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FISHERIES AND AQUACULTURE UTILIZATION AND TRADE: CHALLENGES AND OPPORTUNITIES

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Fisheries and Aquaculture Utilization and Trade: Challenges and Opportunities[1]

Introduction

Established in 1945 as an agency of the United Nations (UN), the Food and Agriculture Organization (FAO) leads international efforts to eradicate hunger, food insecurity and malnutrition. FAO's vision is: "A world free from hunger and malnutrition where food and agriculture contribute to improving the living standards of all, especially the poorest, in an economically, socially and environmentally sustainable manner." Three global goals underpin this vision:

- eradication of hunger, food insecurity and malnutrition, progressively ensuring a world in which people at all times have sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life;
- elimination of poverty and the driving forwards of economic and social progress for all, with increased food production, enhanced rural development and sustainable livelihoods;
- sustainable management and utilization of natural resources, including land, water, air, climate and genetic resources, for the benefit of present and future generations.

Fisheries and aquaculture make a significant contribution to food security and livelihoods of millions of people, supplying around 20 kg of fish/capita/year, essential micronutrients such as vitamins, minerals (zinc, iron, iodine and selenium), omega 3 fatty acids and 17% of global animal proteins. Likewise, around 58 million people were directly employed in fisheries and aquaculture in 2012 and some 200 million direct and indirect employment opportunities occur along the value chain from harvesting to distribution, making the livelihoods of 10-12 percent of the global population dependent on the sector. Finally, fish and seafood is one of the most traded food commodities. Some 36 percent of the production enters international markets, generating a trade value of US$ 144 billion in 2014, from a mere 8 billion in 1976. Over 54%[2] of this trade originates in developing countries whose net trade income (export minus import), valued at US$ 38 billion in 2014, is greater than the net trade income of the main agricultural commodities combined.

This places fisheries and aquaculture at the center of an important economic activity that can contribute significantly to feed and provide livelihoods to a global population set to reach 9.7 billion in 2050[3]. Unfortunately, the sector is already under stress from over-exploitation, pollution, declining biodiversity, expansion of invasive species, climate change and ocean acidification. The share of marine fish stocks that are over-fished has alarmingly increased from 10 percent in 1970 to nearly one third in 2011. A further 61 percent of the fish stocks are fully fished but, the potential economic gain from reducing fishing overcapacity and restoring fish stocks is on the order of US$ 50 billion per year. Illegal, Unreported and Unregulated (IUU) fishing is estimated at 15 to 20 million tonnes a year. Disease outbreaks have cost the aquaculture industry tens of billions of US$ over the last 20 years. Natural disasters such as the 2004 Tsunami or the 2014 Typhoon Haiyan caused massive loss of life and severe damages to the physical infrastructure of the affected countries.

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[2] FAO Food Outlook, May 2015 at http://fao.org/3/a-14581F.pdf
[3] United Nations Department of Economic and Social Affairs. World population prospects. The 2015 revision, July 2015

Hence, realizing the full potential of the sector requires new responsible and sustainable approaches to their economic development. A more environmentally, socially and economically effective fish and seafood chain can contribute to sustainable growth and food security, pave the way for less pressure on aquatic resources and deliver the potential for people employed in the sector to act not only as resource users but also as resource stewards.

In 2013, FAO launched the Blue Growth Initiative (BGI) in support of food security, poverty alleviation and sustainable management of living aquatic resources. The BGI aims at building resilience of coastal communities and restoring the productive potential of the oceans and wetlands by promoting international coordination to strengthen responsible management regimes and practices that can reconcile economic growth and food security with oceans conservation and the eco-systems they sustain.

The BGI is gaining further visibility and importance within the framework of the post-2015 Sustainable Development Goals (SDGs) to support the goals and targets that fall within FAO's mandate, in particular, proposed Goal 2 (End hunger, achieve food security and improved nutrition, and promote sustainable agriculture) and proposed Goal 14 (Conserve and sustainably use the oceans, seas, and marine resources for sustainable development).

