PART 4

OUTLOOK

ALIGNING THE FUTURE OF FISHERIES AND AQUACULTURE WITH THE 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT

Food security and nutrition represent a global challenge, as hunger and malnutrition remain among the most devastating problems facing the world. The Millennium Development Goals (MDGs) included a target of halving the proportion of people who suffer from hunger between 1990 and 2015. According to *The State of Food Insecurity in the World 2015*,[1] this target was almost met at the global level, but progress was uneven across countries and there remained almost 780 million undernourished when the MDGs concluded in 2015. The 2030 Agenda for Sustainable Development and the new Sustainable Development Goals (SDGs), which succeed the MDGs, have the ambitious aim of ending poverty and hunger by 2030. Food security goes beyond guarding against hunger and malnutrition as it exists when "all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life."[2] In this regard, in 1996, the Rome Declaration on World Food Security and the World Food Summit Plan of Action laid the foundations for diverse paths to the common objective of food security, at the individual, household, national, regional and global levels. They indicated that each nation needed to adopt a strategy consistent with its resources and capacities to achieve its individual goals and, at the same time, cooperate regionally and internationally in order to organize collective solutions to global issues of food security. They stressed that, in a world of increasingly interlinked institutions, societies and economies, coordinated efforts and shared responsibilities are essential.[3] According to a UN report,[4] the current world population of more than 7.4 billion is projected to reach 8.5 billion in 2030 and 9.7 billion in 2050, with most of the increase occurring in developing regions. Ensuring adequate food and nutrition security to this growing population is a daunting challenge. The fisheries and aquaculture sector plays and can continue to play a prominent role in world food security. Fish is a vital source of food including micronutrients, particularly for many low-income populations in rural areas, and the sector also contributes to economic growth and development by being a source of employment, livelihoods and income to millions of people engaged in fish harvesting, culturing, processing and trade. This key role has become even more important through the significant changes being experienced by the sector in recent decades, and especially in the last two. With differences among regions and countries, these transformations include: the stabilization of total capture fisheries production at 90–95 million tonnes since mid-1990s; the rapid increase in global aquaculture production, reaching about 74 million tonnes in 2014 and outpacing all other food-producing systems; the globalization of the industry, with substantial growth in world trade in fish and fisheries products, particularly in value terms; and the rising demand for fish and fishery products.

Whether the present trends in the sector continue will depend on a number of important uncertainties. A key question is: Which will the

future perspectives of development for this sector be? Population and income growth, together with urbanization and dietary diversification, are expected to create additional demand and to continue to change the composition of food consumption towards a growing share of animal products, including fish, in developing countries. New and traditional demand for fishery products from both capture fisheries and aquaculture will put growing pressure on fisheries resources, and the future of the sector, being influenced by internal and external driving forces, is complex and uncertain.

This Outlook section is composed of two distinct parts. The first part describes the most plausible trends for the fishery and aquaculture sector in the next decade, while the second part outlines the expectations and roles of the 2030 Agenda, the SDGs and FAO's Blue Growth Initiative (BGI) in shaping future developments.

Expected trends in fish supply and demand

As indicated in the Outlook of *The State of World Fisheries and Aquaculture 2014*,[5] presenting the results of specific fish projections is a standard feature of this publication. This edition presents the key results for the period 2016–2025 for the FAO fish model.[6] This model was developed by FAO in 2010 in collaboration with the Organisation for Economic Co-operation and Development (OECD) with a view to gaining insights as to the potential path of development for the fisheries and aquaculture sector.[7] The dynamic policy specific partial equilibrium model on fish is at present a stand-alone model using the same macroeconomic assumptions and the same feed and food prices employed or generated by the agricultural market model Aglink-Cosimo elaborated jointly by the OECD and FAO. The projections are elaborated annually and published in the OECD-FAO Agricultural Outlook publication.[8] They provide, for a ten-year horizon, an outlook for the sector in terms of potential production, use (human consumption, fishmeal and fish oil), prices and key issues that might influence future supply and demand. They also highlight regional vulnerabilities, changes in comparative advantage, price effects, and potential adaptation strategies in the sector. However, the results should not be considered as forecasts but plausible trends that provide insights into how the sector may develop, taking note of specific assumptions regarding: the future macroeconomic environment; international trade rules and tariffs; frequency and effects of El Niño phenomena; absence of other severe climate effects and of abnormal fish-related disease outbreaks; fishery quotas; longer-term productivity trends; and the absence of market shocks. Should any of these assumptions change, the resulting fish projections would be affected.

Production

Under the set of assumptions used in the fish model and as stimulated by technological improvements and higher demand for fish,[9] total world fishery production (capture plus aquaculture) is projected to expand over the period, reaching 196 million tonnes in 2025 (Table 22). This represents an increase of 17 percent between the base period (average 2013–15) and 2025, but indicates a slower annual growth compared with the previous decade (1.5 percent versus 2.5 percent). The absolute growth will be about 29 million tonnes by 2025 compared with the average 2013–15 level. Almost all of the increase in production will originate from developing countries. Their share in total output will increase from 83 percent in

the base period to 85 percent in 2025. A more marked expansion is expected in Asia, with its share in total production rising from 70 percent to 73 percent. Of the additional 29 million tonnes of output by 2025, 25 million tonnes will be produced in Asia, 1.8 million tonnes in Latin America and the Caribbean, 1.6 million tonnes in Africa, 0.7 million tonnes in Europe, and the rest in Oceania and North America. About 91 percent of total fishery production, or 178 million tonnes, is estimated to be destined for direct human consumption.

Surging demand for fish and fishery products will mainly be met by growth in supply from aquaculture production, which is expected to reach 102 million tonnes by 2025, 39 percent higher than the base period level. Aquaculture will remain one of the fastest-growing sectors for animal food production, although its annual growth rate is estimated to decline from 5.4 percent in the previous decade to 3.0 percent in the projection period. This slowdown in expansion will be mainly due to: constraints on the availability and accessibility to water of good quality; competition from alternative uses for optimal production locations; availability of fish seeds and feeds in the requisite quality and quantities; insufficient investments in infrastructure in regions endowed with natural resources for aquaculture production; capital constraints; and challenges in governance and regulatory framework. Furthermore, even if slightly declining, the still high costs of fishmeal, fish oil and other feeds will remain a constraining factor (as only about 30 percent of the species do not need any feed concentrates to grow). Developing countries will maintain their key role in aquaculture production, with a share of 95 percent of total production. They are expected to capture 96 percent of the additional fish output growth in the projection period. However, aquaculture production should continue to expand also in developed countries (rising 26 percent in the next decade) and in all continents, with variations across countries and regions in the product range of species and products. Asian countries will remain the main producers, representing 89 percent of total production in 2025, and with China alone accounting for 62 percent of world output. Other major increases are expected in Latin America, in particular in Brazil (104 percent higher) due to significant investments in the sector. African production will also expand over the projected period by 35 percent (reaching 2.3 million tonnes) due partly to the additional capacity put in place in recent years, but also in response to rising local demand from higher economic growth, and local policies promoting aquaculture.

Freshwater species, such as carp, catfish (including *Pangasius*) and tilapia, will account for most of the increase in aquaculture production and represent about 60 percent of total aquaculture production in 2025. Production of higher-value species, such as shrimps, salmon and trout, is also projected to continue to grow in the next decade.

