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**IN BRIEF**

# THE STATE OF **WORLD FISHERIES AND AQUACULTURE**

**TOWARDS  
BLUE TRANSFORMATION**

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**COVER PHOTOGRAPH** ©Theerawat Payakyut | Dreamstime.com

**THAILAND.** Preparing the fishing nets on a boat.

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# KEY MESSAGES

## **1. Global fisheries and aquaculture production is at a record high and the sector will play an increasingly important role in providing food and nutrition in the future.**

Total fisheries and aquaculture production reached a record 214 million tonnes in 2020, comprising 178 million tonnes of aquatic animals and 36 million tonnes of algae, largely due to the growth of aquaculture, particularly in Asia. The amount destined for human consumption (excluding algae) was 20.2 kg per capita, more than double the average of 9.9 kg per capita in the 1960s. An estimated 58.5 million people were employed in the primary sector. Including subsistence and secondary sector workers, and their dependents, it is estimated that about 600 million livelihoods depend at least partially on fisheries and aquaculture. The international trade of fisheries and aquaculture products generated around USD 151 billion in 2020, down from the record high of USD 165 billion in 2018 mainly due to the outbreak of COVID-19.

## **2. Aquaculture has great potential to feed and nourish the world's growing population. But growth must be sustainable.**

In 2020, global aquaculture production reached a record 122.6 million tonnes, with a total value of USD 281.5 billion. Aquatic animals accounted for 87.5 million tonnes and algae comprised 35.1 million tonnes. In 2020, driven by expansion in Chile, China and Norway, global aquaculture production grew in all

regions except Africa, due to a decrease in the two major producing countries, Egypt and Nigeria. The rest of Africa enjoyed 14.5 percent growth from 2019. Asia continued to dominate world aquaculture, producing 91.6 percent of the total. Aquaculture growth has often occurred at the expense of the environment. Sustainable aquaculture development remains critical to supply the growing demand for aquatic foods.

## **3. The world's consumption of aquatic foods has increased significantly in recent years and will continue to rise.**

Global consumption of aquatic foods (excluding algae) has increased at an average annual rate of 3.0 percent since 1961, compared with a population growth rate of 1.6 percent. On a per capita basis, consumption of aquatic food grew from an average of 9.9 kg in the 1960s to a record high of 20.5 kg in 2019, while it slightly declined to 20.2 kg in 2020. Rising incomes and urbanization, improvements in post-harvest practices and changes in dietary trends are projected to drive a 15 percent increase in aquatic food consumption, to supply on average 21.4 kg per capita in 2030.

## **4. Fishery resources continue to decline due to overfishing, pollution, poor management and other factors, but the number of landings from biologically sustainable stocks is on the rise.**

The fraction of fishery stocks within biologically sustainable levels decreased to 64.6 percent

in 2019, 1.2 percent lower than in 2017. However, 82.5 percent of the 2019 landings were from biologically sustainable stocks, a 3.8 percent improvement from 2017. Effective fisheries management has been proven to successfully rebuild stocks and increase catches within ecosystem boundaries. Improving global fisheries management remains crucial to restore ecosystems to a healthy and productive state and protect the long-term supply of aquatic foods. Rebuilding overfished stocks could increase fisheries production by 16.5 million tonnes and raise the contribution of marine fisheries to the food security, nutrition, economic growth and well-being of coastal communities.

**5. Reduction of the global fishing fleet size continues, but more needs to be done to minimize overcapacity and ensure sustainability in fishing operations.**

The total number of fishing vessels in 2020 was estimated at 4.1 million, a reduction of 10 percent since 2015, reflecting efforts by countries, in particular China and European countries, to reduce the global fleet size. Asia still had the largest fishing fleet, at about two-thirds of the global total. However, reductions in fleet size alone do not necessarily guarantee more sustainable outcomes, since changes in fishing efficiency can offset the sustainability gains of fleet reductions.

**6. Aquatic animal production is forecast to grow another 14 percent by 2030. It is vital this growth goes hand in hand with safeguarding ecosystems, reducing pollution, protecting biodiversity and ensuring social equity.**

FAO's outlook for fisheries and aquaculture to 2030 projects an increase in production, consumption and trade, albeit at slower growth rates. Total production of aquatic animals is expected to reach 202 million tonnes in 2030, thanks mainly to sustained growth of aquaculture, projected to reach 100 million tonnes for the first time in 2027 and 106 million tonnes in 2030. World capture fisheries is projected to recover, increasing by 6 percent from 2020 to reach 96 million tonnes in 2030, as a result of improved resource management, underfished resources, and reduced discards, waste and losses.

**7. Millions of lives and livelihoods are supported by aquatic food systems. Yet, many small-scale producers, especially women, are vulnerable with precarious working conditions. Building their resilience is key to sustainability and equitable development.**

Of the 58.5 million people employed in the primary fisheries and aquaculture sector in 2020, 21 percent were women, rising to about 50 percent for those employed in the entire aquatic value chain (including pre- and post-harvest). Although they occupy critical roles in fisheries and aquaculture, women constitute a disproportionately large

percentage of the people engaged in the informal, lowest paid, least stable and less skilled segments of the workforce, and often face gender-based constraints that prevent them from fully exploring and benefiting from their roles in the sector.

**8. Aquatic food systems are a powerful solution. Blue Transformation can meet the twin challenges of food security and environmental sustainability.**

FAO is committed to Blue Transformation, a visionary strategy that aims to enhance the role of aquatic food systems in feeding the world's growing population by providing the legal, policy and technical frameworks required to sustain growth and innovation. Blue Transformation proposes a series of actions designed to support resilience in aquatic food systems and ensure fisheries and aquaculture grow sustainably while leaving no one behind, especially those communities that depend on the sector. Climate- and environment-friendly policies and practices, as well as technological innovations, are critical building blocks for Blue Transformation.

**9. Blue Transformation requires a commitment from the public and private sectors if we are to achieve the United Nations 2030 Agenda, particularly since the COVID-19 pandemic has reversed previously favourable trends.**

Blue Transformation requires a commitment from governments, the private sector and civil society to maximize the opportunities that fisheries and aquaculture offer. Blue Transformation seeks to promote sustainable aquaculture expansion and intensification, effective management of all fisheries, and upgrading of aquatic value chains. Proactive public and private partnerships are needed to improve production, reduce food loss and waste and enhance equitable access to lucrative markets. Furthermore, inclusion of aquatic foods in national food security and nutrition strategies, together with initiatives to improve consumer awareness on their benefits, is needed to increase availability and improve access.

# FOREWORD

Despite significant previous progress, the world is off track to end hunger and malnutrition in all its forms by 2030. Degraded ecosystems, an intensifying climate crisis, and increased biodiversity loss are threatening jobs, economies, the environment and food security around the globe, all aggravated by the impacts of the COVID-19 pandemic, crises and other humanitarian emergencies. Today, 811 million people suffer from hunger and 3 billion cannot afford healthy diets.

This has elevated the calls to urgently transform our agrifood systems to ensure food security, improve nutrition and secure affordable healthy diets for a growing population, while safeguarding livelihoods and our natural resources.

Aquatic foods are increasingly recognized for their key role in food security and nutrition, not just as a source of protein, but also as a unique and extremely diverse provider of essential omega-3 fatty acids and bioavailable micronutrients. Prioritizing and better integrating fisheries and aquaculture products in global, regional and national food system strategies and policies should be a vital part of the necessary transformation of our agrifood systems.

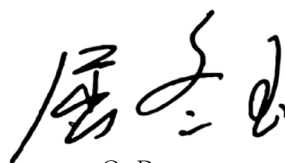
The 2022 edition of *The State of World Fisheries and Aquaculture – Towards Blue Transformation* – builds on this narrative by presenting quantitative evidence of the growing role of fisheries and aquaculture in providing food, nutrition and employment. In 2020, fisheries and aquaculture production reached an all-time record of 214 million tonnes, worth about USD 424 billion. Production of aquatic animals in 2020 was more than 60 percent higher than the average in the 1990s, considerably outpacing world population growth, largely due to increasing aquaculture production. We are eating more aquatic foods than ever – about 20.2 kg per capita in 2020 – more than double our consumption rate 50 years ago. Globally, aquatic foods provide about 17 percent of animal protein, reaching over 50 percent in several countries in Asia and Africa. The sector employs an estimated 58.5 million people in primary production alone – approximately 21 percent women.