This paper summarizes basic information and recommendations of the FAO interventions at the Ad Hoc Expert Group Meeting on Trade in Sustainable Fisheries[4] to illustrate emerging issues and FAO's approach to contribute to their resolution

The Blue Growth Initiative (BGI)

The FAO Global Initiative on Blue Growth in Support of Food Security, Poverty Alleviation and the Sustainable Management of Aquatic Resources, the BGI for short, defines "Blue Growth" as "*Sustainable growth and development emanating from economic activities in the oceans, wetlands and coastal zones, that minimize environmental degradation, biodiversity loss and unsustainable use of living aquatic resources, and maximize economic and social benefits*".

The first proposal for a "*blue economy"* is generally attributed to Gunter Pauli in his book "*The Blue Economy 10 years - 100 innovations - 100 million jobs" (2010).* Interestingly the concept was not first intended to relate specifically to oceans or wetlands, rather the term "*blue economy"* was used to reflect an evolution and refinement of the 'green economy' concept[5].

The concept of Blue Growth, which has been referred to also as "*Blue Economy*", "*Green Economy in a Blue World*", "*Blue Green Economy*", "*Blue economy, the new maritime green economy*" or "*Green growth in fisheries and aquaculture*" has developed during recent years as an emerging paradigm for the sustainable management of natural marine and freshwater resources. The terminology "*Blue Growth*" is preferred by many instead of "*Blue Economy*", because there has been criticism in some development circles of the "*green economy"* concept, in particular its emphasis on zero or limited growth.

Due to a recognition by FAO of the importance and need for the aquaculture and fisheries sector to sustainably grow in order to meet rising food demand and contribute to poverty alleviation, and the fact that zero growth is neither realistic nor desirable, FAO is specifically promoting "*Blue Growth*" in its Initiative rather than Blue Economy".

[4] UNCTAD, 2015. Ad Hoc Expert Group Meeting on Trade in Sustainable Fisheries. 29 September -1 October 2015

[5] http://www.theblueeconomy.org/blue/Home.html.

The Green Economy concept based on sustainable production and consumption is included in the Rio+20 outcomes document "The future we want", and was embraced by many developing countries. The application of the concept of sustainable development and consumption was further developed in response to Member States' questions on its application in marine and coastal sectors. The outcome document of the Summit "the future we want" has recognized the central role that oceans, seas and coastal areas play in sustainable development from blue economy. Since then, this concept has been at the centre of international consultations, including "*the Global Oceans Action Summit for Food Security and Blue Growth (22–25 April 2014, The Hague, Netherlands*)", *"the Blue Week Conference (Lisbon, June 2015)"* to cite only a few.

The Blue Growth concept has also gained visibility and prominence in the oceanic and freshwater development agendas of international organizations such as UNEP, the World Bank, OECD, the European Union, and many nations, both developed and developing, in particular the SIDS.The BGI aims at improving the governance and management of the aquatic resources, the conservation of their biodiversity and habitats, the empowerment of concerned communities, including through better adaptation of vulnerable communities to climatic changes and improved resilience to natural disasters and crises.

The BGI is organized around 4 major streams of work:

Capture Fisheries: The aim is to provide policy, technical and institutional capacity-building support to Governments, regional fisheries bodies (RFBs) and industry to ensure that adequate institutional, scientific and legal framework is in place for introducing, supporting and enforcing fisheries management and good practices to combat IUU, reduce overcapacity, restore stocks and minimize the impact of fishing on the environment.

Global Aquaculture Advancement Partnership (GAAP): The aim here is to support a sustainable increase in global aquaculture production to meet increased demand for fish as the world population grows. GAAP will contribute to this aim by providing technical and capacity building support to Governments and farmers to develop national strategies for aquaculture development, disseminate and adopt better management and governance policies and best practices that increase productivity and reduce environmental and disease risk to stimulate investment.

Livelihoods and food systems: Under this component, FAO would assist governments and private sector to develop policies for value-addition and trade-promotion integrating economic performance, food security, sustainability and social protection. With the transition to more sustainable fisheries management, it will promote public/private partnerships that support investment in infrastructure, technology and practices to increase fisheries value addition and quality. In so doing, FAO would promote decent livelihoods, poverty reduction, job creation, social inclusion and community resilience.

Ecosystem Services: Under this component, FAO will contribute expertise to conduct and disseminate national and regional studies on carbon binding possibilities in sea grass beds, mangroves as defense for coastal erosion and storm and wave damage, fish-crop (rice etc.) systems, seaweed cultivation as well as other possibilities. The information will be used to assist communities to create income and livelihoods in coastal communities, reduce poverty, strengthen and improve social conditions.

