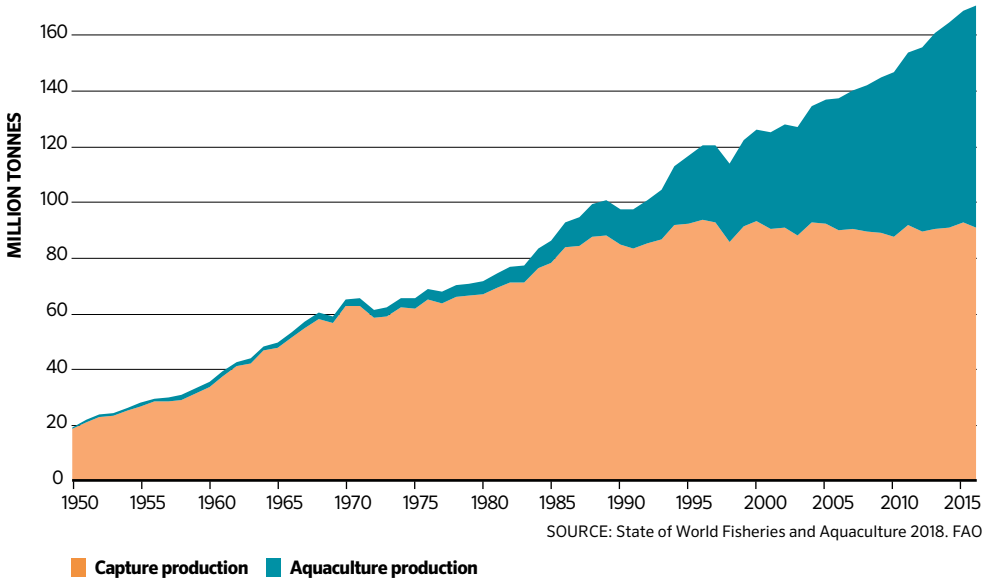
BLUE GROWTH TOOLS

Aquaculture

Aquaculture has seen spectacular growth in recent years. Its importance will only increase in a future where the demand for fish is growing at a time when many capture fisheries are being fully utilized. Today aquaculture accounts for over 50% of the fish destined for human consumption, and continues to 'fill the gap' in the worldwide projected demand for aquatic food, which is expected to increase by approximately 2% per year over the coming decades.

Instruments such as the Ecosystem Approach to Aquaculture, or the technical guidelines such as the ones developed for spatial planning, responsible health management, genetic resource management, aquaculture governance or aquaculture certification among others, now help to ensure that aquaculture products reaching consumers have been produced in a manner consistent with the principles of the Code of Conduct.

Aquaculture is outpacing capture fisheries production



SOURCE: State of World Fisheries and Aquaculture 2018. FAO

Key facts & figures

Global aquaculture production increased by 228% in volume and by 492% in value since 1995, the year in which the Code of Conduct was adopted.

In FAO aquaculture statistics, 598 aquatic species and species groups are currently recorded

In 2016, aquaculture contributed 47% to the world's production of aquatic animals, including finfish, molluscs, crustaceans and other species (up from 26% in 2000).

Finfish farming in inland freshwater areas contributed 66% to the 2006–2016 increase in world production of farmed aquatic animals for human consumption.

Feed, nutrition, and health

Increased research on the relationships between fish diets, nutrition, growth and health has improved the economic and environmental performance of aquaculture production. New ingredients and technological processes allow for the replacement of fish oil and fishmeal in commercial feed, while ensuring that nutritional value of aquaculture products is maintained.