The share of aquaculture in total fishery production will grow from 44 percent on average in 2013–15 to surpass capture fisheries in 2021. In 2025, this share will reach 52 percent (Figure 34). This development highlights a new era, indicating that aquaculture will increasingly be the main driver of change in the fisheries and aquaculture sector. Nonetheless, the capture fisheries sector will remain dominant for a number of species and vital for domestic and international food security. Capture fishery production is projected to increase by about 1 percent, reaching more than 94 million tonnes in 2025. This slight improvement is expected to be due to a combination of factors, several of which will be dependent on progress towards meeting SDG targets (see below), including: the recovery of certain stocks following improved management regimes by some countries; some growth in harvests in those few countries not subject to strict production quotas; declining oil prices; and enhanced utilization of fishery production through reduced onboard discards, waste and losses as required by changes in legislation or stimulated by high fishery prices (including for fishmeal and fish oil). At the beginning of the outlook period, capture production is not expected to increase very much, due mainly to the El Niño effect on South American fisheries. In El Niño years,[10] this »

TABLE 22

MAIN RESULTS OF THE FISH MODEL: COMPARISON 2025 VS 2013–15: PRODUCTION (LIVE WEIGHT EQUIVALENT)

	PRODUCTION			OF WHICH AQUACULTURE		
	AVERAGE 2013–15	2025	GROWTH OF 2025 VS 2013–15	AVERAGE 2013–15	2025	GROWTH OF 2025 VS 2013–15
	(Thousand tonnes)		*(%)*	*(Thousand tonnes)*		*(%)*
WORLD	166 889	195 911	17.4	73 305	101 768	38.8
DEVELOPED COUNTRIES	29 018	29 305	1.0	4 393	5 521	25.7
North America	**6 582**	**6 617**	**0.5**	**584**	**717**	**22.9**
Canada	1 020	1 011	–0.9	159	211	32.8
United States of America	5 562	5 606	0.8	425	506	19.1
Europe	**16 637**	**17 362**	**4.4**	**2 911**	**3 737**	**28.4**
European Union	6 654	6 810	2.3	1 273	1 385	8.9
Norway	3 586	4 263	18.9	1 325	1 963	48.1
Russian Federation	4 419	4 516	2.2	161	216	34.5
Oceania developed	**778**	**815**	**4.8**	**183**	**237**	**29.5**
Australia	228	229	0.4	76	91	20.6
New Zealand	550	586	6.5	108	146	35.8
Other developed	**5 022**	**4 510**	**–10.2**	**716**	**830**	**15.9**
Japan	4 318	3 728	–13.7	651	743	14.1
South Africa	549	601	9.5	4	4	–1.5
DEVELOPING COUNTRIES	137 871	166 606	20.8	68 911	96 247	39.7
Africa	**9 699**	**11 208**	**15.6**	**1 696**	**2 287**	**34.8**
North Africa	*3 071*	*3 192*	*3.9*	*1 153*	*1 284*	*11.3*
Egypt	1 498	1 646	9.9	1 138	1 268	11.4
Sub-Saharan Africa	*6 628*	*8 015*	*20.9*	*543*	*1 002*	*84.6*
Ghana	332	365	9.9	38	75	97.0
Nigeria	1 055	1 394	32.1	306	579	89.3
Latin America and Caribbean	**14 424**	**16 245**	**12.6**	**2 702**	**3 780**	**39.9**
Argentina	840	906	7.9	4	6	53.9
Brazil	1 327	1 972	48.6	560	1 145	104.4
Chile	3 084	3 514	13.9	1 138	1 314	15.5
Mexico	1 730	1 876	8.4	193	297	54.2
Peru	4 914	5 111	4.0	117	111	–5.1
Asia and other Oceania	**113 748**	**139 154**	**22.3**	**64 513**	**90 180**	**39.8**
China	62 094	78 717	26.8	45 263	62 962	39.1
India	9 434	11 570	22.6	4 830	6 880	42.4
Indonesia	10 543	12 411	17.7	4 211	5 761	36.8
Philippines	3 142	3 429	9.1	795	982	23.5
Republic of Korea	2 039	1 980	–2.9	470	536	14.1
Thailand	2 719	2 965	9.0	942	1 191	26.4
Viet Nam	6 257	7 816	24.9	3 361	4 802	42.9
LEAST-DEVELOPED COUNTRIES	13 950	17 181	23.2	3 328	5 470	64.4
OECD[1]	31 135	31 842	2.3	6 165	7 628	23.7

[1] Organisation for Economic Co–operation and Development.
SOURCE: OECD and FAO.

» climatic phenomenon is expected to cause a 2 percent decline in world capture fisheries, with stronger effects on catches of anchoveta harvested by Peru and Chile.

The portion of capture fisheries yield used to produce fishmeal will be about 16 percent by 2025, about 1 percent less than in the base period. This will be due mainly to the growing demand for human consumption of fish species previously used for reduction, as well as more limited availability of raw material and more fishmeal produced from by-products. The share of capture production reduced into fishmeal and/or fish oil will be slightly smaller in El Niño years owing to lower anchoveta catches. In 2025, fishmeal and fish-oil production, in product weight, should be 5.1 million tonnes and 1.0 million tonnes, respectively. In that year, fishmeal production will be 15 percent higher compared with the 2013–15 average, but about 96 percent of the increase will stem from improved use of fish waste, cuttings and trimmings. As more fish is consumed as fillets or in other prepared and preserved forms, a growing share of its residual production, such as heads, tails, bones and other offal resulting from processing, is expected to be reduced into fishmeal and fish oil. Fishmeal produced from fish waste will represent 38 percent of world fishmeal production in 2025, compared with 29 percent for the 2013–15 average level. The use of fish by-products can affect the composition and quality of the resulting fishmeal and/or fish oil with, in general, less protein, more ash (minerals) and increased levels of small amino acids (such as glycine, proline, hydroxyproline) compared with those obtained from whole fish. This difference in composition may hinder increased use of fishmeal and/or fish oil in feeds used in aquaculture and livestock farming. However, the fish model and its projections do not take these changes into consideration.

Prices

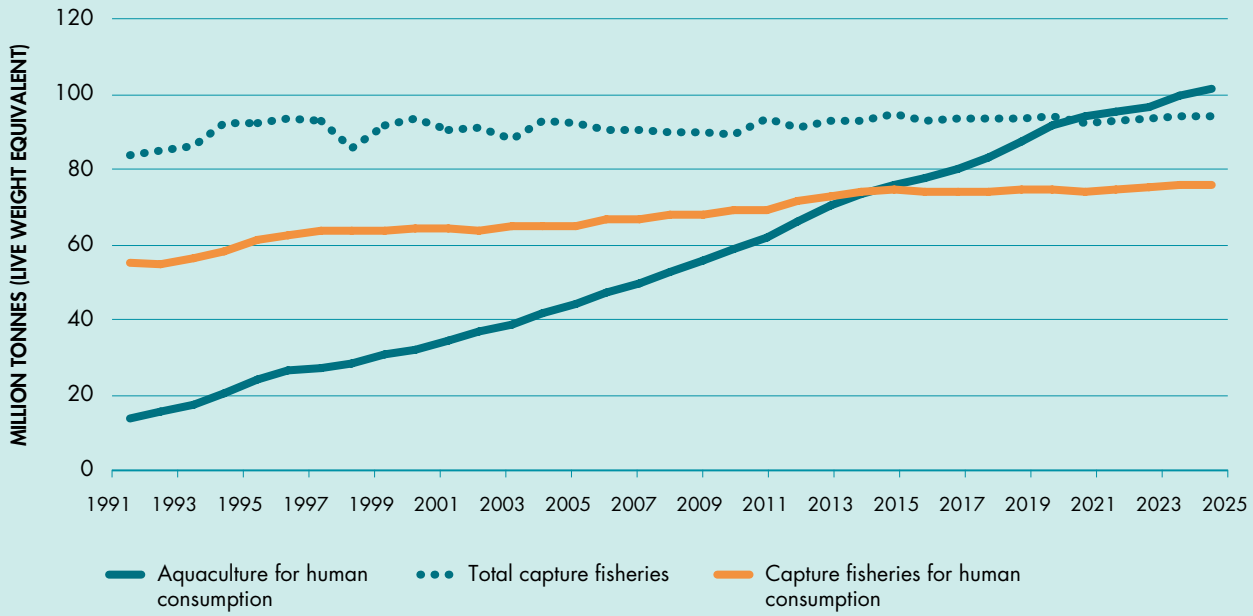
On average, fish prices were lower in 2015 compared with the peaks recorded in 2014. In the next decade, the main drivers affecting world fish prices for capture, aquaculture and internationally traded products will be: income, population growth and meat prices on the demand side; and limited increase in capture fisheries production and costs for feed, energy and crude oil on the supply side. In nominal terms, average fish prices are all expected to decline further in the first part of the projection period due to slower economic growth, sluggish demand in some key markets, and lower input costs. However, in the last five years of the outlook period, prices are expected to subsequently stabilize and grow slightly, and then remain on an elevated plateau by the end of the decade. In 2025, average producer prices are projected to be slightly higher than during the 2013–15 base period, as demand growth is expected to outpace supply. However, the average prices for traded products for human consumption, fishmeal and fish oil are projected to be slightly lower in 2025 relative to the base period. Yet, in real terms, all prices are projected to decline somewhat from the peak of 2014, but then remain on a high plateau (Figure 35).