At the Global level, the substantive work of the BGI would support the implementation of the FAO Code of Conduct for Responsible Fisheries CCRF, the related International Plans of Action (IPOAs) (e.g. IPOAs for managing fishing capacity, for IUU fishing), International Agreements and Guidelines (e.g. the international Guidelines on Securing Sustainable Small Scale Fisheries,

the Voluntary Guidelines on Responsible Governance of Tenure of Land, Fisheries and Forests, the FAO/ILO/IMO instruments on the Safety of Fishing Vessels and Fishers, bycatch management and reduction of discards; management of deep-sea fisheries in the high seas), the eco-system approach to fisheries and improving practices in fishing and aquaculture.

At the regional level, the BGI aligns and supports the implementation of the Blue Growth Regional Initiative in Asia and Pacific, with a focus on sustainable aquaculture intensification and in the Near East and North Africa, with a focus on capture fisheries along the entire fish supply chain. It supports the network of regional fisheries bodies RFBs/RFMOs, which are mandated to work towards achieving relevant components of the BGI.

At the country level, several pilot countries are supported by FAO to promote and implement the BG concepts in their national policies and strategies on fisheries and aquaculture. Other countries and regions have expressed interest in the BGI. Likewise, consultations with other regions are ongoing to develop synergies where appropriate with other Regional Initiatives, in particular the Water Scarcity Initiative (FAORNE) and the Rice Initiative (FAORAP)

Outlook models for understanding future trends and addressing forthcoming challenges

In order to have supporting policies and political commitments that effectively promote food security and good nutrition, it is essential that up-to-date information and statistics are available and accessible. In the perspective of future population growth and possible increase in demand for fish and fishery products, the need to develop specific projections for better understanding the plausible outlook for fisheries and aquaculture and the challenges they might face has recently attracted more international attention. Outlook studies can represent an important tool for international organizations, such as FAO, OECD, the World Bank, their members, and the international community to facilitate understanding of the impacts of changes in aquaculture and capture fisheries and of demand shifts and policy reforms, as well as to obtain relevant information for developing strategic responses to emerging challenges. Outlook projections can also help FAO, other international organizations, and donors to highlight work priorities and to develop a tailored strategy to support countries in addressing the major challenges facing the sector.

In recent years, specific fish models have been developed in partnership with international organizations. It was considered important that this work should not be done in isolation, but integrated into an overall agricultural analysis aiming at achieving a more comprehensive and consistent examination of the medium- or long-run prospects for fish together with those for food and agriculture. The two main outcomes are: (i) the FAO Fish Model developed by FAO as a satellite to the OECD–FAO AGLINK–COSIMO Projection System,[6] with medium term projections (ten years) annually included in the OECD–FAO Agricultural Outlook publication since 2011; and (ii) the *Fish to 2030* publication (World Bank, 2013), which shows the results of the International Model for Policy Analysis of Agricultural Commodities and Trade (IMPACT model) of the International Food Policy Research Institute (IFPRI). For both models, FAO fishery statistics on production, trade, and apparent consumption, the FAO Food Balance Sheets, represent the main data used. Based on key assumptions and uncertainties, these outlook models represent an important tool for providing insights on likely paths of development and constraints in supply and demand to determine regional vulnerabilities, changes in comparative advantage, price effects, and potential adaptation strategies in the fisheries and aquaculture sector. The results of both outlook models are based on specific assumptions regarding the future macroeconomic environment, international trade rules and tariffs, absence of abnormal fish related disease outbreaks, fishery quotas, longer term productivity trends and the absence of market shocks. Should one of these assumptions change, the resulting fish projections would be affected.