©FAO/Crespi

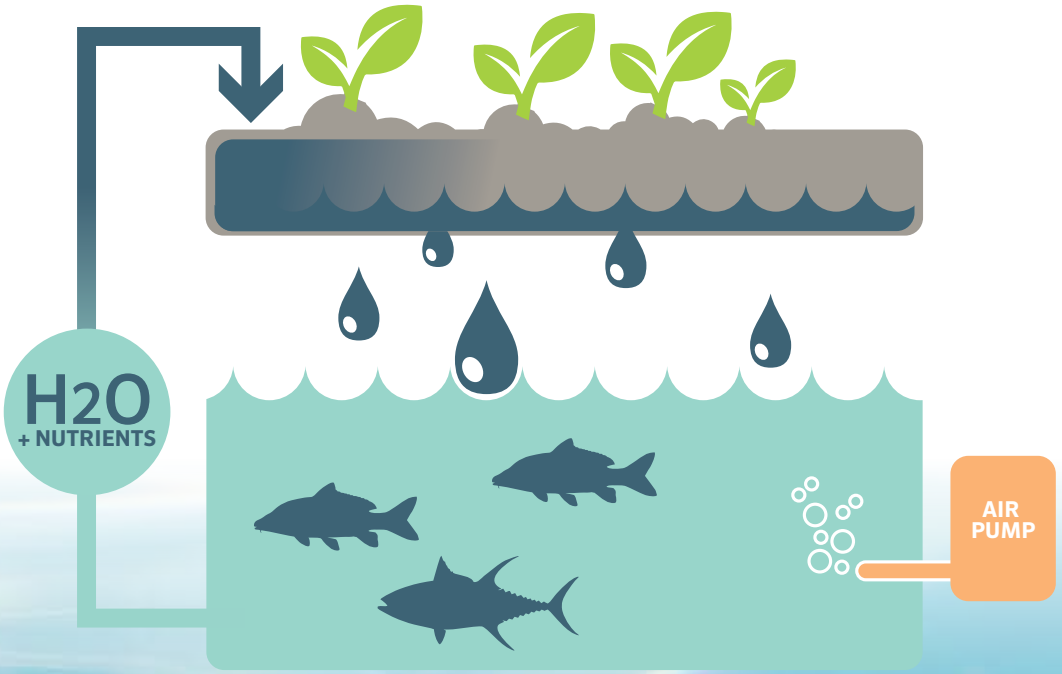
Engineering technologies

Cage development and recirculation technologies allow for dense, efficient, and resilient fish farms. One fish farm FAO worked with in eastern China holds 52 concrete raceways which recirculate water and support black bass and grass carp cultivation. The Blue Growth Initiative will support member governments in spreading these technologies to rural farmers and fishers.

Aquaponics

Aquaponics combines hydroponics, soil-less agriculture, and aquaculture within a closed system. The fish produce waste including ammonia (NH3), which bacteria convert into nitrate, a nutrient for plants. The plants uptake the nitrate, a nutrient for plants, and other nutrients from the water, purifying it before it returns to the fish tank. Water efficient, not reliant on fertilizers or pesticides, and implementable in non-arable areas like rooftops or deserts, aquaponics presents economic opportunity and a reliable food source in areas where aquaculture and soil-based agriculture are challenging. However, aquaponics also requires daily management, electricity, specialized knowledge in fish, bacteria, and plant production, and initial capital. Aquaponics offers an easily adaptable system to provide fish protein, produce, and profits to families and small communities.

The biological components in the aquaponic process: fish, plants and bacteria



BLUE GROWTH TOOLS

Towards a more sustainable seafood value chain

A value chain is the entire process by which a sector or a company adds value to their final product. Blue Growth measures can improve the process, diminish losses and waste, and minimize the carbon footprint, while simultaneously adding value to the product. At the end of the seafood value chain, consumers can contribute to sustainable Blue Growth through their purchasing choices and their efforts to reduce food waste.

Effective policies are key to Blue Growth actions from job creation and decent employment to efficient resource management, food loss and waste reduction, poverty reduction and providing incentives for investment and innovation. Influencing policy decisions is also necessary to strengthen the role of women in the seafood industry, and to empower vulnerable communities engaged in small-scale production.

Ocean-sourced Fashion

The traditional fisheries and fish farming sectors generate enormous amounts of fish skin, too often perceived as a waste product. Simultaneously, the fashion industry struggles with sustainability in its water-demanding cotton production and with synthetic fabrics releasing micro plastics into the ocean. One interesting and creative example being spearheaded by Scandinavian designers: utilizing wasted fish skin and seaweed to create elegant fashion designs. An increased use of marine resources in the fashion industry can increase the sustainability of both the fashion industry and the marine industries.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Key facts & figures

Seafood products are among the most widely traded food commodities accounting for roughly 143 billion USD per year.