Capture fisheries are expected to remain under restrictive production quotas while demand for certain species continues to be sustained. In nominal terms, the average price for wild fish (excluding fish for reduction) is projected to grow by more than that for farmed fish (7 percent compared with 2 percent) between the base period and 2025, with average annual growth rates of 1.0 percent and 0.8 percent, respectively, over the projection period. However, the overall price of fish caught in the wild will remain lower than that for farmed fish. This is partially explained by the increasing share of lower-value fish in overall catches. The limited increase in the average aquaculture price is also due to the decline of feed prices from the high levels recorded in 2011–12 as well as better feed conversion ratios and continuing productivity gains (even though at a slower pace than in previous decades). In real terms, both capture and aquaculture prices are expected to decline by about 13 percent and 17 percent, respectively, during the outlook period.

Fishmeal prices increased significantly from 2006 to 2013, peaking at US$1 747 per tonne in 2013. Since then, there has been a slight decline, but »

FIGURE 34

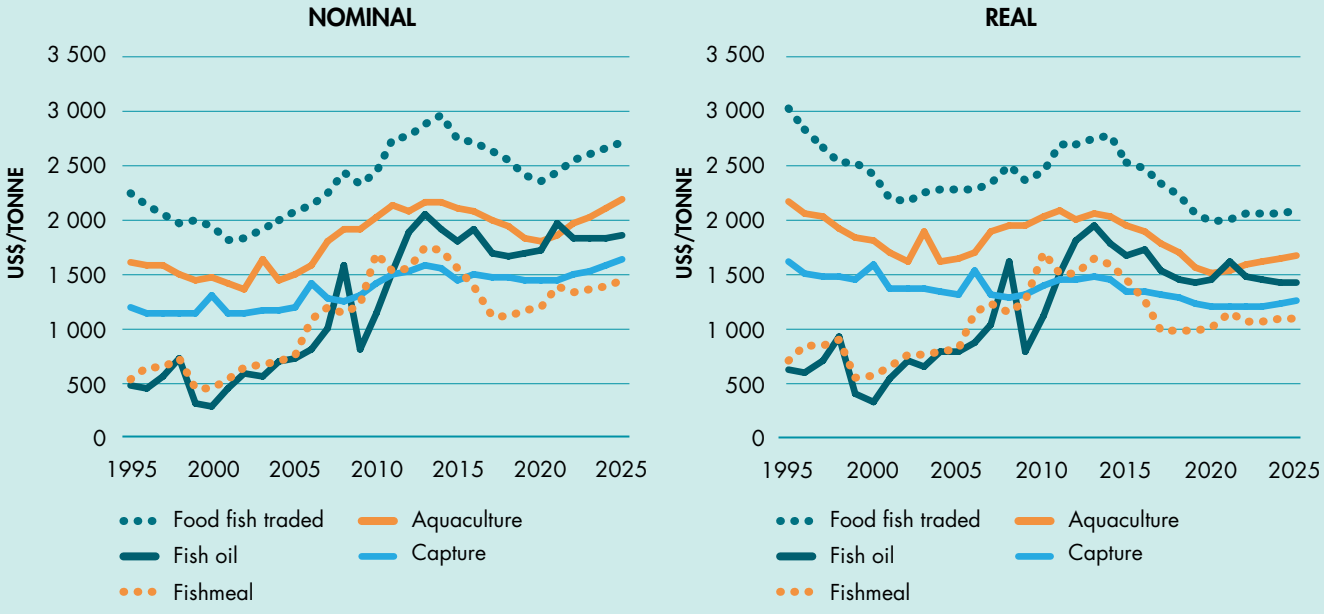
GLOBAL CAPTURE FISHERIES AND AQUACULTURE PRODUCTION TO 2025



SOURCE: OECD and FAO.

FIGURE 35

GLOBAL FISH PRICES IN NOMINAL AND REAL TERMS TO 2025



Note: Food fish traded: world unit value of trade for human consumption (sum of exports and imports). Aquaculture: FAO world unit value of aquaculture fisheries production (live weight basis). Capture: FAO estimated value of world ex-vessel value of capture fisheries production excluding for reduction. Fishmeal: 64–65% protein, Hamburg, Germany. Fish oil: any origin, Northwest Europe.

SOURCE: OECD and FAO.

» prices have remained high. By 2025, the average fishmeal price is expected to be 14 percent lower in nominal terms and 30 percent lower in real terms compared with the base period. The only exceptions will be in El Niño years due to reduced catches in South America, in particular for anchoveta, which is mainly used for reduction into fishmeal and fish oil. Starting from very high levels, fish-oil prices are expected to decline in the period 2016–2025, but still remain higher than fishmeal prices. The average fish-oil price is projected to decline by 3 percent in nominal terms, and by 21 percent in real terms, between the base period and 2025.

The average price of traded fish products will also decline over the outlook period, with a 5 percent decrease in nominal terms and a fall of about 23 percent in real terms by 2025. The main drivers for this decline will be the competitive prices of substitutes, in particular chicken, the slowdown in demand from key markets due to sluggish economic growth, and the reduced production and marketing costs of aquaculture products due to lower transport and feed costs. Owing to the already low or minimal import tariffs in the main importing developed countries, international fish trade is projected to remain relatively liberal, and global price changes should continue to be readily transmitted from one market to another. However, in many developing countries, import tariffs and licences can continue to play a significant role. Price changes in international markets will have spillover effects on non-traded species as well. For individual fishery commodities, price volatility could be more pronounced due to supply swings caused by drastic changes in catch quotas and disease outbreaks in the aquaculture sector as well as fluctuations in feed costs.

Consumption

Fish is expected to remain predominantly utilized for human consumption, making a valuable and nutritious contribution to diversified and healthy diets. The main utilization for non-food uses will continue to be reduction into fishmeal and fish oil, and other uses will be for ornamental purposes, aquaculture purposes (fingerlings, fry, etc.), bait, pharmaceutical purposes and as direct feed for aquaculture, livestock and other animals. World apparent fish consumption is projected to increase by 31 million tonnes (Figure 36) in the next decade to reach 178 million tonnes in 2025 (Table 23). On a per capita basis, apparent fish consumption will be 21.8 kg (live weight equivalent) in 2025, 8 percent above the base period level of 20.2 kg. The driving force behind this increase will be a combination of rising incomes and urbanization interlinked with the expansion of fish production and improved distribution channels. However, consumption will grow at a slightly slower pace than in the historical period, in particular in the second half of the outlook period, when fish will start to become more expensive in comparison with meat. The annual growth rate of per capita apparent fish consumption is projected to decline from 1.9 percent in the past decade to 0.8 percent over the next ten years. With human consumption of farmed species exceeding that of capture fisheries for the first time in 2014 (see section Fish consumption, p. 70), aquaculture is expected to further increase its share and provide 57 percent of fish for human consumption in 2025.

Per capita fish consumption is expected to increase in all continents, with Asia, Oceania and Latin America and the Caribbean showing the fastest growth. In particular, major increases are projected in Brazil, Peru, Chile, China and Mexico. Apparent fish consumption will remain static or decrease in a few countries, including Japan, the Russian Federation, Argentina and Canada. A slight increase (2 percent) is projected for Africa. This growth will be enhanced by increasing African aquaculture production and imports. Disparities in fish consumption will remain between developed and developing countries, with the latter having lower levels of consumption, although the gap is narrowing. In developing countries, annual per capita fish consumption will rise from 19.6 kg in the base period to 21.5 kg in 2025. In the same period, per capita fish consumption in developed countries is estimated to increase from 22.7 kg to 23.4 kg. However, if sub-Saharan Africa is excluded, per capita fish consumption in 2025 in developing countries will reach 24.3 kg, being higher than consumption in developed countries. Overall, developing countries »

TABLE 23

MAIN RESULTS OF THE FISH MODEL: COMPARISON 2025 VS 2013–15: FOOD FISH SUPPLY (LIVE WEIGHT EQUIVALENT)