This report also highlights further changes needed in the fisheries and aquaculture sector to address the challenges of feeding the world effectively, equitably and sustainably. Its subtitle, *Towards Blue Transformation*, reflects the acceleration required to achieve a sustainable, inclusive and efficient sector able to meet expectations, the

urgent need to integrate sustainably harvested aquatic foods into national food system policies and programmes, and opportunities to contribute to restoring aquatic habitats and biodiversity.

*The State of World Fisheries and Aquaculture 2022* is underpinned by a significant policy context. First, the Declaration for Sustainable Fisheries and Aquaculture, unanimously endorsed in 2021 by the Thirty-fourth Session of the FAO Committee on Fisheries (COFI), concludes with a call to support “an evolving and positive vision for fisheries and aquaculture in the twenty-first century, where the sector is fully recognized for its contribution to fighting poverty, hunger and malnutrition.” Second, this 2022 edition coincides with the implementation of three relevant United Nations Decades, namely the Decade of Action to deliver the Global Goals, the Decade of Ocean Science for Sustainable Development, and the Decade on Ecosystem Restoration. Finally, the report is launched as we approach the middle of the International Year of Artisanal Fisheries and Aquaculture 2022. The policy landscape could not be more ambitious and the moment more opportune to transform towards more efficient, more inclusive, more resilient and more sustainable aquatic food systems to help achieve the Sustainable Development Goals.

Since its first edition in 1995, *The State of World Fisheries and Aquaculture* has provided technical insight and evidence-based information on a sector crucial to societal success. It serves a wide audience – from policymakers, managers and scientists, to fishers and consumers – to demonstrate and enhance the vital role and contributions of fisheries and aquaculture to achieve better production, better nutrition, a better environment and a better life for all, leaving no one behind. I am confident that this edition will continue the tradition of making valuable contributions in helping us meet the challenges of the twenty-first century.



Qu Dongyu  
FAO Director-General



# PART 1

## WORLD REVIEW

### GLOBAL FISHERIES AND AQUACULTURE AT A GLANCE

**The fisheries and aquaculture sectors have been increasingly recognized for their essential contribution to global food security and nutrition in the twenty-first century.** Further expansion of this contribution requires the acceleration of transformative changes in policy, management, innovation and investment to achieve sustainable, inclusive and equitable global fisheries and aquaculture. *The State of World Fisheries and Aquaculture 2022*<sup>1</sup> presents updated and verified statistics<sup>2</sup> of the sector and analyses its international policy context and selected high-impact initiatives and actions undertaken to accelerate international efforts to support achievement of the Sustainable Development Goals. It looks at the impact and implications of the COVID-19 pandemic on fisheries and aquaculture production, utilization and trade.

1 Note that this 2022 edition of *The State of World Fisheries and Aquaculture* includes for the first time a Glossary which reflects the ongoing expansion of the terminology resulting from sector's increasing role in food security, human nutrition and trade.

2 If not expressly indicated, the statistical analysis on production, utilization, consumption and trade is carried out separately for aquatic animals (excluding aquatic mammals and reptiles) and algae. Detailed coverage of species and specific sectorial exclusions are indicated in the Glossary in the main report.

Global production of aquatic animals was estimated at 178 million tonnes in 2020, a slight decrease from the all-time record of 179 million tonnes in 2018 (Table 1). Capture fisheries contributed 90 million tonnes (51 percent) and aquaculture 88 million tonnes (49 percent) (Figure 1). In addition to aquatic animals, 36 million tonnes (wet weight) of algae were produced in 2020, of which 97 percent originated from aquaculture, mostly marine aquaculture.

Of the overall production of aquatic animals, over 157 million tonnes (89 percent) were used for human consumption (Figure 2). The remaining 20 million tonnes were destined for non-food uses, to produce mainly fishmeal and fish oil (16 million tonnes or 81 percent).

Global apparent consumption of aquatic foods increased at an average annual rate of 3.0 percent from 1961 to 2019, a rate almost twice that of annual world population growth (1.6 percent) for the same period. Per capita consumption of aquatic animal foods grew by about 1.4 percent per year, from 9.0 kg (live weight equivalent) in 1961 to 20.5 kg in 2019. During recent decades, per capita consumption of aquatic foods has been influenced most strongly by increased supplies, changing consumer preferences, advancements in technology and income growth.

**TABLE 1** WORLD FISHERIES AND AQUACULTURE PRODUCTION, UTILIZATION AND TRADE<sup>1</sup>

	1990s	2000s	2010s	2018	2019	2020
	Average per year					
	<i>Million tonnes (live weight equivalent)</i>					
<b>Production</b>						
<b>Capture:</b>						
Inland	7.1	9.3	11.3	12.0	12.1	11.5
Marine	81.9	81.6	79.8	84.5	80.1	78.8
Total capture	88.9	90.9	91.0	96.5	92.2	90.3
<b>Aquaculture:</b>						
Inland	12.6	25.6	44.7	51.6	53.3	54.4
Marine	9.2	17.9	26.8	30.9	31.9	33.1
Total aquaculture	21.8	43.4	71.5	82.5	85.2	87.5
Total world fisheries and aquaculture	110.7	134.3	162.6	178.9	177.4	177.8
<b>Utilization<sup>2</sup></b>						
Human consumption	81.6	109.3	143.2	156.8	158.1	157.4
Non-food uses	29.1	25.0	19.3	22.2	19.3	20.4
Population (billions) <sup>3</sup>	5.7	6.5	7.3	7.6	7.7	7.8
Per capita apparent consumption (kg)	14.3	16.8	19.5	20.5	20.5	20.2
<b>Trade</b>						
Exports – in quantity	39.6	51.6	61.4	66.8	66.6	59.8
Share of exports in total production	35.8%	38.5%	37.7%	37.3%	37.5%	33.7%
Exports – in value (USD 1 billion)	46.6	76.4	141.8	165.3	161.8	150.5

<sup>1</sup> Excluding aquatic mammals, crocodiles, alligators and caimans and algae. Totals may not match due to rounding.

<sup>2</sup> Utilization data for 2018–2020 are provisional estimates.

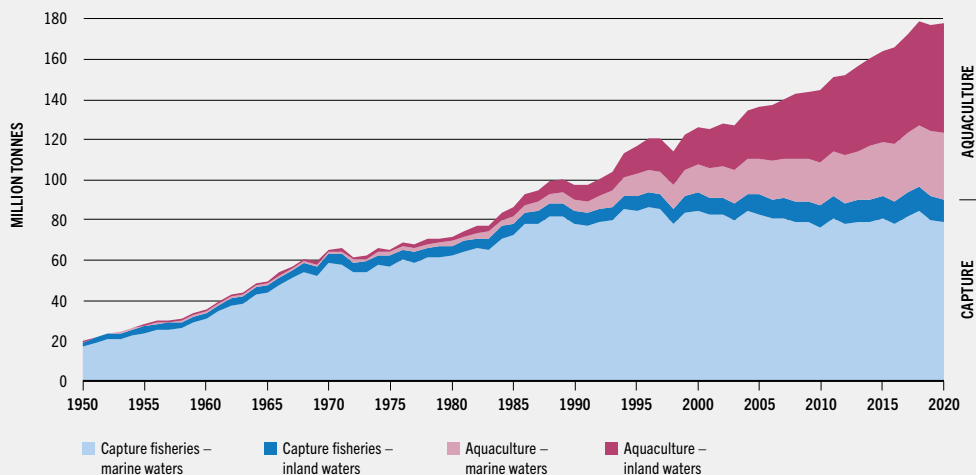
<sup>3</sup> Source of population figures: United Nations. 2019. 2019 Revision of World Population Prospects. In: *UN*. New York. Cited 22 April 2022. <https://population.un.org/wpp>

SOURCE: FAO.