59.6 million people are employed directly through fisheries and aquaculture.

About 200 million direct and indirect employment opportunities are created along the value chain.

35% of fish and seafood is lost or wasted – almost double the figures for losses for meat products.

Building a more efficient and sustainable seafood value chain

Harvesting
- Improve safety and security for workers
- Decrease carbon emissions & adopt appropriate technologies
- Develop ecotourism
- Eliminate IUU
- Preserve biodiversity
- Improve cold-chain

Primary processing
- Improve energy efficiencies
- Lower carbon emissions
- Innovate & adopt appropriate technologies
- Recycle food byproducts

Secondary processing
- Lower carbon emissions
- Improve infrastructure
- Support innovation

Wholesale
- Improve transport
- Use recyclable packaging
- Decrease food waste
- Improve infrastructure

Retail
- Reduce packaging and recycle
- Decrease food waste
- Improve transport
- Promote sustainable seafood choices

Consumer
- Encourage recycling
- Decrease food waste
- Improve nutrition
- Inform about sustainability of seafood & carbon footprint of food

Post-consumption
- Decrease food waste
- Recycle packaging

Small changes can result in big impacts along the value chain

Simple, inexpensive technologies can have tremendous effects on the value chain, particularly by increasing the earnings of rural fishers and processers. More efficient fish smoking kilns in Côte d'Ivoire increased profits for women's cooperatives, improved the health of the women smoking the fish, and met EU standards for dried fish imports. Additionally, the more efficient kilns resulted in lower levels of food loss and waste and reduced the amount of carbon fuel required to produce the product, thereby decreasing greenhouse gas emissions and protecting natural resources.

BLUE GROWTH TOOLS

Food loss and waste (Save Food)

One billion tonnes of food is wasted each year despite the fact that 815 million people around the globe are still undernourished. Food loss and waste squanders precious natural resources, contributes to food insecurity, and slows economic and social development.

Combating food losses and waste requires different approaches in different parts of the world. About half of the seafood loss in North America takes place at the consumption stage. In the developing world, most losses are experienced at the post-harvest stage, with fish lost in poorly constructed nets, in substandard transport without ice to maintain sanitary conditions, or within inefficient fish processing and storage facilities. In the developed world, increased coordination between fishers, traders, supermarkets, and consumers limit overproduction and wasted fish on grocery shelves.

Key facts & figures

The percentage of fish food losses – 35% - is almost double that of losses for meat products.

Approximately 25% of seafood in North America and Oceania is wasted at the consumption stage

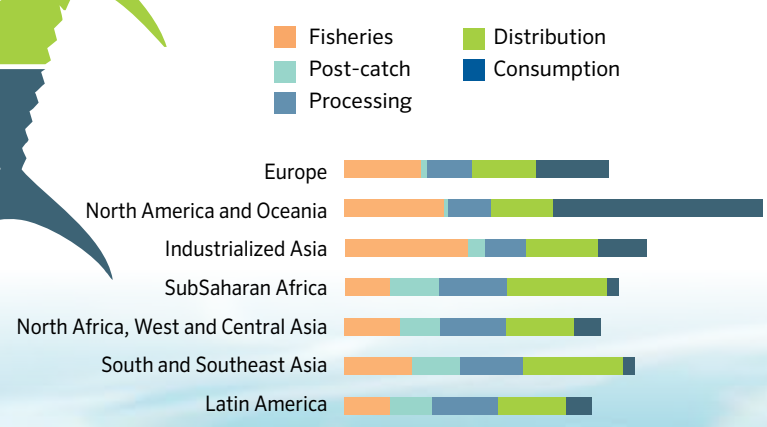
Fish consumption is expanding on all continents, with higher increases expected in Asia and Oceania.

