INFOFISH speaks to.....

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***Q:** Since time immemorial, aquatic foods have always contributed to the food security of communities, but it is only in the last few decades that the pressure has mounted on the sector due to challenges such as population growth, persistent malnutrition, unregulated economic development and degradation of the land and oceans. Setting the scene in this first question, we'd like to hear your thoughts on how sustainable aquatic food systems can more effectively contribute to better nutrition, enhanced livelihoods, stronger social protection and a healthier environment.*

A: Aquatic foods have been part of the human diet for 2 million years and we have cultured (not just harvested) them for at least 2 000 years. But wide production and consumption started much later. In 1950, for example, global fisheries and aquaculture production was a mere 16 million tonnes, providing 2.5 billion humans with 6.5 kg of aquatic foods per person and year. Population growth, economic development – and its associated nutritional improvements – and the emergence of large aquaculture industries have resulted in 165 million tonnes of aquatic foods being produced in 2022, bringing almost 21 kg of top food to every one of the 8 billion of us. But the growing importance of aquatic foods goes beyond their protein content. They are rich sources of vitamins, minerals and omega-3 fatty acids. A recent FAO/WHO Expert Consultation on the Risks and Benefits of Fish Consumption concluded that consuming fish benefits all human life stages. With 3 600 species consumed, of which 700 are farmed, the diversity of aquatic foods provides a safety net against over-reliance on a few staple diets and their associated risks. When produced sustainably and consumed responsibly, aquatic foods are a key component of a food systems approach to ending hunger and malnutrition.

***Q:** The last edition of FAO's flagship publication The State of World Fisheries and Aquaculture (SOFIA 2022) mentioned that about 90 percent of farmed fishery products originate from Asia, where in some cases, there appears to be cause for concern regarding the environmental impact of aquaculture. What causes this global imbalance, is this growth sustainable, and what are some ways in which environmental sustainability can be addressed, both together with FAO and with regional partners?*

A: Aquaculture has been the fastest-growing food production sector for several decades, growing at over 5% per year since the turn of the century. In 2022 it overtook capture fisheries as the leading source of aquatic animal production. However, this growth has not been homogeneous. Asia contributes almost 90% of the aquaculture production of aquatic animals, while Africa contributes less than 2.5%. This is problematic because Africa, for example, already a net importer of aquatic foods, is the only continent expected to experience a decline in per capita consumption of aquatic foods by the end of the decade, as production is unlikely to keep up with population growth. The good news is that African (and Latin American) animal aquaculture production has been growing at 8 percent per year since the turn of the century, tapping into technologies and practices developed in Asia. This is a trend that is likely to continue as aquaculture expands, not just to meet nutritional needs but also to drive employment and economic development. Today, the farm-gate value of aquaculture exceeds USD310 billion, increasingly shared by more producers. Sustaining this growth comes with challenges: controlling disease emergence and spread, regulating antimicrobial use, improving feed and genetic selection, avoiding habitat destruction and wild biodiversity impacts, among others. All food systems have trade-offs, but our collective mandate is clear: to nourish 10 billion people while minimizing harm. There are no silver bullets in the fight against hunger, only context-specific solutions, grounded in sustainability, responsibility and innovation.

***Q:** Asia also produces almost two-thirds of total inland fisheries production (followed by Africa) where the sector represents a very important source of animal protein for communities with little or poor access to marine species. However, the contribution of inland fisheries to food security and livelihoods is often under-recognized in national plans of action as compared to marine fisheries. Could you elaborate on how FAO is assisting developing countries to sustainably manage their inland fisheries activities?*

A: You are correct. Inland fisheries may not be by volume as high as marine catches, but they are predominantly small-scale and contribute disproportionally to the daily consumption of aquatic foods in many developing countries. Their catches are often very diverse, but face complex management challenges, including shared governance across borders in lakes and rivers, and competition over water use. To support sector sustainability, FAO assists member countries through ecosystem-based and Integrated Water Management approaches. This includes policy support, data collection, community empowerment, and the development of guidelines for sustainable fisheries. Two examples to illustrate this work:

In Cambodia, FAO supports a large number of Community Fisheries initiatives (CFi) and Coastal Fisheries initiatives (CFIs), empowering local

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fishers to co-manage resources, including in Tonle Sap Lake, one of the world's most productive inland fisheries. These efforts have resulted in improved fish stocks, better livelihoods, and enhanced food security.

https://www.khmertimeskh.com/501517105/capfish-capture-projects-drive-for-sustainable-development/.