Aquatic foods remain some of the most traded food commodities in the world. World exports of aquatic products in 2020, excluding algae, totalled about 60 million tonnes live weight, worth

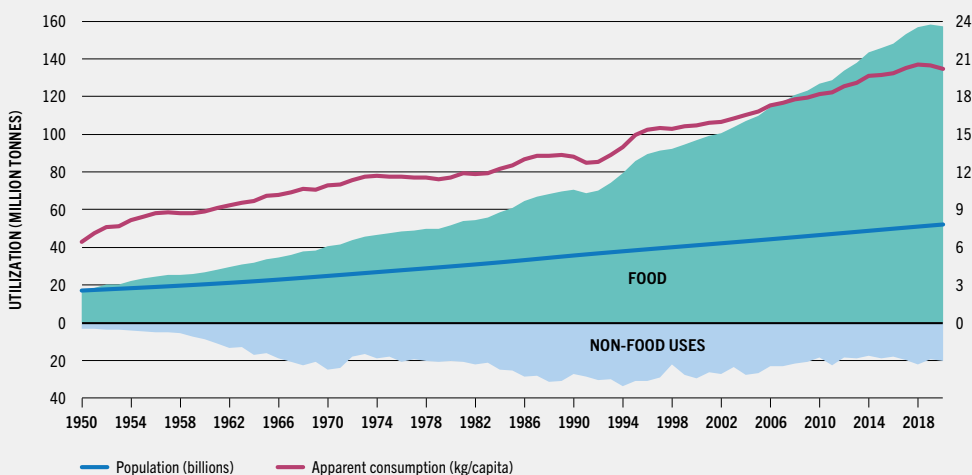
USD 151 billion. This represents a major decline (8.4 percent in value and 10.5 percent in volume) from the record high of 67 million tonnes, worth USD 165 billion, reached in 2018.

**FIGURE 1** WORLD CAPTURE FISHERIES AND AQUACULTURE PRODUCTION



NOTES: Excluding aquatic mammals, crocodiles, alligators, caimans and algae. Data expressed in live weight equivalent.  
SOURCE: FAO.

**FIGURE 2** WORLD FISHERIES AND AQUACULTURE PRODUCTION: UTILIZATION AND APPARENT CONSUMPTION



NOTES: Excluding aquatic mammals, crocodiles, alligators, caimans and algae. Data expressed in live weight equivalent. For algae and apparent consumption, see Glossary in the main report, including Context of SOFIA 2022. Source of population figures: United Nations. 2019. 2019 Revision of World Population Prospects. In: *UN*. New York. Cited 22 April 2022. <https://population.un.org/wpp>  
SOURCE: FAO.

## TOTAL FISHERIES AND AQUACULTURE PRODUCTION

**Total fisheries and aquaculture production reached an all-time record of 214 million tonnes in 2020**, comprising 178 million tonnes of aquatic animals and 36 million tonnes of algae, a slight increase (3 percent) from the previous 2018 record (213 million tonnes). The limited growth is mainly caused by a 4.4 percent decline in capture fisheries due to reduced catches of pelagic species, particularly anchoveta, a reduction in China's catches, and the impacts of the COVID-19 pandemic in 2020. This decline was compensated for by a continued growth of aquaculture, albeit at a slower yearly rate in the last two years.

For aquatic animal production, this trend masks significant variations between continents, regions, and countries. In 2020, Asian countries were the main producers accounting for 70 percent of the total, followed by the Americas, Europe, Africa and Oceania (Figure 5). China remained the first major producer with a share of 35 percent of the total. The expansion of aquaculture in recent decades has boosted the overall growth of aquatic animal production in inland waters, from 12 percent of total production in the late 1980s to 37 percent in 2020.

## CAPTURE FISHERIES PRODUCTION

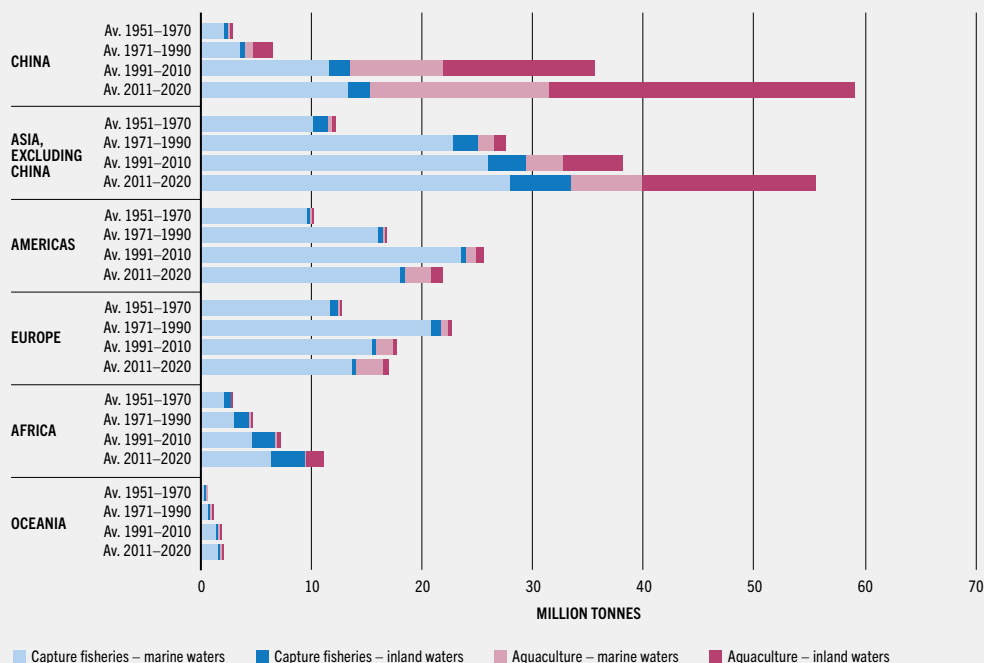
**In 2020, global capture fisheries production (excluding algae) was 90.3 million tonnes, with an estimated value of USD 141 billion,**

including 78.8 million tonnes from marine waters and 11.5 million tonnes from inland waters – a fall of 4.0 percent compared with the average of the previous three years. Finfish represent about 85 percent of total marine capture production, with anchoveta once again the top species harvested. In 2020, catches of the four most high-value groups (tunas, cephalopods, shrimps and lobsters) remained at their highest levels or declined marginally from peak catches recorded previously.

Despite a decrease of 5.1 percent from 2019, global catches in inland waters, estimated at 11.5 million tonnes, remained at a historically high level and benefited from improved reporting by the producing countries. Asia produced almost two-thirds of total inland fisheries, followed by Africa – inland catches are important for food security in both these regions. For the first time since the mid-1980s, China was not the top inland fisheries producer, overtaken by India at 1.8 million tonnes.

## AQUACULTURE PRODUCTION

**Global aquaculture production in 2020 reached a record 122.6 million tonnes (Figure 13),** including 87.5 million tonnes of aquatic animals worth USD 264.8 billion and 35.1 million tonnes of algae worth USD 16.5 billion. Around 54.4 million tonnes were farmed in inland waters and 68.1 million tonnes came from marine and coastal aquaculture.