	FOOD FISH SUPPLY			PER CAPITA FISH CONSUMPTION		
	AVERAGE 2013–15	2025	GROWTH OF 2025 VS 2013–15	AVERAGE 2013–15	2025	GROWTH OF 2025 VS 2013–15
	(Thousand tonnes)		*(%)*	*(kg)*		*(%)*
WORLD	146 648	177 679	21.2	20.2	21.8	7.9
DEVELOPED COUNTRIES	31 917	33 950	6.4	22.7	23.4	3.1
North America	**8 381**	**9 339**	**11.4**	**23.6**	**24.3**	**3.0**
Canada	801	851	6.2	22.5	21.8	–3.1
United States of America	7 580	8 488	12.0	23.7	24.6	3.8
Europe	**15 568**	**16 605**	**6.7**	**20.8**	**22.2**	**6.7**
European Union	11 082	12 181	9.9	22.0	23.9	8.6
Norway	274	317	15.7	53.3	55.3	3.8
Russian Federation	3 171	2 979	–6.1	22.1	21.1	–4.5
Oceania developed	**760**	**1 014**	**33.4**	**27.0**	**31.7**	**17.4**
Australia	646	893	38.2	27.3	33.0	20.9
New Zealand	115	122	6.1	25.5	24.7	–3.1
Other developed	**7 207**	**6 992**	**–3.0**	**26.5**	**24.6**	**–7.2**
Japan	6 362	6 035	–5.1	50.2	49.1	–2.2
South Africa	417	430	3.1	7.7	7.4	–3.9
DEVELOPING COUNTRIES	114 732	143 730	25.3	19.6	21.5	9.7
Africa	**10 881**	**14 655**	**34.7**	**10.0**	**10.2**	**2.0**
North Africa	*2 803*	*3 553*	*26.8*	*15.6*	*16.7*	*7.1*
Egypt	1 875	2 446	30.5	20.9	22.5	7.7
Sub-Saharan Africa	*8 078*	*11 102*	*37.4*	*8.9*	*9.1*	*2.2*
Ghana	639	656	2.7	23.9	19.5	–18.4
Nigeria	2 097	2 910	38.8	11.8	12.5	5.9
Latin America and Caribbean	**6 302**	**8 476**	**34.5**	**10.0**	**12.2**	**22.0**
Argentina	207	192	–7.2	4.8	4.0	–16.7
Brazil	1 972	2 841	44.1	9.6	12.7	32.3
Chile	253	314	24.1	14.2	16.0	12.7
Mexico	1 610	2 117	31.5	12.8	14.9	16.4
Peru	675	969	43.6	21.8	27.6	26.6
Asia and other Oceania	**97 549**	**120 599**	**23.6**	**23.5**	**26.4**	**12.3**
China	54 128	66 747	23.3	39.5	47.2	19.5
India	7 755	9 758	25.8	6.0	6.7	11.7
Indonesia	8 896	11 206	26.0	35.0	39.4	12.6
Philippines	3 091	3 703	19.8	31.2	31.9	2.2
Republic of Korea	2 924	3 340	14.2	58.4	64.3	10.1
Thailand	1 859	1 879	1.1	27.5	27.4	–0.4
Viet Nam	3 275	3 846	17.4	35.4	37.7	6.5
LEAST-DEVELOPED COUNTRIES	12 170	15 978	31.3	13.2	13.6	3.0
OECD[1]	32 314	35 410	9.6	24.7	25.8	4.5

[1] Organisation for Economic Co–operation and Development.
Source: OECD and FAO.

» are projected to eat 93 percent of the additional fish available for human consumption during the projected period. The 10 percent increase in their apparent per capita fish consumption will be due to the combination of several factors affecting the intake of animal proteins at expense of other food. These factors include: rising living standards; population growth; rapid urbanization; growing recognition of fish as healthy and nutritious food; and technological developments in food, processing, packaging and distribution. The slight increase in the high rates of per capita consumption in developed countries reflects, among other things, slowing population growth and dietary shifts that are already under way. Moreover, consumers, especially in more-developed economies, are increasingly concerned about sustainability issues, animal welfare and food safety, which may also affect their consumption patterns, including for fishery products. A sizeable and growing share of fish consumed in developed countries will be met by imports.

Notwithstanding the increased availability of fish to most consumers, the rise in fish consumption will not be homogenous among countries and within countries in terms of quantity and variety consumed. As the fisheries and aquaculture sector will remain one of the most globalized of all food sectors, consumers will also be exposed to the impacts of global trends as supply chains lengthen and as growing urbanization and improved distribution increase the range of products available.

Consumption of fishmeal and fish oil will remain characterized by the traditional competition between aquaculture and livestock for fishmeal, and between aquaculture and dietary supplements for direct human consumption for fish oil, but will be constrained by the rather stable production. Due to still high prices and major innovation efforts, it is expected that the percentage of fishmeal and fish oil in compound feeds in aquaculture will continue its downward trend (Figure 37), and fishmeal and fish oil will be more frequently used as strategic ingredients to enhance growth at specific stages of fish production. Being rich in omega-3 fatty acids, fish oil is expected to be increasingly processed for direct human use as it is considered beneficial for a wide range of biological functions.

Trade

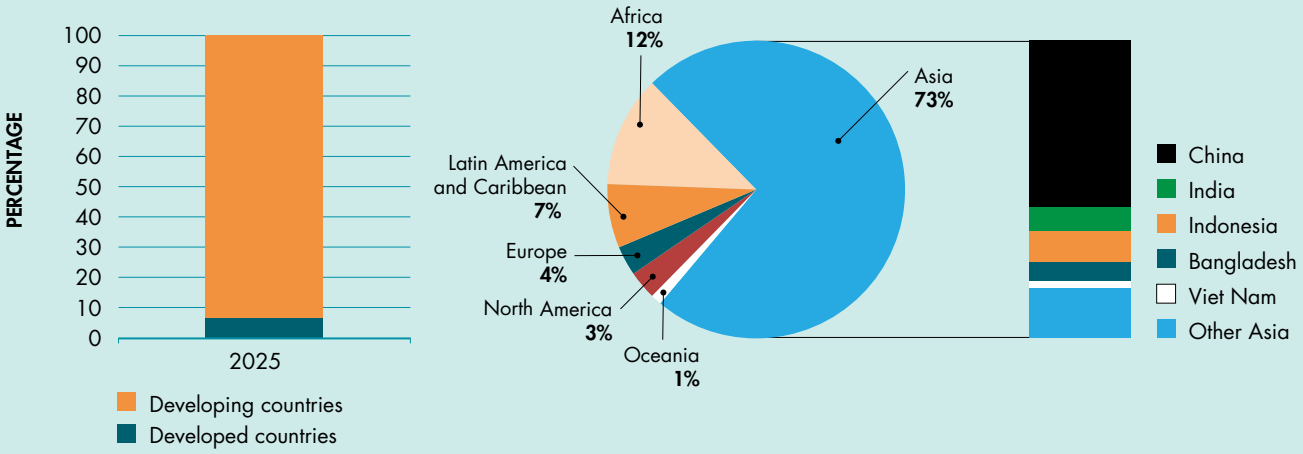
Fish and fishery products will continue to be highly traded, fuelled by increasing consumption of fishery commodities, trade liberalization policies, globalization of food systems, and technological innovations in processing, preservation, packaging and transportation. About 36 percent of total fishery production including trade between member States of the European Union (intra-EU trade) is expected to be exported[11] in the form of different products for human consumption or non-edible purposes in 2025 (excluding intra-EU trade, the figure is 31 percent). A share of this trade might consist of species traded in different stages of processing among countries and regions. This makes the fisheries and aquaculture sector rather complex and globalized.

World trade in fish for human consumption is expected to exceed 46 million tonnes in live weight equivalent in 2025, up 18 percent from the base period (Table 24), with a slowdown in its annual growth rate from 2.3 percent in 2006–2015 to 1.9 percent in 2016–2025. This decline will be caused by high prices, slower growth of fishery production and stronger domestic demand in some of the major exporting countries. Aquaculture will contribute to a growing share of the international trade in fishery commodities for human consumption.