[6] More information on the AGLINK–COSIMO modelling system, and on the OECD–FAO Agricultural Outlook publication is available at www.agri-outlook.org/

The OECD–FAO Agricultural Outlook

The OECD–FAO Agricultural Outlook is an annual publication presenting projections and related market analysis for some 15 agricultural[7] products over a ten-year horizon. The projections are based on the AGLINK–COSIMO modelling system. The AGLINK model was developed by the OECD in the early 1990s and then enhanced through the development by FAO of the COSIMO component for a large number of developing countries. It brings together the commodity, policy, and country expertise of both organizations and input from collaborating members to provide an annual assessment of prospects for the coming decade for national, regional, and global agricultural commodity markets. It shows how these markets are influenced by economic developments and government policies, and it highlights some of the risks and uncertainties that may influence market outcomes. The capacity to capture interactions between commodities and between countries is a major strength of this model, allowing analysts to assess not only the direction but also the magnitude of market adjustments resulting from economic or policy changes. For many countries, agricultural policies are specifically modelled within AGLINK–COSIMO. This makes the model a powerful tool for forward-looking analysis of domestic and trade policies through the comparison of scenarios of alternative policy settings against the benchmark of the baseline projections.

FAO, with the collaboration and agreement of the OECD and FAO Secretariats for AGLINK–COSIMO, has recently built a dynamic, policy-specific, partial-equilibrium satellite model on fish and fishery products. This satellite model has followed the same general principles used to build the AGLINK–COSIMO modelling system in order to facilitate its eventual integration.[8] The main results of the fish model, which are included in the "Fish and seafood" chapter of the annual OECD–FAO Agricultural Outlook publication, provide insights on the most plausible scenario for a ten-year horizon in the fisheries and aquaculture sector. Under a certain set of assumptions, the results portray an outlook in terms of future production potential, projected demand for fisheries products, consumption, prices, and key factors that might influence future supply and demand. These trends guide FAO, OECD, and their Members to plan the sustainable use and conservation of fisheries and aquaculture resources for economic growth, improved social welfare, and development.

The Fish model contains more than 1 100 equations and covers the same countries and regions as AGLINK–COSIMO. There are two types of supply functions: capture and aquaculture. Demand is for aggregate fisheries, but it is split according to three end uses: food, processed into fishmeal and fish oil, and other uses (kept exogenous). There are three links between the fishery and the agriculture markets: on the demand side through the substitution between fish and other animal products, through the amount of feed demanded by aquaculture, and through the interaction between fishmeal and fish oil and their respective oilseed substitutes.

The baseline projection should be considered a plausible scenario elaborated on the basis of specific assumptions regarding the macroeconomic conditions, the policy settings, weather conditions, longer term productivity trends and international market developments. The main outcomes of the latest fish projections were included in the OECD–FAO Agricultural Outlook 2015–2024 publication published in July 2015. Some key findings include:

- World fisheries and aquaculture production is projected to expand by 19 percent between the 2012-14 base period and 2024, to reach 191 million tonnes.
- The main driver of this increase will be aquaculture, which is expected to reach 96 million tonnes by 2024, 38 percent higher than the base period (average 2012-14) level.

[7] Agriculture, including fisheries and aquaculture.
[8] At present, the fish model is not fully integrated in the overall AGLINK–COSIMO modelling system.

- In 2023, aquaculture is set to surpass total capture fisheries (including non-food uses), earlier than projected by previous issues of the Outlook and the WB/IFPRI/FAO Fish to 2030 report.
- World per capita apparent fish food consumption is projected to reach 21.5 kg in live weight equivalent in 2024, up from 19.7 kg in the base period.
- Fish consumption will expand in all continents with higher increases expected in Asia and Oceania.
- In contrast with previous *Outlook Reports*, for the first time, a slight increase is projected for fish consumption in Africa.
- For total fish food consumption, since 2014, species raised from aquaculture became the main source of fish for human consumption, and this share is projected to reach 56 percent in 2024.
- This global picture masks variations between regions. The bulk of increase in production and consumption will continue to originate from Asian countries. China will remain the leading producer and exporter at world level. Developing countries will be the major drivers in increase in production, trade and consumption of fish and fishery products.

Fish To 2030

Fish to 2030 is the result of a collaborative work between IFPRI, FAO, the University of Arkansas at Pine Bluff, and the World Bank. The report builds on the publication Fish to 2020 (Delgado et al. 2003), which provided a comprehensive global overview of the food fish supply and demand balance. The Fish to 2030 report employs IFPRI's IMPACT[9] model to generate projections of global fish supply and demand up to 2030. The IMPACT model is a relatively straightforward partial equilibrium global agriculture sector model, covering the world in 115 model regions for a range of more than 40 agricultural commodities, to which fish and fish products were added for the Fish to 2030 study.