35%

FISH & SEAFOOD FOOD LOSSES

8% of fish caught globally is thrown back into the sea. In most cases they are dead, dying or badly damaged.

This is equal to almost 3 billion Atlantic salmon.



Reducing Post-Harvest Losses in Egypt

Over a one-year study FAO analyzed the fish loss and waste situation in the Delta area of Egypt with the main objective of reducing pre and post-harvest losses and waste in the fisheries and aquaculture sectors. Three important value chains in the Delta area (Semi-industrial fisheries in the Mediterranean, Tilapia Aquaculture and Small Scale Fisheries in the Lagoons) were targeted. The project was implemented with a constant and full participation of all the relevant stakeholders linked to the fisheries and aquaculture sector: national authorities, fisheries and aquaculture associations, training institutions and research centers, fishers and aquaculturists, market, private sector, NGOs and consumers. The fish policy context was studied to strengthen the fish loss and waste strategic, policy and regulatory framework. The project finished with the organization of training sessions on fish loss and waste reduction, particularly in fish markets, stressing best practices to reinforce the local capacity of the various actors of the value chain.

Drying Racks in Burundi

FAO taught women in Burundi to build and use raised racks for fish drying instead of placing them on the sand. Previously, the women lost 15% of the catch to animals or rainwater contamination. Today, the prices of the cleaner, quicker drying fish have doubled since 2004. Women often participate in less valued post-harvesting operations while men occupy fishing roles. Therefore, economic opportunities for women are valuable, and the women in this project gained greater credibility with their increased earning power. Although men hope to enter this newly lucrative industry, the government supports women's cooperatives through microcredit schemes.

BLUE GROWTH TOOLS

Ecolabels and certification

The demand for fish and fishery products is increasing rapidly. But as consumer patterns change, so do requests for information about the origins of the fish being consumed, and guarantees that they were fished sustainably. Seafood industry experts are increasingly speaking about the consumer demand for 'sea to plate' traceability. Fisheries and aquaculture ecolabels and certifications were developed to try to address those requests.

Certification schemes set standards for an ecolabel, certifies that a fishery and supply chain conform to those standards and accredit the certifying body. Certification and eco-labelling is popular among environmentally aware and active consumers, is primarily used by large supermarket chains and is centered on a few seafood species. Within the context of Blue Growth, certification and ecolabels offer tools for transformative interventions to add value, minimize environmental degradation or foster sustainable resource use.

Key facts & figures

In 2005, the FAO ecolabelling guidelines for marine capture fisheries were endorsed.

In 2011, the FAO ecolabelling guidelines for inland capture fisheries were endorsed.

In 2011, the FAO technical guidelines on aquaculture certification were endorsed.

In 2015, the Global Sustainable Seafood Initiative, a global benchmarking tool based on the Code of Conduct to evaluate third-party certification, was launched in Vigo, Spain.

FAO guiding documents for voluntary certification

Ecolabelling has been discussed by FAO members since 1997, resulting in the following guiding documents:

- Guidelines for Eco-Labeling of Fish and Fishery Products from Marine Capture Fisheries (2005, revised 2009)
- Guidelines for the Eco-Labeling of Fish and Fishery Products from Inland Capture Fisheries (2010)
- Technical Guidelines for Aquaculture Certification (2011)
- Evaluation framework for Aquaculture Certification (approved 2013)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FAO Certification Guidelines are: consistent with relevant international law (UNCLOS, Fish Stocks Agreement, WTO) and are voluntary, market driven, transparent, non-discriminatory and recognize the special conditions applying to developing countries. FAO Certification Guidelines are intended to provide guidance to governments and organizations that already maintain, or are considering establishing, labelling schemes for certifying fish from fisheries or from aquaculture.

A global benchmarking tool for certification schemes

With the proliferation of so many seafood certification schemes, consumer confusion arose. In 2012, the Global Sustainable Seafood Initiative was established by industry leaders to provide a global benchmarking tool to assess third-party certification schemes against the FAO Code of Conduct for Responsible Fisheries, Certification Guidelines and other FAO instruments. FAO and NGOs sit on the Global Sustainable Seafood Initiative Steering Board as affiliated partners. The Initiative was officially launched in 2015, at the 20th anniversary celebrations of the FAO Code of Conduct for Responsible Fisheries in Vigo, Spain. Since the launch, numerous certification schemes are undergoing benchmarking processes and some have already been recognized.