The next decade will be characterized by an increasing role of developing countries in fishery trade, and a corresponding decline in the share of developed economies. In the next decade, developing countries will continue to lead fishery exports of fish for human consumption, notwithstanding a slight decline in their share in total trade of fish for human consumption (from 67 percent in the base period to 66 percent in 2025). Due to their primary role in fishery production, the bulk of the growth in fish exports is projected to originate from Asian countries, which will account for about 67 percent of the additional exports by 2025. In the same year, »

FIGURE 36

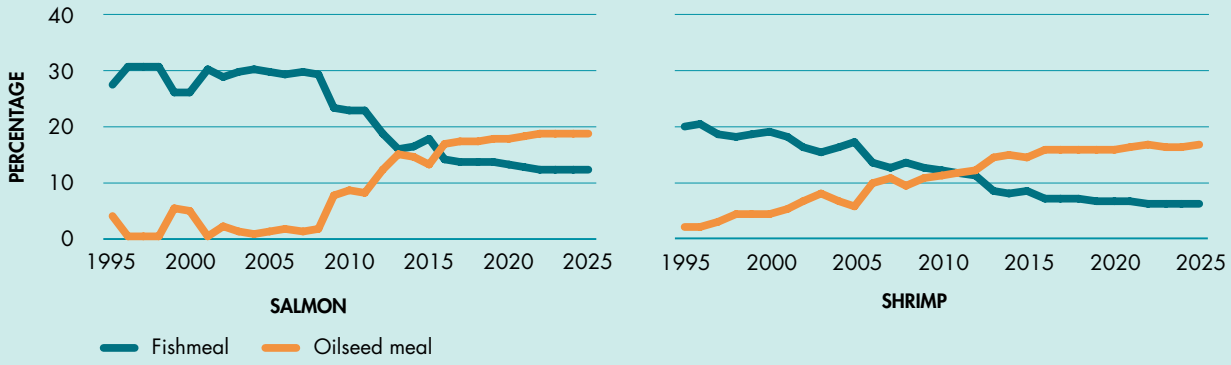
ADDITIONAL FISH CONSUMED IN 2025



SOURCE: OECD and FAO.

FIGURE 37

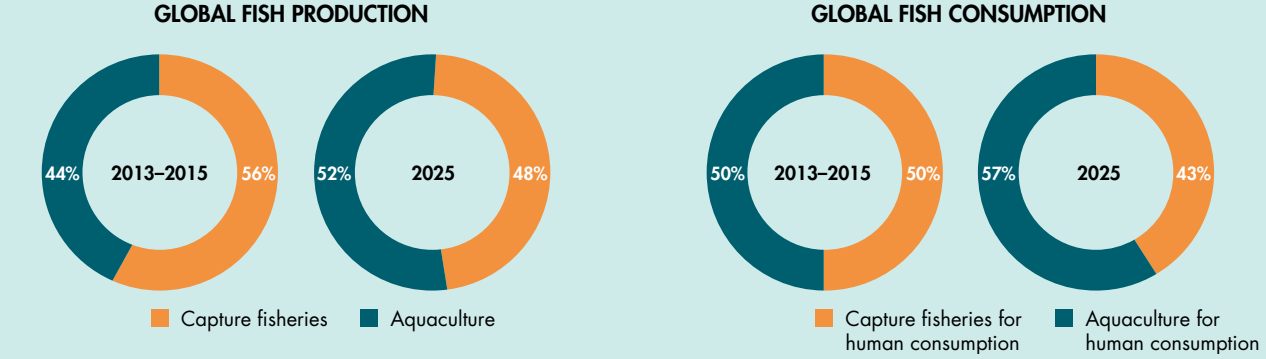
SHARE OF FISHMEAL USED AS FEED IN AQUACULTURE PRODUCTION OF SALMON AND SHRIMP



SOURCE: OECD and FAO.

FIGURE 38

RELATIVE SHARES OF AQUACULTURE AND CAPTURE FISHERIES IN PRODUCTION AND CONSUMPTION



SOURCE: OECD and FAO.

» Asian countries are expected to slightly increase their share in world exports for human consumption from 50 to 53 percent as a result of further expansion of their aquaculture production. At the country level, China, Viet Nam and Norway will be the world's largest fish exporters.

Owing to their slow but continuous economic recovery, demand for seafood in major developed economies in Japan and in Europe and North America is expected to be revitalized, with growing imports of fish for human consumption. Due to stagnating domestic fishery production, overall, developed countries will remain highly dependent on external supplies to satisfy their domestic demand, with their imports expected to increase by 20 percent over the Outlook period. However, although developed countries will continue to dominate world imports of fish and fishery products for human consumption, their share in global imports will decrease from 54 percent in 2013–15 to 53 percent in 2025. Import expansion for developing countries will consist of supplies of raw material for their processing sectors for subsequent re-export and, increasingly, of products destined to meet surging domestic consumption, in particular for species not produced locally. Increasing imports are expected to be recorded by several Asian countries (including Indonesia, the Philippines and Viet Nam), Brazil, and selected countries in the Near East and in Africa.

Exports of fishmeal are projected to remain steady at base period levels (3.0 million tonnes in product weight), with an overall increase of 15 percent in 2016–2025. Developing countries will remain the main exporters and importers of fishmeal. Owing to their leading role in aquaculture production, Asian countries will remain the main importers of fishmeal. Peru will be the leading exporter of fishmeal, followed by the United States of America, Chile and Thailand. Fish-oil exports are expected to increase (by 9 percent) over the period 2016–2025. Due to salmon farming and growing demand for fish to be consumed as food, European countries will represent the main importers, with a 57 percent share of global fish-oil imports in 2025.

Main uncertainties

Many factors can affect the fish projections reported in this section. The next decade is likely to see major changes in the environment, resources, macroeconomic conditions, international trade rules and tariffs, market characteristics, and social conduct. Their effects may influence production and fish markets in the medium term.

Climate change, variability and extreme weather events are also compounding threats to the sustainability of capture fisheries and aquaculture development in marine and freshwater environments.[12] Impacts occur as a result of both gradual atmospheric warming and associated physical (sea surface temperature, ocean circulation, waves and storm systems) and chemical changes (salinity content, oxygen concentration, and acidification) of the aquatic environment.[13] This could lead to: warming water temperatures; changing ocean currents and Southern Oscillation; sea-level rise; changes in rainfall, river flows, lake levels, thermal structure, and storm severity and frequency; and ocean acidification. These impacts could result in changes in catch quantity and composition, and in fish distribution. Moreover, extreme weather events and sea-level rise are anticipated to affect fisheries-related infrastructure such as ports and fleets, further raising the costs of fishing, processing and distribution activities. These possible events would take place in the context of other global social and economic pressures on natural resources and ecosystems, including environmental degradation and increasing land and water scarcity.

In the coming decade, capture fisheries production is projected to remain rather stable. However, the real prospects for capture fisheries are rather difficult to determine because they depend on the natural productivity of fish stocks and ecosystems, and are subject to many variables and uncertainties. Moreover, illegal unreported and unregulated (IUU) fishing and the overcapacity of fishing fleets globally are other important threats affecting the sustainability of fisheries resources. In addition, the ongoing practice of »

TABLE 24

MAIN RESULTS OF THE FISH MODEL: COMPARISON 2025 VS 2013–15: TRADE (LIVE WEIGHT EQUIVALENT)