**FIGURE 5 REGIONAL CONTRIBUTION TO WORLD CAPTURE FISHERIES AND AQUACULTURE PRODUCTION**

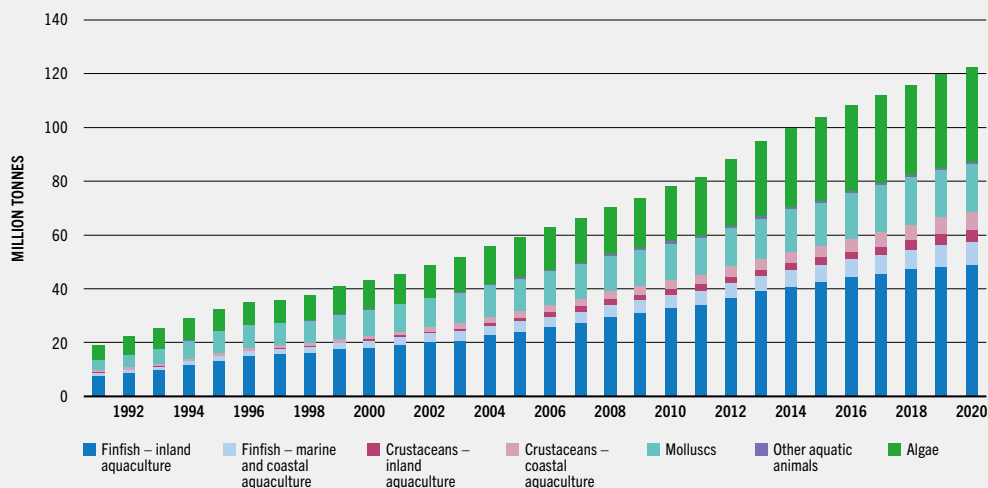
NOTES: Excluding aquatic mammals, crocodiles, alligators and caimans and algae. Data expressed in live weight equivalent.

SOURCE: FAO.

All regions, except Africa, experienced continued aquaculture growth in 2020, driven by expansion in Chile, China and Norway – the top producers in their respective regions. Africa experienced a decrease in the two major producing countries, Egypt and Nigeria, while the rest of Africa enjoyed 14.5 percent growth from 2019. Asia continued to dominate world aquaculture, producing over 90 percent of the total.

The contribution of aquaculture to the global production of aquatic animals reached a record 49.2 percent in 2020. Aquaculture of fed aquatic animals continues to outpace that of non-fed aquatic animals. Despite the great diversity in farmed aquatic species, only a small number of “staple” species dominate aquaculture production, particularly grass carp for global inland aquaculture and Atlantic salmon for marine aquaculture.



**FIGURE 13** WORLD AQUACULTURE PRODUCTION, 1991–2020

NOTES: Data exclude shells and pearls. Data expressed in live weight equivalent.

SOURCE: FAO.

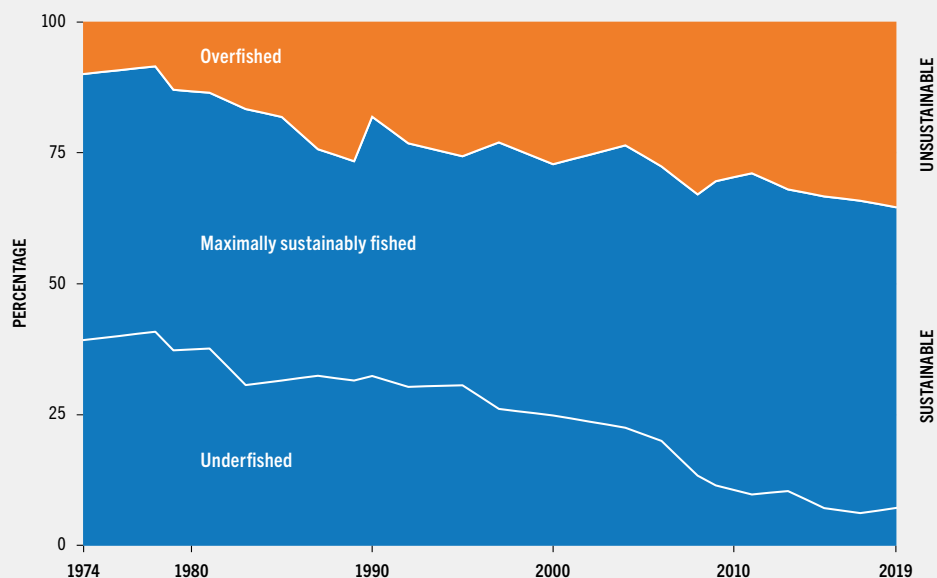
## THE STATUS OF FISHERY RESOURCES

**FAO continues to report on the status of fishery resources. The Organization's long-term monitoring of assessed marine fishery stocks confirms that marine fishery resources have continued to decline.** The fraction of fishery stocks within biologically sustainable levels decreased from 90 percent in 1974 to 64.6 percent in 2019, with maximally sustainably fished stocks at 57.3 percent and underfished stocks at 7.2 percent (Figure 23).

Nevertheless, despite worsening trends by number, in 2019, biologically

sustainable stocks accounted for 82.5 percent of the landings of aquatic products, a 3.8 percent increase from 2017. For example, on average, 66.7 percent of the stocks of the ten species most landed in 2019 were fished within biologically sustainable levels in 2019, slightly higher than in 2017. This demonstrates that larger stocks are managed more effectively.

Rebuilding overfished stocks could increase marine capture fisheries production by 16.5 million tonnes and thus contribute to the food security, nutrition, economies and well-being of

**FIGURE 23** GLOBAL TRENDS IN THE STATE OF THE WORLD'S MARINE FISHERY STOCKS, 1974–2019

SOURCE: FAO.

coastal communities. Scientifically assessed and intensively managed stocks have, on average, seen increased abundance at proposed target levels; in contrast, regions with less developed fisheries management have much greater harvest rates and lower abundance. This highlights the urgent need to replicate and re-adapt successful policies and regulations in fisheries that are not managed sustainably, and implement innovative, ecosystem-based mechanisms that promote sustainable use and conservation around the world.

Many of the important inland fisheries lie within least developed and developing countries, where limited human and financial resources to monitor and manage such fisheries represent a major obstacle. In 2016, FAO began developing a global threat map for inland fisheries to provide a baseline metric to track changes in major basins and improve inland fisheries. Preliminary results indicate that across all major basins, 55 percent of inland fisheries are under moderate pressure and 17 percent under high pressure.

## FISHING FLEET

The total number of fishing vessels in 2020 was estimated at 4.1 million, a reduction of 10 percent since 2015, reflecting efforts by many countries, in particular China and European countries, to reduce the global fleet size. Asia still has the largest fishing fleet, at about two-thirds of the global total. The global total of motorized vessels has remained steady at 2.5 million vessels, with Asia having almost 75 percent; about 97 percent of the world's non-motorized vessels are spread between Asia and Africa.

## EMPLOYMENT IN FISHERIES AND AQUACULTURE

An estimated 58.5 million were engaged in the primary production sector as full-time or part-time workers. Some 35 percent were employed in aquaculture, a figure which has flattened in recent years, while the global number of fishers has contracted. In 2020, 84 percent of all fishers and fish farmers were in Asia (Table 12). Overall, women accounted for 21 percent of those engaged in the primary sector (28 percent in aquaculture and 18 percent in fisheries), but they tend to have more unstable employment in aquaculture and fisheries, representing only 15 percent of full-time workers in 2020. However, when considering the available data for the processing sector only, women accounted for just over 50 percent of full-time employment and 71 percent of part-time engagement.

## UTILIZATION AND PROCESSING OF FISHERIES AND AQUACULTURE PRODUCTION

Utilization and processing of fisheries and aquaculture production have changed considerably in past decades. In 2020, 89 percent (157 million tonnes) of world production (excluding algae) was used for direct human consumption, compared with 67 percent in the 1960s. The remainder (over 20 million tonnes) was used for non-food purposes – the vast majority for fishmeal and fish oil. Live, fresh or chilled forms still represented the largest share of aquatic food (excluding algae) for direct human consumption, followed by frozen, prepared, and preserved and cured. In Asia and Africa, the share of aquatic food production preserved by salting, smoking, fermentation or drying is higher than the world average. A growing share of by-products is used for food and non-food purposes. For example, over 27 percent of the global production of fishmeal and 48 percent of the total production of fish oil were obtained from by-products.

## CONSUMPTION OF AQUATIC FOODS

Global consumption of aquatic foods (excluding algae) increased at an average annual rate of 3.0 percent from 1961 to 2019, a rate almost twice that of annual world population growth (1.6 percent) for the same period, with annual per capita consumption reaching a record high of 20.5 kg in 2019.