In the 1990s, IFPRI developed the IMPACT model to address a lack of long-term vision and consensus among policy-makers and researchers about the actions necessary to feed the world in the future, reduce poverty, and protect the natural resource base. It serves as the basis for research on the linkage between the production of key food commodities and food demand and security at the national level in the context of scenarios of future change, with cutting-edge research results on rapidly evolving topics such as bioenergy, climate change, and diet/food preferences.

For the Fish to 2030 report, the IMPACT model was calibrated and employed to evaluate different policies and alternative events, and to illustrate the likely evolution of the global seafood economy. The results are structured according to a baseline scenario, considered the most plausible one, and six alternative scenarios that investigate potential impacts of changes in the drivers of global fish markets under various assumptions. The overall publication is centred around three main topics: (i) health of global capture fisheries; (ii) the role of aquaculture in filling the global fish supply–demand gap and potentially reducing the pressure on capture fisheries; and (iii) implications of changes in the global fish markets on fish consumption.

The key findings of the baseline projections are the following:

- Total fish production should grow by almost 45 million tonnes respect to 2008 reaching 187 million tonnes in 2030.
- With capture fisheries production stable, major growth will come from aquaculture, albeit expanding more slowly than previously.

[9] More information on the IMPACT model is available at: www.ifpri.org/sites/default/files/publications/impactwater2012.pdf

- By 2030, capture fisheries and aquaculture will be contributing equally to global fish Outlook production, and with aquaculture probably dominating beyond 2030.
- The fastest supply growth is expected for tilapia, carp and Pangasius/catfish.
- Aquaculture is projected to supply more than 60 percent of fish destined for direct human consumption by 2030.
- China is expected to increasingly influence the global fish sector.
- Aquaculture will grow rapidly in South Asia, Southeast Asia and Latin America. Per capita fish consumption is projected to decline in Japan, Latin America, Europe, Central Asia and sub-Saharan Africa.
- Owing to population growth of 2.3 percent per year, sub-Saharan Africa will increase its demand for fish for human consumption by 30 percent by 2030. As its production is projected to expand only marginally, the region's dependence on fish imports will rise from 14 percent in 2000 to 34 percent in 2030.

Eco-labelling and certification in fisheries and aquaculture

Eco-labels for sustainably-sourced seafood evolved primarily as a means to use market power of the most highly traded food commodity to promote sustainable fisheries management. Market access was to be a reward to fisheries managed sustainably according to the certifier's criteria. These market-based measures initially reflected the goals of civil society and consumer groups in industrialized countries who believed fisheries were not being adequately managed by governments. The first private seafood certification scheme[10] was established in 1997 as a joint project between the largest seafood buyer of the time and an international non-profit organisation.[11] Since then, there has been a proliferation of private voluntary certification schemes operating in the seafood market, each with different goals, principles and criteria.[12]

Given the uptake of seafood eco-labels in the major importing markets, governments are increasingly concerned that certification schemes are interfering with fisheries management, an activity usually deemed the responsibility of governments either at the national level within Exclusive Economic Zones and inland waters, or through multi-national action in Regional Fisheries Bodies. In 1997, Members of the FAO Committee on Fisheries (COFI) requested FAO to develop International Guidelines for Eco-labelling of Fish and Fishery Products from Capture Fisheries. A similar request for Technical Guidelines for Aquaculture Certification was made in 2006. Following intense expert debate and consultation with FAO Members and other stakeholders, the requested Certification Guidelines have been finalized in 2009 for marine capture fisheries, 2010 for inland capture fisheries and 2011 for aquaculture. These international guidelines are in the public domain and have been used by various stakeholders to assess certification schemes' claims of conformity to FAO guidelines or for self-assessments. However, the complexity of the Guidelines has led to uncertainty about claims of compliance and there remains a lack of comparability and transparency among the many and diverse certification schemes operating in the seafood market today. In addition, the large number of schemes with differing objectives that have evolved since 1999 add certification fees and auditing costs to the international seafood value-chain.

[10] The Marine Stewardship Council (MSC), a joint project between Unilever and WWF, certified its first capture fishery for the MSC label in 1999.

[11] Sainsbury, K. (2008). Review of Guidelines for Ecolabelling of Fish and Products from Capture Fisheries, and Recommended Minimum Substantive Requirements, Report for the Expert Consultation on Ecolabelling Guidelines for Fish and Fishery Products, FAO, Rome, 3-5 March 2008.