	EXPORTS			IMPORTS		
	AVERAGE 2013–15	2025	GROWTH OF 2025 VS 2013–15	AVERAGE 2013–15	2025	GROWTH OF 2025 VS 2013–15
	(Thousand tonnes)		*(%)*	*(Thousand tonnes)*		*(%)*
WORLD	39 149	46 359	18.4	38 340	46 359	20.9
DEVELOPED COUNTRIES	13 097	15 707	19.9	20 793	24 447	17.6
North America	**2 978**	**3 685**	**23.7**	**5 747**	**7 348**	**27.9**
Canada	792	781	–1.4	650	701	7.8
United States of America	2 186	2 905	32.9	5 097	6 647	30.4
Europe	**8 783**	**10 422**	**18.7**	**10 252**	**11 699**	**14.1**
European Union	2 470	3 001	21.5	7 818	9 137	16.9
Norway	2 930	3 700	26.3	285	180	–36.8
Russian Federation	1 983	2 448	23.4	1 079	1 133	5.0
Oceania developed	**483**	**487**	**0.8**	**568**	**799**	**40.7**
Australia	61	40	–34.4	516	748	45.0
New Zealand	422	447	5.9	52	51	–1.9
Other developed	**854**	**1 112**	**30.2**	**4 225**	**4 601**	**8.9**
Japan	639	864	35.2	3 668	3 841	4.7
South Africa	165	183	10.9	234	351	50.0
DEVELOPING COUNTRIES	26 052	30 652	17.7	17 547	21 912	24.9
Africa	**2 110**	**1 483**	**–29.7**	**3 949**	**5 527**	**40.0**
North Africa	*622*	*603*	*–3.1*	*687*	*1 247*	*81.5*
Egypt	26	20	–23.1	404	820	103.0
Sub-Saharan Africa	*1 488*	*880*	*–40.9*	*3 263*	*4 280*	*31.2*
Ghana	31	30	–3.2	335	321	–4.2
Nigeria	11	9	–18.2	1 053	1 525	44.8
Latin America and Caribbean	**4 430**	**5 194**	**17.2**	**2 431**	**3 272**	**34.6**
Argentina	680	762	12.1	58	60	3.4
Brazil	40	48	20.0	757	991	30.9
Chile	1 512	1 767	16.9	120	118	–1.7
Mexico	185	161	–13.0	407	750	84.3
Peru	649	879	35.4	148	203	37.2
Asia and other Oceania	**19 513**	**23 975**	**22.9**	**11 166**	**13 113**	**17.4**
China	7 759	11 257	45.1	3 413	2 884	–15.5
India	1 063	947	–10.9	25	25	0.0
Indonesia	1 320	1 408	6.7	182	509	179.7
Philippines	413	322	–22.0	359	596	66.0
Republic of Korea	662	410	–38.1	1 637	1 870	14.2
Thailand	2 082	2 624	26.0	1 694	1 867	10.2
Viet Nam	2 651	3 669	38.4	278	413	48.6
LEAST-DEVELOPED COUNTRIES	1 462	1 178	–19.4	1 018	1 089	7.0
OECD[1]	13 266	15 415	16.2	20 760	24 800	19.5

[1] Organisation for Economic Co–operation and Development.
Source: OECD and FAO.

» fleets moving their operations from depleted areas to new areas can cause a long-term decline in global catches as overfishing spreads. These situations are also linked with, and exacerbated by, the poor governance characterizing several fisheries activities.

It is expected that future growth in fish production and related fish consumption will mainly originate from aquaculture (Figure 38). However, many factors might affect the prospects for this sector. These include: land and water and associated conflicts; feed, seed[14] supply and genetic resources; environmental integrity and disease problems; development and adoption of new and improved farming technologies; market, trade and food safety; climate change; investment capital impediments; and problems that can originate from unguided and unmonitored aquaculture practices. Aquaculture is also expected to continue to grow through intensification, species diversification, expansion into new milieus (including moving farther into offshore marine waters) and through the introduction of innovative, more-resource-efficient farming technologies. Well-advised policies and strategies backed by strong research programmes will be of paramount importance in overcoming production constraints.

Consumer concerns related to issues such as animal welfare, food quality, production and processing methods may cause further uncertainties in the fish sector. Especially in more-affluent markets, consumers are increasingly requiring high standards of quality assurance and demanding guarantees that the fish they purchase are produced sustainably. Stringent quality- and safety-related import standards, together with requirements for products meeting international animal health and environmental standards and social responsibility requirements, might act as barriers to small-scale fish producers and operators attempting to penetrate international markets and distribution channels. Future prices might be influenced not only by higher feed prices but also by the introduction of more rigorous regulations on the environment, food safety, traceability and animal welfare.

Summary of main outcomes from projections

The following major trends for the period up to 2025 emerge from the analyses:

- World production, total consumption, food demand and per capita food consumption will increase over the next decade; however, the rate of these increases will slow over time.
- World capture production is projected to increase only slightly if overfished stocks are well managed, while expanding world aquaculture production is projected to fill the supply–demand gap, albeit growing more slowly than in the past.
- The major changes in demand are in developing countries, where continued but slowing population growth, rising per capita incomes and urbanization will all increase the demand for fishery products.
- Prices will decline in real terms but remain on a high plateau.
- Trade in fish and fishery products is expected to increase more slowly than in the past decade, and the share of fish production being exported is projected to remain stable.
- Progress in ensuring the sustainability of capture fisheries and aquaculture and their contribution to the fight against hunger and poverty and to economic and social development is critical, emphasizing the crucial importance of integrated approaches to the implementation of the 2030 Agenda and all its relevant SDG targets.

The 2030 Agenda for Sustainable Development and the fisheries and aquaculture sector

At the United Nations Sustainable Development Summit on 25 September 2015, leaders of UN Member States adopted the 2030 Agenda for Sustainable Development,[15] which includes a set of 17 Sustainable Development Goals (SDGs). The 2030 Agenda defines global sustainable development priorities and aspirations for 2030 and seeks to mobilize global efforts to benefit

people, planet, prosperity, peace and partnership. It not only covers the SDGs but also the Addis Ababa Action Agenda[16] on financing for development as well as the Paris Agreement[17] on climate change. The SDGs aim, by 2030, *inter alia*, to: end poverty and hunger; further develop agriculture; support economic development and employment; restore and sustainably manage natural resources and biodiversity; fight inequality and injustice; and tackle climate change. The SDGs are truly transformative.[18] They are interlinked, calling for new combinations in the ways policies, programmes, partnerships and investments pull together to achieve the common goals.

The 2030 Agenda strives for a world that is just, rights-based, equitable and inclusive.[19] It commits stakeholders to work together to promote sustained and inclusive economic growth, social development and environmental protection, and to benefit all, including women, children, youth and future generations. The new agenda envisages a world of universal respect for human rights, equality and non-discrimination, and the over-riding message of the new agenda is "to leave no one behind", to ensure "targets met for all nationals and peoples and for all segments of society", and "to reach the furthest behind first", with two dedicated goals on combating inequality and discrimination.

Through the 2030 Agenda, nations acknowledge the imperative of a revitalized global partnership: "an intensive global engagement in support of implementation of all the goals and targets, bringing together Governments, civil society, the private sector, the United Nations system and other actors and mobilizing all available resources." The revitalized global partnership will endeavour to deliver the means of implementation of the 2030 Agenda through "domestic public resources, domestic and international private business and finance, international development cooperation, international trade as an engine for development, debt and debt sustainability, addressing systemic issues and science, technology, innovation and capacity-building, and data, monitoring and follow-up."

FAO emphasizes that food and agriculture are key to achieving the 2030 Agenda.[20] FAO's tasks and work are in fact already contributing to progress towards almost all SDGs. Both the SDGs and FAO's Strategic Framework are geared towards tackling the root causes of poverty and hunger, building a fairer society, and leaving no one behind. In particular, SDG 1 (End poverty in all its forms) and SDG 2 (End hunger, achieve food security and improved nutrition and promote sustainable agriculture) reflect FAO's vision and mandate. Other SDGs covering gender (SDG 5), water (SDG 6), economic growth and employment and decent work (SDG 8), inequality (SDG 10), production and consumption (SDG 12), climate (SDG 13), oceans (SDG 14), biodiversity (SDG 15), and peace and justice (SDG 16) are also highly relevant, while the agreed means of implementation and the revitalized global partnership (SDG 17) provide the basis for realization of the 2030 Agenda in all food and agriculture sectors, including fisheries, aquaculture and post-harvest fisheries.

The importance of oceans, seas and coasts as well as rivers, lakes and wetlands – including their resources and ecosystems as utilized by fisheries and aquaculture – for sustainable development is now widely recognized by the international community. This was evident at the 1992 Rio Summit, as embodied in Chapter 17 (as well as in Chapters 14 and 18) of Agenda 21, and runs through the historic 1995 Code of Conduct for Responsible Fisheries (the Code). It has been promoted most recently in the Rio+20 outcome document,[21] where Members called for "holistic and integrated approaches to sustainable development that will guide humanity to live in harmony with nature and lead to efforts to restore the health and integrity of the Earth's ecosystem."

Several SDGs are relevant to fisheries and aquaculture and to the sustainable development of the sector (see section Global agenda – global ambitions, p. 80). Indeed, SDG 14 (Conserve and sustainably use the oceans, seas and marine resources for sustainable development) expressly focuses on the oceans, underlining the importance of the conservation and sustainable use of the

oceans and seas and of their resources for sustainable development, including through their contributions to poverty eradication, sustained economic growth, food security and creation of sustainable livelihoods and decent work.