**TABLE 12** WORLD EMPLOYMENT FOR FISHERS AND FISH FARMERS BY REGION FOR SELECTED YEARS, 1995–2020

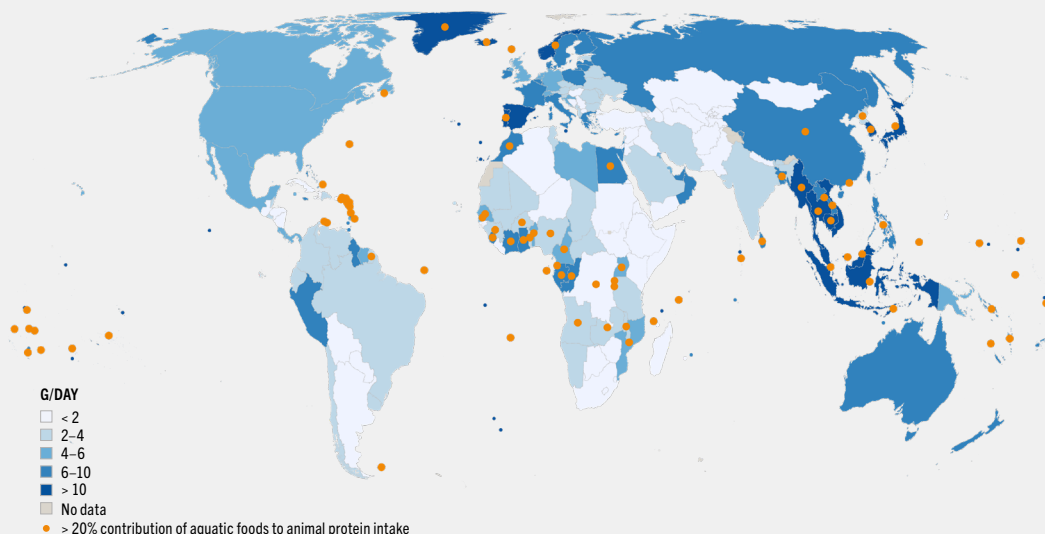
	1995	2000	2005	2010	2015	2020
(thousands)						
Fisheries and aquaculture						
Africa	2 812	3 589	4 159	5 032	5 562	5 641
Americas	2 072	1 905	1 978	2 321	2 501	2 621
Asia	31 632	41 265	45 693	50 401	52 079	49 425
Europe	476	514	463	426	375	388
Oceania	466	475	478	482	481	474
Total	37 456	47 748	52 770	58 662	60 999	58 549
Fisheries						
Africa	2 743	3 395	3 906	4 671	5 057	5 007
Americas	1 793	1 605	1 679	1 981	2 156	2 015
Asia	24 205	28 335	30 476	31 994	31 833	30 102
Europe	378	418	380	333	286	294
Oceania	460	465	469	473	471	464
Total	29 579	34 219	36 909	39 452	39 803	37 882
Aquaculture						
Africa	69	194	252	361	505	634
Americas	279	301	299	340	345	606
Asia	7 426	12 930	15 217	18 407	20 246	19 323
Europe	98	96	83	93	89	94
Oceania	6	9	9	9	10	10
Total	7 878	13 529	15 861	19 211	21 195	20 667

SOURCE: FAO.

Preliminary estimates point to a lower consumption in 2020 due to a COVID-19-driven contraction of demand, followed by a slight increase in 2021. Despite a few exceptions, most countries saw a rise in their per capita aquatic food consumption between 1961 and 2019, with upper-middle-income countries experiencing the strongest annual

growth. Globally in 2019, aquatic foods provided about 17 percent of animal proteins and 7 percent of all proteins. For 3.3 billion people, aquatic foods provide at least 20 percent of the average per capita intake of animal protein ([Figure 43](#)). In Cambodia, Sierra Leone, Bangladesh, Indonesia, Ghana, Mozambique and some small island developing States, aquatic

**FIGURE 43** CONTRIBUTION OF AQUATIC FOODS TO ANIMAL PROTEIN SUPPLY PER CAPITA, AVERAGE 2017–2019



The designations employed and the presentation of material on this map do not imply the expression of any opinion whatsoever on the part of FAO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties. Final boundary between the Republic of Sudan and the Republic of South Sudan has not yet been determined. Final status of the Abyei area is not yet determined. A dispute exists between the Governments of Argentina and the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Malvinas).

SOURCE: FAO.

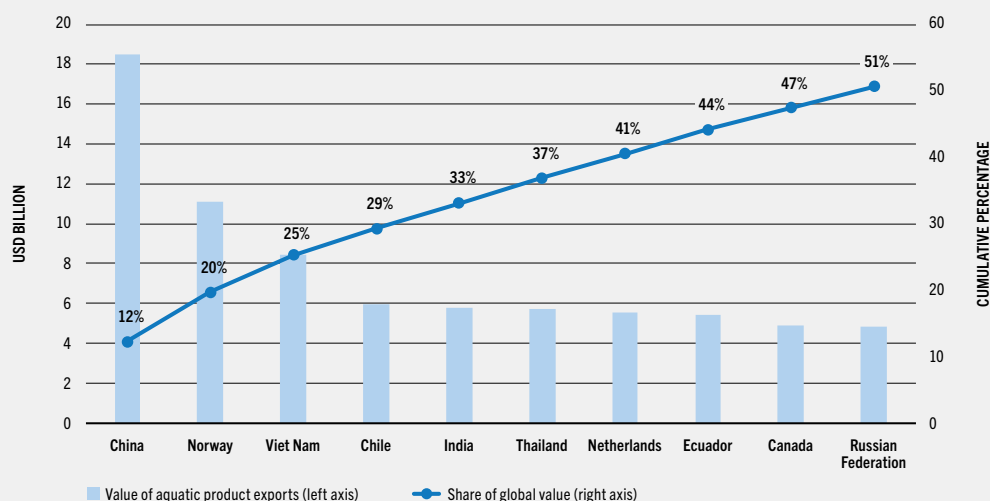
foods contribute half or more of total animal protein intake.

## TRADE OF FISHERIES AND AQUACULTURE PRODUCTS

**International trade of fisheries and aquaculture products has grown significantly in recent decades, expanding over continents and regions.** In 2020, world exports of aquatic products, excluding algae, were worth

USD 151 billion – a 7 percent decline from the 2018 record high of USD 165 billion. The value of traded aquatic products accounted for 11 percent of total agricultural trade (excluding forestry) and about 1 percent of total merchandise trade in 2020. These shares are much higher in many countries, exceeding 40 percent of the total value of merchandise trade in Cabo Verde, Iceland, Kiribati and Maldives, for example.



**FIGURE 52** TOP TEN EXPORTING COUNTRIES OF AQUATIC PRODUCTS BY VALUE, 2020

NOTE: Excluding aquatic mammals, reptiles, amphibians, turtles, algae, sponges and corals.

SOURCE: FAO.

From 1976 to 2020, the value of trade in aquatic products increased at an average annual rate of 6.9 percent in nominal terms and 3.9 percent in real terms (adjusted for inflation). The faster rate of growth in value relative to quantity reflects the increasing proportion of trade in high-value species and products undergoing processing or other forms of value addition.

China remains the world's largest exporter of aquatic animal products, followed by Norway and Viet Nam (Figure 52), with the European Union the largest single importing market. The largest importing countries are the United States of America, followed by China and Japan. In terms of volume, China is the top importing country of species not only for domestic consumption but also as raw material to be processed in China and then re-exported. ■



#### **CÔTE D'IVOIRE**

Feeding tilapias on a farm in Padlegnan, a village included in the FISH4ACP project.  
©FAO/Sia Kambou

## PART 2

# TOWARDS BLUE TRANSFORMATION

### BLUE TRANSFORMATION: A VISION FOR TRANSFORMING AQUATIC FOOD SYSTEMS

The current Decade of Action to deliver the Global Goals<sup>3</sup> must accelerate actions to address food security while preserving our natural resources.