[12] FAO (2011). *Review of Ecolabelling Schemes for Fish and Fishery Products from Capture Fisheries*, FAO Fisheries and Aquaculture Technical Paper 533, Rome. FAO (2010), *Private Standards and Certification in Fisheries and Aquaculture*, FAO Fisheries and Aquaculture Technical Paper 553, Rome.

Assessment of compliance to the FAO certification guidelines is beyond the mandate of FAO However, FAO was tasked by member countries to develop Evaluation Frameworks that would allow interested parties to benchmark certification schemes against the FAO Guidelines. An aquaculture evaluation framework was adopted by COFI in 2014. The evaluation framework for capture fisheries is work in progress and the draft framework, which is in the public domain, is being used by academia and other interested parties.

In light of the rapid uptake and rising costs associated with market-based measures for eco-labelling fish and fishery products from responsibly-sourced fisheries, a group of 32 private seafood companies and the German government (GIZ) formed a partnership in 2013, called the Global Sustainable Seafood Initiative (GSSI). The GSSI initiative is designed after the Global Food Safety Initiative (GSFI) which has successfully operated for 10 years. The GSSI partners financed a three-year project to develop a global benchmarking tool to assess third party seafood certification schemes. Two non-governmental organizations and the FAO are affiliated partners and members of the GSSI Steering Board. The GSSI initiative aims to raise transparency in international seafood markets and increase consumer confidence in seafood. Uptake of the GSSI benchmarking tool by the seafood industry is expected to reduce duplication costs associated with multiple eco-labels for the same product entering different retail markets. Three GSSI expert working groups - Process, Fisheries, and Aquaculture – developed the benchmarking tool, which will be used to assess certification schemes against a set of baseline requirements linked to the FAO Code of Conduct for Responsible Fisheries (CCRF), FAO Certification Guidelines for marine and inland capture fisheries, and FAO Technical Guidelines for aquaculture certification. Schemes that meet the requirements will be able to use the GSSI logo. With the GSSI logo, private companies will have information about minimum comparability between the various certification schemes, while additional GSSI indicators can be benchmarked to evaluate superior claims by more advanced schemes, and to drive improvements in seafood certification schemes in general.

FAO joined the GSSI initiative as part of its new public-private partnerships[13] strategy, to more closely engage with private sector and civil society actors by: providing corporate strategic advice, developing tools and methodologies, and long-term vision. Public-private sector initiatives are especially relevant for the fisheries and aquaculture sector, in promoting the mandates of FAO discussed in the introduction. Within the GSSI partnership, FAO has advocated for good geographical representation and reasonable access for developing countries, i.e. that the global benchmarking tool does not become a potential technical barrier to trade. The GSSI tool was pilot-tested in 2015 on a voluntary basis by several certification schemes. The tool will be launched in October 2015 at the 20th Anniversary celebrations of the CCRF in Vigo, Spain.

A major concern is the ability of developing country fisheries and aquaculture producers to meet the requirements of private certification schemes designed around industrial fisheries in developed countries, with strong government and research institutions. To assist developing country fisheries, Fisheries Improvement Projects (FIPs)[14] are being piloted for various fisheries in developing countries, with the aim to raise the level of fisheries management in these targeted fisheries, and thus to increase availability of sustainably-sourced products for international markets. Other developing country fisheries have obtained eco-labelling through private investment or co-ownership of resources by international corporations, or in the case of aquaculture through cluster certification of small-scale producers. There is room for significantly more support from private sector enterprises, the donor community and other stakeholders to promote sustainable management practices in developing country fisheries, especially small scale sector.

The FAO and other multi-national organizations, including the World Trade Organization (WTO), have raised concerns about whether seafood certification schemes act as technical barriers to trade,

[13] FAO Office for Partnerships, Advocacy and Capacity Development (OPC).
[14] Information about Fishery Improvement Projects at Internet address: http://fisheryimprovementprojects.org/

especially for developing country exporters. This issue has been debated at the SPS Committee on several occasions. As governments are becoming more involved in seafood eco-labelling and this could have repercussions for fish trade rules, as public certification could be interpreted as "technical" standards under WTO rules, in which case there could be an increasing number of seafood trade disputes at WTO in the future.