To allow oceans, seas and marine resources to continue to contribute to human well-being, SDG 14 recognizes the need to manage and conserve marine resources while supporting those ecosystem services that are of crucial importance for humans. A more sustainable use of resources, changes in production and consumption patterns, and improved management and regulation of human activities can help reduce negative environmental impacts and allow current and future generations to benefit from aquatic ecosystems. Promoting sustainable fishing and fish farming practices will not only contribute to resource and ecosystem management and conservation but ensure the world's oceans and seas are able to deliver nutritious food.

Along with important contributions to global food and nutrition security, livelihoods and national economic growth, oceans, seas and inland waters provide valuable ecosystem goods and services for the planet. About 50 percent of carbon in the atmosphere that becomes bound in natural systems is cycled into the oceans and inland waters. However, these same oceans and inland waters are under threat from overexploitation, pollution, declining biodiversity, expansion of invasive species, climate change and acidification. Stresses caused by human activity on the oceans' life support systems have reached unsustainable levels.

Today, 31 percent of commercially important assessed marine fish stocks worldwide are overfished (see section The status of fishery resources, p. 38). Mangroves, salt marshes and seagrass beds are being cleared at an alarming rate, exacerbating climate change and global warming. Aquatic pollution and habitat degradation continue to threaten fisheries and aquaculture resources in both inland and marine waters. At risk are hundreds of millions of people who depend on fisheries and aquaculture for their livelihoods, food security and nutrition. Furthermore, the vital contributions of fisheries and aquaculture to the world's well-being and prosperity are being compromised by poor governance, management and practices, while IUU fishing remains an obstacle to achieving sustainable fisheries.

Several SDG 14 targets call for specific actions in fisheries *inter alia*: effectively regulate harvesting; end overfishing and IUU fishing; address fisheries subsidies; increase economic benefits from sustainable management of fisheries and aquaculture; provide access for small-scale fishers to resources and markets; implement provisions of the United Nations Convention on the Law of the Sea (UNCLOS). Other SDG 14 targets cover marine pollution prevention and reduction, management and protection of marine and coastal ecosystems all of which are also important priorities for sustainable fisheries and aquaculture. Thus, SDG 14 spells out the need for cooperation and coordination among all stakeholders for more sustainable fisheries management and better conservation of resources. It creates a framework to sustainably manage and protect marine and coastal ecosystems.

Today's holistic approach to sustainable management and development of fisheries and aquaculture, as promoted by FAO's Blue Growth Initiative (see below), aims at reconciling economic growth with improved livelihoods and social equity. It balances the sustainable and socio-economic management of natural aquatic resources with an emphasis on efficient resource use in capture fisheries and aquaculture, ecosystem services, trade, livelihoods and food systems.

National, regional and global efforts by fisheries and aquaculture stakeholders aiming to achieve the 2030 Agenda will benefit from past and ongoing processes of collaboration, mutual support and international consensus building. Measures aiming at the implementation of the Code will prove the basis for implementation of relevant SDG targets. Reporting on Code implementation efforts to FAO's Committee on Fisheries (COFI) and its Sub-Committees on

Trade and Aquaculture will demonstrate progress made towards the 2030 Agenda as reported by national fisheries administrations, regional fishery bodies (RFBs), and international civil society organizations (CSOs) and intergovernmental organizations. The international fisheries community can build on a solid framework of international instruments, including the Code, supporting fisheries governance worldwide.

The 2030 Agenda highlights the importance of building partnerships and strengthening stakeholder participation as key to progress and success to promote and effectively implement activities in support of specific as well as interlinked SDG targets. International examples of such ongoing initiatives in the fisheries and aquaculture sector include:

- the Global Partnership for Climate, Fisheries and Aquaculture[22] (covering SDGs 2, 13 and 14);
- the promotion and implementation by local, national and international CSOs and multiple governments of the Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication[23] (SDGs 1, 2, 5, 8 and 14);
- cooperation between national institutions and between FAO, the International Maritime Organization, and the International Labour Organization (ILO) in the fight against IUU fishing and other crime associated with fishing through: support to national and regional plans of actions to combat IUU fishing; implementation of the Voluntary Guidelines for Flag State Performance;[24] development of the Global Record of Fishing Vessels;[25] and implementation of FAO's Port State Measures Agreement,[26] ILO's Work in Fishing Convention 188[27] and other instruments on safety at sea and decent work in fisheries (SDGs 14 and 8);
- support to implementation, monitoring and review of efforts related to SDG 14.c on UNCLOS and other relevant binding and voluntary oceans governance instruments through consultation and coordination within and beyond the UN-Oceans[28] interagency collaboration mechanism (SDGs 14 and 17).

The 2030 Agenda places an emphasis on capacity-development efforts, especially those strengthening the policy environment, institutional arrangements and collaborative processes that will help empower fishing and aquaculture communities, CSOs, seafood value-chain actors and public entities. Given the multidimensional and interlinked nature of the SDGs, effective coordination and strategic integration of policy and implementation efforts addressing multiple SDG targets will be key to achieving lasting and constructive changes in policies and institutions, as well as participation in and commitments to actions at the local, country and international levels. In many cases, developing solutions to challenges in fisheries and aquaculture will require interactions and collaboration with, and support from, stakeholders and institutions outside the sector. The 2030 Agenda encourages such interactions and processes that will lead to more integrated, efficient, inclusive and better coordinated initiatives as they address multiple SDG targets.

It will be of paramount importance for governmental and non-governmental stakeholders in fisheries and aquaculture to familiarize themselves with the 2030 Agenda and the SDGs, and to further promote awareness and action towards their achievement. Of significant relevance is SDG 17 (means of implementation and global partnership for sustainable development), which covers commitments on finance, technology, capacity building, trade, policy and institutional coherence, multistakeholder partnerships and data, monitoring and accountability.

FAO is advising Members on SDG implementation policies and processes, including follow-up, monitoring and review. It is collaborating with UN-Oceans, the UN Statistical Division, the Inter-Agency Expert Group on SDG indicators, the Inter-Agency Task Force on Financing for Development outcomes and means of implementation of the 2030 Agenda, and other partners. FAO is also contributing to the High-level Political Forum on Sustainable Development,[29] which is the main platform for SDG follow-up and review and which may draw on the work of other intergovernmental bodies

and fora that review progress and discuss policies in specific areas, including the Committee on World Food Security and FAO's Technical Committees such as COFI.

Monitoring progress

Through an unprecedented consultative process driven by UN Members, the adopted SDG framework contains a set of 169 targets and 231 indicators to measure and monitor progress at the global level.

Sustainable Development Goal 14 comprises ten targets – with several explicitly addressing fisheries-related issues and others with direct implications for the fisheries sector. The fisheries-related targets call for actions to: effectively regulate harvesting and to end overfishing, IUU fishing and destructive fishing practices; address fisheries subsidies; increase economic benefits from sustainable management of fisheries and aquaculture; and secure access for small-scale artisanal fishers to fishery resources and markets. The other targets relate to marine pollution prevention and reduction, management and protection of marine and coastal ecosystems, and implementation of UNCLOS and applicable existing regional and international regimes.

All targets are supported by agreed indicators established by the Inter-Agency and Expert Group on SDGs and adopted by the UN Statistical Commission.[30] FAO has been identified as custodian for some 20 indicators, while contributing to some 5–6 additional indicators. FAO is custodian agency for three SDG 14 targets, namely:

- Target 14.4: By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics.
  Indicator 14.4.1: Proportion of fish stocks within biologically sustainable levels.
- Target 14.6: By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the World Trade Organization fisheries subsidies negotiation.
  Indicator 14.6.1: Progress by countries in the degree of implementation of international instruments aiming to combat illegal, unreported and unregulated fishing.
- Target 14.b: Provide access for small-scale artisanal fishers to marine resources and markets.
  Indicator 14.b.1: Progress by countries in the degree of application of a legal/regulatory/policy/institutional framework which recognizes and protects access rights for small-scale fisheries.