Aquatic foods can provide a larger proportion of humanity's nutritious food requirements. Blue Transformation is a vision for sustainably transforming aquatic food systems, a recognized solution for food and nutrition security and environmental and social well-being, by preserving aquatic ecosystem health, reducing pollution, protecting biodiversity and promoting social equality.

Blue Transformation focuses on sustainable aquaculture expansion and intensification, effective management of all fisheries, and upgraded value chains. This requires holistic and adaptive approaches that consider the complex interaction in agrifood systems and support multi-stakeholder interventions using existing and emerging knowledge, tools and practices to secure and maximize the contribution of aquatic food systems to global food security and nutrition.

<sup>3</sup> In 2019, the United Nations Secretary-General called for a decade of ambitious action to deliver the Sustainable Development Goals by 2030: the Decade of Action to deliver the Global Goals.

### INTENSIFYING AND EXPANDING SUSTAINABLE AQUACULTURE PRODUCTION

By 2030, aquatic food production is forecast to increase by a further 15 percent, mainly by intensifying and expanding sustainable aquaculture production. Such growth must preserve aquatic ecosystem health, prevent pollution, and protect biodiversity and social equality. Blue Transformation aims to: (i) increase the development and adoption of sustainable aquaculture practices; (ii) integrate aquaculture into national, regional and global development strategies and food policies; (iii) expand and intensify aquaculture production to meet the growing demand for aquatic food and enhance inclusive livelihoods; and (iv) improve capacities at all levels to develop and adopt innovative technology and management practices for a more efficient and resilient aquaculture industry.

Fundamental barriers facing aquaculture production systems, governance, investment, innovations and capacity building must be addressed. Focus priority areas for innovative aquaculture practices are aquafeeds and feeding, digitalization, and the promotion of efficient and pro-environment practices.

Implementing these solutions requires adequate capacity and skills, training, research and partnerships, and can benefit from developments in information and communications technology and the wider access to mobile applications and platforms.

Good governance, based on sound and enforceable legal and institutional frameworks, is fundamental to create an enabling environment to attract investment in aquaculture expansion. A balanced mix of finance and insurance services is needed at all scales to improve infrastructure and support technological innovations and mechanisms, such as carbon or nitrogen credits and blue bonds to reward blue investment for environmental benefits and ecosystem services.

## IMPROVING FISHERIES MANAGEMENT

**Effective management of all fisheries is a core objective of Blue Transformation. Improving fisheries management is essential to rebuild fishery stocks, increase catches and restore ecosystems to a healthy and productive state while managing exploited resources within ecosystem boundaries.**

International instruments such as the United Nations Convention on the Law of the Sea, the Code of Conduct for Responsible Fisheries and related implementation tools, should guide governance and policy reform worldwide. Intergovernmental organizations (IGOs), non-governmental

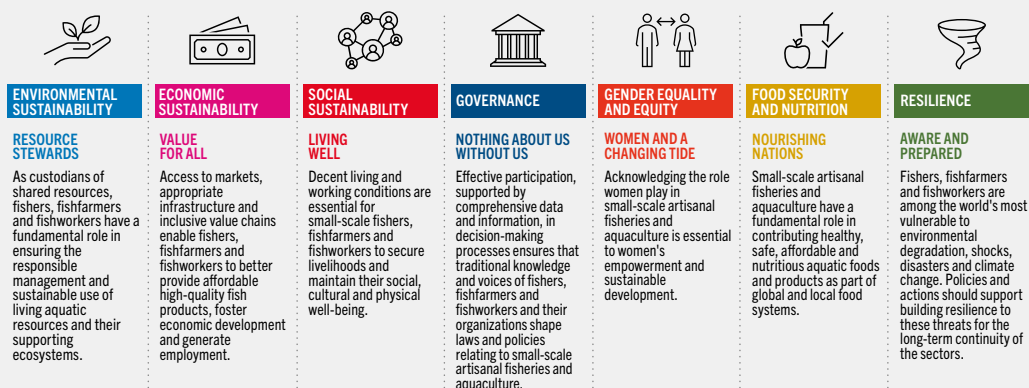
organizations (NGOs) and the private sector should intensify cross-sectoral collaboration and cooperation arrangements to further strengthen their complementary roles in addressing local, national and regional fisheries management issues.

Effective management should adopt the ecosystem approach to fisheries with due consideration of tenure, rights and co-management, taking into account the benefits and trade-offs of environmental, social and economic objectives of fishery resources and aquatic ecosystems. Through co-management mechanisms, relevant stakeholders should be involved in decision-making, supported by effective monitoring, control and surveillance (MCS), increased information exchange, enforcement and strengthened coordination.

Technological advances are instrumental for effective implementation of conservation and management measures, by improving data collection, analysis and dissemination, MCS, efficiency, environmental protection and safety at sea. Social protection programmes positively impact resource conservation and the protection of livelihoods.

Developing – especially least developed – countries have limited technical and institutional capacities to ensure effective fisheries management. They require tailored capacity development initiatives with approaches adapted to their financial and human capacity constraints.



**FIGURE 58** KEY MESSAGES OF IYFA 2022

SOURCE: FAO. 2021. *International Year of Artisanal Fisheries and Aquaculture 2022 Global Action Plan*. Rome.  
[www.fao.org/3/cb4875en/cb4875en.pdf](http://www.fao.org/3/cb4875en/cb4875en.pdf)

## INNOVATING FISHERIES AND AQUACULTURE VALUE CHAINS

Aquaculture expansion and effective fisheries management depend on innovating fisheries and aquaculture value chains, which in turn need public and private partnerships to support new technologies, increase availability of aquatic foods, enhance consumer awareness of their benefits, reduce food loss and waste (FLW), and improve access to lucrative markets. Reducing FLW entails the implementation of multidimensional actions integrating governance, technology, skills and knowledge, services and infrastructure, and market linkages. Access to lucrative markets requires the capacity to respond to market requirements, in particular the non-tariff measures addressing

consumer, environmental and social protection and using transparent and reliable traceability systems.

## THE INTERNATIONAL YEAR OF ARTISANAL FISHERIES AND AQUACULTURE 2022

IYFA 2022 was declared by the United Nations General Assembly to enhance global awareness and understanding of small-scale artisanal fisheries and aquaculture; foster action to support its contribution to sustainable development; and promote dialogue and collaboration between and among actors and partners, engaging key public and private stakeholders to address challenges and opportunities for small-scale fisheries and aquaculture to contribute to achieving the Sustainable Development Goals (SDGs) (Figure 58). ■



## PART 3

# BLUE TRANSFORMATION TO ACHIEVE THE 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT

### DECADE OF ACTION TO DELIVER THE GLOBAL GOALS

**With less than eight years to 2030, the world is not on track to end hunger and malnutrition and achieve the SDGs.** The COVID-19 pandemic reversed previously favourable trends. In line with the 2030 Agenda for Sustainable Development, the Decade of Action to deliver the Global Goals intends to strengthen the strategies of countries, IGOs, NGOs and civil society organizations to promote a fair, prosperous and sustainable world.