Public ecolabel schemes

A number of countries or regions have developed their own eco-label schemes to replace private third-party certification schemes. This is a trend which may increase in the future, as FAO has been requested to provide capacity building to member governments interested in developing their own national ecolabel scheme.

Blue Forum and Blue Ports

Blue Growth will never be achieved without the partnership and collaboration of the private sector. FAO is working with various partners – private sector, governments, NGOs, fisherfolk associations and others – to establish a Blue Forum that will promote not only environmental sustainability of the sector, but also place an emphasis on strengthening the socioeconomic situation for all workers along the seafood value chain. As part of this commitment, FAO is also working with partners to explore opportunities for mainstreaming Blue Growth approaches at fishing ports. Spain has committed to achieving a Blue Port at its Galician Port of Vigo, establishing a fishing port that is environmentally, economically and socially sustainable.


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BLUE GROWTH TOOLS

Technology and innovation

Although fishing and aquaculture may evoke images of wooden boats rowed with oars and small fish ponds, the sector today is highly dependent on technology and innovation in order to expand sustainably. Large-scale fishing vessels are now worth millions of US dollars and carry technology developed by scientists and engineers across all sectors. Innovation in the sector links global value chains, reduces energy use and provides healthy, bountiful harvests.

Financial Instruments

FAO, in partnership with the World Bank, is developing guidelines for emerging Blue Economy and Blue Growth financial instruments (e.g., investment funds, debt for nature swaps) to raise awareness of the opportunities, challenges, and requirements associated with such instruments. These guidelines will help countries and constituents to determine suitable instruments for their purposes and the associated capacity needs to effectively and efficiently implement such instruments.

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Key facts & figures

Global capture fisheries consume approximately 41 million tonnes of fuel per year.

Rebuilding overfished stocks could increase production by approximately 15 million tonnes.

Over half of fishing vessels are engine-powered, but motorized vessels are spread unevenly across the globe. In North America, over 90% of ships are motorized, while in Africa less than 50% are motorized.

The Nansen Programme

The *Dr. Fritdjof Nansen*, is the most advanced marine research vessel in the world, and the only one to fly the UN flag. This collaboration between Norway and FAO dates back to 1974. The Nansen has travelled the equivalent of six times around the globe, conducting research in some of the least studied waters around the world, but primarily in Africa and Asia. The Nansen provides a platform for many developing countries that lack the proper infrastructure to conduct such marine research on their fisheries resources - on the effects of climate change, the presence of pollution and marine plastics - independently. A gender policy ensures that the rotating crew of scientists on board for each survey includes many female scientists from national ministries, universities and research institutes. This unique research partnership allows many developing countries to achieve their efforts managing sustainable fisheries and to obtain critical information key to their reporting on SDG 14 achievements. The newest Nansen vessel, launched in 2017, is replete with seven scientific laboratories, an auditorium, and equipped with modern sonar sensors able to map fish distribution quickly and a remote-control submersible vehicle able to take photos of life on the ocean floor.

Disruptive Technologies

Disruptive technologies are new technologies that still lack refinement, are often just known to a limited public, and might not yet have a proven practical application. Disruptive technologies therefore have the potential to change the way people work, do business and engage in the global economy. Disruptive technologies in the fisheries and aquaculture sectors include mobile internet (e.g. providing real-time market prices for fish), advanced robotics (e.g. automatic fish filleting) and the "Internet of Things", or interconnectedness among systems, devices and advanced sensors (e.g. electronic fish tags). FAO's Blue Growth Initiative encourages innovation and adoption of new technologies, including disruptive ones. Disruptive technologies can offer new ways for the fisheries and aquaculture sector to do business so that it is more sustainable and more resource and energy efficient while creating new decent work opportunities, including opportunities for women and youth.

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