In face of the rapid increase in number and diversity of private certification schemes and their uptake by global retailers and supermarket chains which control much of the international seafood trade, some governments have developed public certification schemes. For capture fisheries, the existing public eco-labels[15] are based in the three major importing markets, whereas examples of public certification of aquaculture[16] have branched into some developing countries that produce high-value aquaculture products, such as shrimp and molluscs, for export to industrialized countries.

While only a small number of governments have developed public certification schemes for their capture fisheries or aquaculture sectors,[17] this trend appears to be on the rise. A number of developing countries have requested capacity building assistance from FAO to develop their own national eco-labels. The incentive is two-fold; to insure market access for seafood exports and thus protects the livelihoods of vulnerable populations of small-scale fishers and aquaculture producers, as well as a means to lower costs of certification. In the case of small-scale sector, reducing the cost of certification of a fishery can be vital for maintaining access to global and regional markets.

Seafood traceability systems

Despite the adoption of the CCRF and the progress it has brought, not all fishing activities are conducted in a responsible or legal manner. Some fishers do not respect fishing rules, undermining responsible management and trade. IUU fishing can occur in the High Seas, Exclusive Economic Zones and Inland fisheries. It has increased significantly over the last two decades. Some high-value marine species reached major levels of IUU fishing. These activities can occur under flags of non-compliance or flags of convenience. Global prevention of IUU is essential for ensuring sustainable fisheries resources for global food security. It is not enough that some countries and Regional Fisheries Management Organizations are managing aquatic resources responsibly, if others are not. In addition, criminal activities such as slavery, drugs, and piracy are known to be associated with IUU fishing vessels.

One of the major deterrents to IUU fishing is to deny access to markets for illegal fish products. The FAO Port State Measures Agreement[18] aims to block entry of IUU fish into the value chains by denying entry into ports of undocumented fish products. Estimates by the World Bank/FAO[19] put the value of illicitly harvested fish at 11 – 26 million tonnes each year, worth between US$10 and US$23.5 billion. Means for stopping IUU fishing can include: monitoring, control and surveillance (MSC) of known IUU vessels; international cooperation such as sharing information on IUU vessels; denying access to ports; national legislation to allow prosecution of IUU vessels; international coordination of catch certificates to facilitate border control of traded fish;

[15] For example: Iceland Responsible Fisheries, Marine Eco-Label Japan, Alaska Seafood, U.S. Dolphin Safe label.

[16] For example, Vietnamese Good Agriculture Practice (VietGAP) is mandatory for aquaculture producers; ThaiGAP is a voluntary private standard whose development was supported by government.

[17] Sainsbury, K. (2008). Review of Guidelines for Ecolabelling of Fish and Products from Capture Fisheries, and Recommended Minimum Substantive Requirements, Report for the Expert Consultation on Ecolabelling Guidelines for Fish and Fishery Products, FAO, Rome, 3-5 March 2008.

[18] FAO (2009). Port State Measures Agreement, Rome. This binding international agreement will enter into force 30 days after 25 countries have ratified, accepted, approved or acceded to it in their national legislations. Currently there are 13 national ratifications plus the EU.

[19] World Bank / FAO (2008). Sunken Billions, Washington, DC.

certification of products from verifiably managed fisheries. This requires an over-arching solution for traceability of traded fish from vessel to final consumer.

Traceability is defined at the Codex Alimentarius level as *"the ability to follow the movement of a food through specified stage(s) of production, processing and distribution*". In the case of fish products, the design and implementation of effective seafood traceability systems is both necessitated and complicated by the continuing process of supply chain globalization and expanding global trade networks which mean that fish will often be handled by vessels, farms, wholesalers, processors, distributors and retailers in several different countries before final consumption. These developments have important implications for, inter alia, food safety concerns and sustainability issues and have led to increasingly stringent traceability regulations in the major import markets, with the European Union as the prime example. In 2014,[20], 66 percent of FAO member countries reported that traceability requirements were an emerging issue while 79 percent considered that regulations to combat IUU fishing were an emerging issue. Eco-labels and certification requirements were identified as an emerging issue for 63 percent of FAO members.