Fisheries and aquaculture contribute to most SDGs, in particular, SDG 14 (Life below water), which is dedicated to the ocean and its marine resources. FAO, as custodian of four SDG indicators that concern the sustainable use of marine living resources, is leveraging and adapting existing global monitoring and reporting mechanisms to integrate national data. SDG Indicators 14.6.1 and 14.b.1 now reveal encouraging trends regarding levels of policy implementation. Recent and upcoming methodology enhancements are designed to address limited national capacities in many developing countries to measure the sustainability of marine fishery stocks (SDG Indicator 14.4.1), and to allow

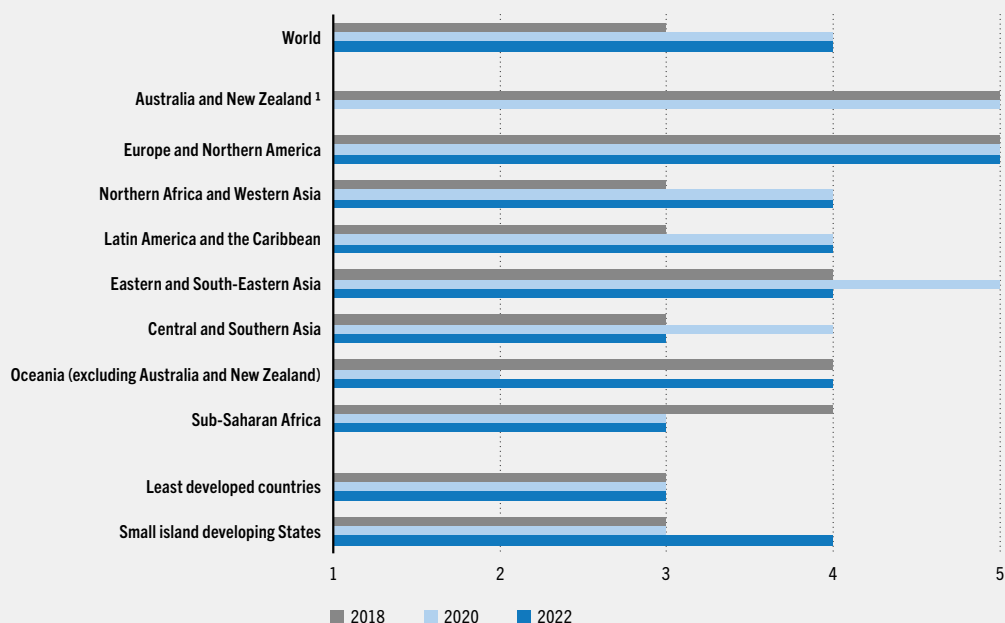
countries to better understand the importance of sustainable fisheries for their national economies (SDG Indicator 14.7.1). With regard to ocean environmental status (SDG Targets 14.1, 14.3 and 14.5), while some indicators reveal worsening trends and accelerating rates of pollution, there is clear progress and a strong political will to enact national legislation on protection of marine environments (Figure 61).

Reporting the true contribution of fisheries and aquaculture to the 2030 Agenda is still hampered because the SDG 14 indicators cover mostly marine capture fisheries; the contribution of aquaculture has not always been clearly identified or communicated, and the contribution of inland fisheries and aquaculture to food and nutrition is absent from current SDG texts.

### UNITED NATIONS DECADE OF OCEAN SCIENCE FOR SUSTAINABLE DEVELOPMENT (2021–2030)

The United Nations Decade of Ocean Science for Sustainable Development (UNDOSSD) recognizes that a strong science-policy interface is crucial to design sustainable

**FIGURE 61** PROGRESS IN THE DEGREE OF IMPLEMENTATION OF INTERNATIONAL INSTRUMENTS AIMED AT COMBATING IUU FISHING BY REGION, 2018–2022 (SDG INDICATOR 14.6.1)



<sup>1</sup> Insufficient reporting States to create an aggregated score for this regional grouping in 2022.

NOTE: The chart shows the average level of implementation of the indicator by countries within each grouping, from the lowest level (1) to the highest level (5).

SOURCE: FAO.

**solutions** and ultimately enshrine decisions, agreements and actions in the best available evidence. The UNDOSSD Implementation Plan, a highly participatory and inclusive process, builds on existing achievements to deliver across geographies, sectors, disciplines and generations, address ten priority challenges and unite the Decade

partners in collective action. To address the challenges relevant to fisheries and aquaculture, they seek to generate knowledge, support innovation, address inequalities in ocean science capacity and develop solutions to optimize the role of the ocean in food security under changing environmental, social and climate conditions.

## UNITED NATIONS DECADE ON ECOSYSTEM RESTORATION

**The United Nations Decade on Ecosystem Restoration, co-led by FAO and the United Nations Environment Programme, calls for the global revival of ecosystems and their services by restoring habitats and species to ensure productive and resilient social-environmental systems in the face of ongoing and future challenges.**

Restoring inland, coastal and marine ecosystems requires adequate governance and support to incorporate conservation and sustainable production actions by multiple actors, sectors and jurisdictions. The Decade represents an opportunity to build networks and partnerships across the globe, strengthening the restoration–science–policy nexus.

Restoring fisheries productivity requires the rehabilitation of mangrove forests, seagrass meadows and reefs, watersheds and wetlands, and effective management to rebuild fishery stocks and reduce adverse impacts of fishing

on ecosystems. Actions in aquaculture aim to restore ecosystem structure and function to support food provisioning, while minimizing pollution, invasive alien species, waste and the emergence of diseases.

The Post-2020 Global Biodiversity Framework faces three important challenges: (i) to broaden its adoption and delivery outside the conservation community, widening ownership of challenges and solutions for biodiversity; (ii) to match resources for implementation of change to the ambition of its tasks; and (iii) to engage in a dynamic process that can be well measured and communicated.

To integrate these challenges into their plans of action, stakeholders must support strengthening the nexus between biodiversity restoration, economic benefit and livelihoods. Other actions aim at optimizing sustainable biodiversity use by addressing risks and mitigation associated with farmed aquatic diversity, reducing bycatch and the pollution caused by abandoned, lost and discarded fishing gear, and using selective fishing technology. ■

## PART 4

# EMERGING ISSUES AND OUTLOOK

### COVID-19, A CRISIS LIKE NO OTHER

**Since March 2020, the COVID-19 pandemic has swept through continents and countries causing unprecedented health, social and economic damage, including to fisheries and aquaculture.**

Worldwide, COVID-19 entailed lockdowns and closures of markets, ports and borders, causing disruption in aquatic food production and distribution and loss of employment and livelihoods (Figure 67).

Fishing was disrupted and aquaculture struggled to maintain its planned production cycles. Supply chains dominated by small and medium enterprises were particularly vulnerable to COVID-19 restrictions. Vulnerable and marginalized people were disproportionately affected, with women enduring greater employment declines and loss of household livelihoods. Recovery was gradual by diversifying household income with other agricultural activities, streamlining business costs, targeting local markets and embracing online marketing and direct delivery.

Governments adopted diverse and complex support measures, depending on national priorities, capacity and resources. Countries with functioning

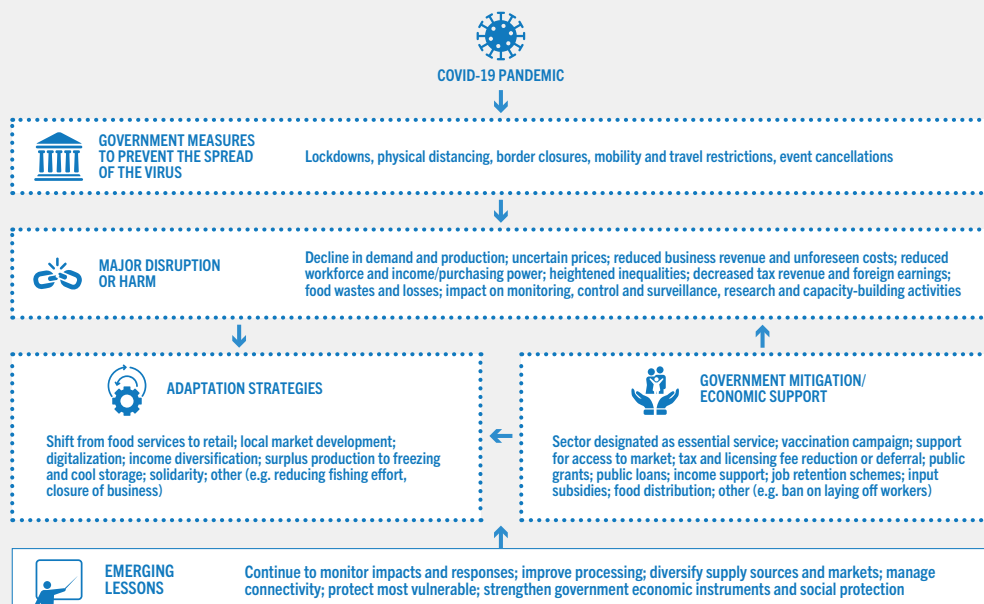
social protection systems responded more efficiently to mitigate the impacts of the pandemic. Unfortunately, informal workers, numerous in the fisheries and aquaculture sectors, were often excluded.