FAO will collaborate with and support custodian agencies for other SDG 14 targets, for example, SDG 14.c (collaboration between UN Division for Ocean Affairs and the Law of the Sea, FAO and other members[31] of UN-Oceans):

- Target 14.c: Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in the United Nations Convention on the Law of the Sea, which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of "The future we want".
  Indicator 14.c.1: Number of countries making progress in ratifying, accepting and implementing through legal, policy and institutional frameworks, ocean-related instruments that implement international law, as reflected in UNCLOS, for the conservation and sustainable use of the oceans and their resources.

The indicators expected to help monitor progress on the above SDG targets 14.6, 14.b and the fisheries component of 14.c are composite

indicators developed on the basis of the existing mechanism for monitoring implementation of the Code by COFI Members through biennial Code surveys. They will therefore contribute to and support the reporting process for global monitoring of fisheries-related targets of the 2030 Agenda. Recently, response rates by COFI Members have increased dramatically, following the launching of the more accessible online Code reporting system.

Additional efforts to assess progress in fisheries management are ongoing. These could assist related national, regional and global initiatives, and also support national and global SDG monitoring measures. In this context, FAO actively contributed to the 2016 Expert Meeting[32] on improving progress reporting and working towards implementation of Aichi Biodiversity Target 6, which developed a draft conceptual framework that could be used as guidance by parties to the Convention on Biological Diversity (CBD) in reporting on their implementation towards the achievement of Target 6 on sustainable fisheries. The meeting identified a set of actions and potential indicators related to achieving Target 6 and discussed ways to facilitate this through improved coordination among the CBD, FAO and RFBs.

In addition, within the framework of the FAO/GEF Coastal Fisheries Initiative, specific efforts are ongoing to develop and implement a fisheries performance evaluation system that can be used to: (i) effectively evaluate the impacts of coastal fisheries projects; (ii) monitor changes in environmental, social and economic benefits of fisheries; and (iii) support knowledge sharing through identifying pathways for implementation of management strategies to achieve sustainable fisheries.

The FAO Blue Growth Initiative and the SDGs

The FAO Blue Growth Initiative (BGI),[33] based on the sound principles of the Code, directly contributes to a wide range of SDGs (see section Global agenda – global ambitions, p. 80). It prioritizes balancing the sustainable environmental, social and economic aspects of use of our living aquatic resources. Through the BGI, FAO mobilizes international support to provide incentives and assistance to developing countries so they can adapt and upscale implementation of blue growth strategies at the local, national and regional levels to secure political commitment and governance reform. The BGI brings together policies, investment, innovation and public–private partnerships that underpin sustained growth and give rise to new economic opportunities in fish harvesting and utilization and in ecosystem goods and services.

In order to help achieve the SDGs,[34] FAO and its Members and partners have been mainstreaming the BGI across both the Near East and North Africa region and the Asia and Pacific region.[35] The Asia and Pacific BGI currently focuses on sustainable aquaculture development to reverse environmental degradation and ameliorate competition for mangrove space and freshwater resources. Responsible management and sustainable development of aquaculture can also offer good work opportunities to Asian fish farmers, in particular youth, while simultaneously boosting their income and nutrition security, and safeguarding their natural resources. This initiative is a good example of the type of actions required to ensure aquaculture becomes environmentally sound and truly sustainable in line with the SDGs.

Similarly, a comprehensive study is under way with a view to unleashing the potential of blue growth in the Near East and North Africa. In this region, activities include: promoting desert aquaculture in Algeria; assessing livelihoods of fishing communities along the Nile River in Egypt and the Sudan; improving value chains in Tunisia to ensure that women harvesting clams receive greater and diversified income; and promoting the Nouakchott Declaration on the reduction of losses and waste in the fisheries sector. Fisheries and aquaculture also provide an excellent opportunity to create rural employment, especially for youth, thereby allowing them to remain in their own villages with gainful employment, rather than having to migrate to urban areas or abroad in search of work. This study should provide valuable information on the feasibility of developing aquaculture in arid

zones and assessing the potential social and economic benefits that can accrue from improved value chains and reductions in losses and waste, which in turn will be important factors in meeting the SDGs and delivering blue growth.

Blue growth is especially relevant for Small Island Developing States (SIDS) and coastal areas around the globe. Cabo Verde is extremely vulnerable to the effects of climate change and climate-related disasters, which have direct impacts on food and nutrition security and livelihoods. However, SIDS such as Cabo Verde are best poised to develop and promote economically viable, technically feasible and culturally acceptable development strategies that support conservation and sustainable use of the oceans. Cabo Verde worked with FAO to develop a blue growth charter, recently adopted by the Government of Cabo Verde, for implementation at the national level.[36] The charter highlights the country's commitment to blue growth, and places increased emphasis on the services provided by coastal, oceanic and freshwater ecosystems, while simultaneously minimizing environmental pollution, loss of biodiversity and unsustainable use of aquatic resources. Moreover, the charter aims to maximize economic and social benefits for the population, and fully engages key sectors as partners, including fisheries and aquaculture, the seafood industry, marine and coastal tourism, scientific research and shipping. Successful implementation of this charter would be a good example for other SIDS as a means to meet SDG targets and benefit from blue growth.

The 2030 Agenda provides the framework, processes, stakeholder engagement and partnerships that can: (i) allow present and future generations to benefit from aquatic resources; and (ii) help the fisheries and aquaculture sector to feed a growing population with nutritious food and provide economic prosperity, employment opportunities and well-being. ■

NOTES

1 FAO, IFAD & WFP. 2015. *The State of Food Insecurity in the World 2015. Meeting the 2015 international hunger targets: taking stock of uneven progress.* Rome, FAO. 57 pp. (also available at www.fao.org/3/a-i4646e/index.html).

2 FAO. 2001. *The State of Food Security in the World 2001.* Rome. 58 pp. (also available at www.fao.org/docrep/003/y1500e/y1500e00.htm).

3 FAO. 1996. *Rome Declaration on World Food Security. World Food Summit, 13–17 November 1996, Rome, Italy* [online]. Rome. [Cited 8 May 2016]. www.fao.org/docrep/003/w3613e/w3613e00.HTM

4 United Nations, Department of Economic and Social Affairs, Population Division. 2016 *World Population Prospects: The 2015 Revision* [online]. Medium variant. [Cited 8 May 2016]. http://esa.un.org/unpd/wpp/

5 FAO. 2014. *The State of World Fisheries and Aquaculture 2014.* Rome. 223 pp. (also available at www.fao.org/3/a-i3720e.pdf).

6 For more information on the FAO fish model: FAO. 2012. *The State of World Fisheries and Aquaculture 2012*, pp. 186–193. Rome. 209 pp. (also available at www.fao.org/docrep/016/i2727e/i2727e00.htm).

7 For more information on efforts to integrate fish in overall agricultural analysis: Ababouch, L., Taconet, M., Plummer, J., Garibaldi, L. & Vannuccini, S. 2016. Bridging the science-policy divide to promote fisheries knowledge for all: the case of the Food and Agriculture Organization of the United Nations. *In* B.H. MacDonald, S.S. Soomai, E.M. De Santo & P.G. Wells, eds. *Science, information, and policy interface for effective coastal and ocean management*, pp. 389–417. Boca Raton, USA, CRC Press, Taylor & Francis Group. 474 pp.

8 This section is mainly based on the results of the fish model as included in the OECD-FAO Agricultural Outlook 2016-2025. More information about the publication is available at www.agri-outlook.org/ and the entire publication, including the fish chapter, is available at: OECD. 2016. OECD-FAO Agricultural Outlook. In: *OECD* [online]. [Cited July 2016]. www.agri-outlook.org/publication/

9 In this section, the term "fish" indicates fish, crustaceans, molluscs and other aquatic animals, but excludes aquatic mammals, crocodiles, caimans, alligators, seaweed and other aquatic plants.

10 In the model, the years affected by the El Niño phenomenon are set at the beginning of the Outlook period and 2021.

11 Including fishmeal converted into a live weight equivalent basis.

12 FAO. 2016. *Climate change and food security: risks and responses.* Rome. 110 pp. (also available at www.fao.org/3/a-i5188e.pdf).

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14 Fish seed indicates eggs, spawn, offspring, progeny or brood of the aquatic organism (including aquatic plants) being cultured. At this infantile stage, seed may also be referred to or known as fry, larvae, postlarvae, spat and fingerlings. Seed may originate from two main sources: captive breeding programmes; and caught from the wild.

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