In addition to its role in providing retrievable information related to food safety requirements, traceability in fish products is also essential for the development of effective tools to combat IUU fishing. An important development in combatting IUU is the European Union Council Regulation No 1005/2008. Under this regulation, each shipment of wild caught seafood traded in the European Union must have a catch certificate issued by the competent fisheries management authority of the vessel's flag state. Likewise, Japan signed a joint statement of agreement to work together with the EU to fight IUU fishing by blocking imports of seafood caught illegally. Sustainability and traceability to combat IUU fishing are also a core component of the Action Plan of the U.S. President's Task Force on IUU Fishing.[21]

In 2014, FAO prepared a report analyzing current seafood traceability systems using a traffic light approach, both in terms of food quality and safety as well as to combat IUU fishing.[22] This work is ongoing, to include a gap analysis of traceability systems. An expert consultation was held in Rome in July 2015, to be followed by three regional workshops for FAO member countries in November and December 2015 to draft international guidelines on catch documentation schemes (CDS). The draft CDS guidelines will be presented to the FAO Sub Committee on Fish Trade in February 2016. It is anticipated that harmonization of catch documentation schemes, particularly electronic CDS, will promote transparency, facilitate customs transactions for perishable and time-sensitive products, while preventing IUU fish from entering seafood value chains thereby threatening livelihoods of fishers using legal methods and sustainable management practices. This will require approval and uptake of voluntary CDS Guidelines by member states and other stakeholders along the seafood value chain.

Policy recommendations

Food security and nutrition represent a global challenge, as hunger and malnutrition remain among the most devastating problems facing the world. In the perspective of sustained future population growth, this challenge is even more compelling. The fisheries and aquaculture sector can continue to play a prominent role in world food security, but it requires that capture and aquaculture production grow sustainably, through effective fisheries management policies and best aquaculture practices. As indicated by both fish models, the majority of future fish consumption is expected to be heavily dependent on aquaculture. However, the prospects of this sector depend on numerous interlinked factors, including access and availability of land and water; availability, sustainability

[20] FAO (2014). Monitoring Implementation of Article 11 of the Code of Conduct for Responsible Fisheries (CCRF), Document COFI:FT/XIV/2014/11, COFI Sub Committee on Fish Trade, Bergen, Norway, 24-28 February 2014.
[21] U.S. (2015). *Action Plan for Implementing the Task Force Recommendations*, Presidential Task Force on Combating IUU Fishing and Seafood Fraud, Washington, DC.
[22] FAO (2014). "Review and Analysis of Current Traceability Practices", COFI Sub Committee on Fish Trade, COFI:FT/XIV/2014/Info.6, Bergen, Norway, 24-28 February 2014.

and cost of feed; access to technology and finance; control of disease outbreaks; environmental externalities including climate change, pollution and problems that can originate from unguided aquaculture development; fisheries governance; food safety and traceability issues and many others.

The efforts of civil society and private sector stakeholders through market-based measures (eco-labels) has promoted improved traceability of fish from responsibly-managed fisheries and aquaculture producers, while at the same time raising auditing costs and further complicating the international market for fish and fishery products, especially for developing countries. In addition, the growing evolution of public certification schemes may lead to increased trade disputes between countries as eco-labels cross the line between voluntary business to business transactions into the realm of technical standards that fall under the agreements of the World Trade Organization.

Globalization of the seafood value chain has significantly changed international seafood trade. Changes are expected to accelerate further. The fishery supply chain is already complex as fish products often cross national boundaries several times before final consumption due to the increasing outsourcing of processing. Trade in fish and fishery products is foreseen to continue to be characterized by a wide range of product types and participants. Integration of global fish markets will continue which can produce positive results, but at the same time can increase the risk of excluding small-scale producers and businesses. Small scale producers represent the majority and their role is vital to meet the increasing demand. Capacity building in various areas of market access is key to promote inclusiveness of global seafood markets.

This year, FAO is celebrating the twentieth anniversary of the FAO Code of Conduct for Responsible Fisheries (CCRF). A substantive undertaking of the Blue Growth Initiative (BGI) is the promotion of principles and standards of the CCRF for the conservation, management and development of fisheries. The CCRF and related International Plans of Actions, Guidelines and Agreements, constitute a solid framework for national, regional and international efforts to ensure sustainable exploitation of aquatic living resources in a socially and environmentally responsible manner. To achieve this, FAO will continue to build its global action network involving a wide array of international institutions, intergovernmental organizations, representatives of the private sector and civil society.