The pandemic exposed the interconnectivity of markets and supply chains and the need for inclusive and shock-responsive national social protection systems. On the positive side, the crisis accelerated digitalization, and encouraged e-monitoring and enforcement, the use of green energy and clean technologies and the development of local production and markets.

### FISHERIES AND AQUACULTURE ADAPTATIONS TO CLIMATE CHANGE

**Increased warming has caused irreversible changes requiring urgent ocean-based action to strengthen and accelerate climate mitigation and adaptation measures, increasing the urgency of fisheries and aquaculture adaptations to climate change.** This calls for the explicit consideration of climate stressors in fisheries and aquaculture management by connecting adaptation plans and management or development actions, including local and context-specific indicators associated with climate stressors of fisheries and aquaculture.

**FIGURE 67** EXAMPLES OF DISRUPTIONS, ADAPTATION AND MITIGATION STRATEGIES, AND LESSONS EMERGING FROM THE COVID-19 CRISIS

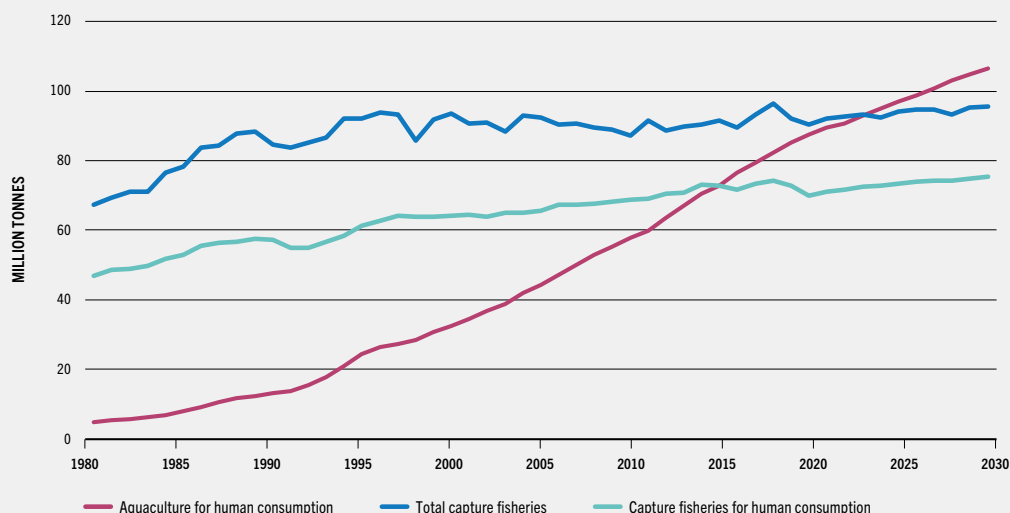


SOURCE: FAO.

Transformative adaptation plans are required at national and local levels, using an inclusive and participatory approach and considering the needs and benefits of small-scale fisheries and aquaculture. These plans would benefit from adopting climate-informed spatial management approaches, integrating equity and human rights considerations and investing in innovation.

At the twenty-sixth session of the Conference of the Parties to the United Nations Framework Convention on Climate Change in Glasgow (COP26), the key role of oceans was strengthened, opening opportunities for fisheries and aquaculture to expand its contribution to global efforts, sharing adaptation and mitigation solutions, and raising the profile of inland fisheries and aquaculture within the international climate discussions.



**FIGURE 71** WORLD CAPTURE FISHERIES AND AQUACULTURE PRODUCTION, 1980–2030

NOTES: Excluding aquatic mammals, crocodiles, alligators, caimans and algae. Data expressed in live weight equivalent.  
SOURCE: FAO.

## ADVANCING TOWARDS GENDER EQUALITY IN FISHERIES AND AQUACULTURE

**Gender equality in fisheries and aquaculture is fundamental for sustainability and inclusiveness.** Despite their significant role in the sector, women are mostly engaged in the informal, lowest paid, least stable and least skilled segments of the workforce. Because of social, cultural and economic contexts, they often face

gender-based constraints that prevent them from fully realizing and benefiting from their roles in the sector. This is further complicated by limited access to information, services, infrastructure, markets, social protection and decent employment, decision-making and leadership positions.

The FAO Policy on Gender Equality guided the adoption of key FAO instruments and ways to promote gender transformative approaches.

## FISHERIES AND AQUACULTURE PROJECTIONS

**FAO fisheries and aquaculture projections to 2030 point to an increase in production, consumption and trade, albeit at slower growth rates.** Total production of aquatic animals is expected to reach 202 million tonnes in 2030, with the main increase coming from aquaculture, contributing 106 million tonnes in 2030 (Figure 71). World capture fisheries is projected to increase to reach 96 million tonnes, as a result of recovering stocks of certain species owing to improved resource management, growth in catches of underfished resources, and reduced discards, waste and losses.

In 2030, 90 percent of all aquatic animal production will be for human consumption, an overall increase of 15 percent compared with 2020. This means annual per capita consumption will increase from 20.2 kg in 2020 to 21.4 kg in 2030. Aquatic food supply will

increase in all regions, while per capita consumption is expected to decline slightly in Africa, raising concerns in terms of food security.

Trade in aquatic products will continue to expand, but at a slower pace than in the previous decade, reflecting the slowdown in production growth, higher prices restraining overall demand and consumption, and stronger domestic demand in some of the major producing and exporting countries, such as China. A stable share (36 percent) of total production will be exported in 2030 with an increasing contribution from aquaculture.

Prices of internationally traded aquatic products are estimated to increase by 33 percent in nominal terms in 2030. This increase will be driven by improved incomes, population growth, strong demand, reduced supply and increased production cost pressure from inputs such as feed, energy and fish oil. ■





# 2022 THE STATE OF WORLD FISHERIES AND AQUACULTURE

## TOWARDS BLUE TRANSFORMATION

The 2022 edition of *The State of World Fisheries and Aquaculture* coincides with the launch of the Decade of Action to deliver the Global Goals, the United Nations Decade of Ocean Science for Sustainable Development and the United Nations Decade on Ecosystem Restoration. It presents how these and other equally important United Nations events, such as the International Year of Artisanal Fisheries and Aquaculture (IYAFA 2022), are being integrated and supported through Blue Transformation, a priority area of FAO's new Strategic Framework 2022–2031 designed to accelerate achievement of the 2030 Agenda for Sustainable Development in food and agriculture.

The concept of Blue Transformation emerged from the Thirty-fourth Session of the FAO Committee on Fisheries in February 2021, and in particular the Declaration for Sustainable Fisheries and Aquaculture, which was negotiated and endorsed by all FAO Members. The Declaration calls for support for “an evolving and positive vision for fisheries and aquaculture in the twenty-first century, where the sector is fully recognized for its contribution to fighting poverty, hunger and malnutrition.” In this context, Part 1 of this edition of *The State of World Fisheries and Aquaculture* reviews the world status of fisheries and aquaculture, while Parts 2 and 3 are devoted to Blue Transformation and its pillars on intensifying and expanding aquaculture, improving fisheries management and innovating fisheries and aquaculture value chains. Blue Transformation emphasizes the need for forward-looking and bold actions to be launched or accelerated in coming years to achieve the objectives of the Declaration and in support of the 2030 Agenda. Part 4 covers current and high-impact emerging issues – COVID-19, climate change and gender equality – that require thorough consideration for transformative steps and preparedness to secure sustainable, efficient and equitable fisheries and aquaculture, and finally draws some outlook on future trends based on projections.

*The State of World Fisheries and Aquaculture* aims to provide objective, reliable and up-to-date information to a wide audience – policymakers, managers, scientists, stakeholders and indeed everyone interested in the fisheries and aquaculture sector.



*The State of World Fisheries  
and Aquaculture 2022 (full text)*



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