In Indonesia, inland fisheries support millions of livelihoods and are highly biodiverse, but freshwater ecosystems face serious threats due to overexploitation and environmental degradation. In partnership with the Ministry of Marine Affairs and Fisheries (MMAF), we have helped develop 15 national and regional policies, governing more than 11 800 square kilometers of critical freshwater ecosystems across Java, Kalimantan, and Sumatra. Our efforts include community-based management models, multi-sectoral governance approaches, and pioneering Indonesia's first sustainable fish passage in West Java, to protect migratory fish species from extinction risks.

https://www.fao.org/indonesia/news/detail/ifish—transforming-indonesia-s-inland-fisheries-towards-sustainability/en.

Top: Releasing eels in the Cijalu river under the FAO-MMAF IFish project in Cilacap (West Java), Indonesia; Bottom: Women trained under the IFish initiative champion the ethos of "No Eel Goes to Waste." The project's objective is to strengthen the management framework for the sustainable use of inland aquatic biodiversity to increase the protection of high conservation-value freshwater ecosystems and their biodiversity in Indonesia.

***Q:** Although increasing volumes of fish and fishery products are entering international trade through fisheries and aquaculture, has the global industry been equally successful in meeting the food security and nutrition needs of populations in lower-income nations? Some three billion people are estimated to be unable to afford healthy diets, according to SOFIA 2022. Specifically, how can fish be incorporated into national strategies aimed at reducing micronutrient deficiency?*

A: Since 1960 the volume of aquatic food products has increased at twice the rate of population growth, thus making net contributions to nutritional improvements not just globally, but in all regions of the world. Furthermore, the trade share in aquatic products for developing countries has increased from 38% in 1976 to 54% in 2019. Thus, while it is true that developed markets still dominate fish imports, the importance of developing countries as consumers and producers has been steadily increasing. There are examples of developing countries that export high-value fish and import lower-value species, for double benefits. For example, Nigeria exports high-value species such as shrimp and imports species of lower-value such as herring, mackerel and even fish heads. Trading in fish can also help nutritional outcomes in the countries of origin.

In many countries, aquatic animal-sourced foods are also the most affordable sources of food. Small fish can be dried using simple technologies, allowing them to be distributed over greater distances as well as incorporated into, for example, school feeding programmes. FAO has been piloting such programmes in Malawi, Ghana, Botswana, Angola, Honduras and Peru.

It is important to ensure countries recognize aquatic foods in their national food security and nutrition strategies. It has been estimated that only half of the countries with such strategies explicitly include aquatic foods in them. The attention that UN Nutrition or the UN Food Systems Summits are paying to aquatic foods, as a way to reduce micronutrient deficiencies in developing countries, must succeed.

***Q:** On the theme of the blue food economy, how can we build a value chain that can deliver safe and nutritious foods from a healthy ocean to meet the dietary needs of people?*

A: With over 700 million people suffering from hunger and almost 3 billion unable to afford a healthy diet, developing safe and nutritious value chains is not an option. An efficient and effective aquatic food value chain starts with safe production and ends with the consumption of safe aquatic food. Practices along the value chain should follow science-based criteria and risk management measures to ensure people's demand for safe diets is met. FAO supports countries by conducting value chain analysis, and developing targeted improvement plans. We also provide scientific advice to the Codex Alimentarius Commission, and support member countries in setting food safety standards. As aquaculture supply continues to grow, FAO focus areas are expertise in aquaculture biosecurity, feed, and special planning. The "One Health" approach is relevant to aquatic food system transformation for the health of people, animals and the environment.

An example is our support for the Gambia's oyster sector. By transitioning to modern oyster farming, stakeholders are now producing larger oysters and tapping into the lucrative fresh oyster market.

***Q:** With regard to climate change, the Intergovernmental Panel on Climate Change (IPCC) has forecasted that mean sea surface temperatures will increase by between 0.33°C and 1.29°C by 2050. This will, among others, cause an overall decrease in the abundance of fish stocks and the geographical distribution of species boundaries. Would you agree with the statement that the global fisheries industry in general is not ready to*

meet these predicted challenges? To what extent is FAO able to influence global dialogue on addressing the gaps, particularly as specific fisheries will require specific policy responses?

A: Climate change is without a doubt one of the most evident disruptors that will affect all aspects of fisheries, from research and management to fisheries operations. Some mobile species will change distributions, and this will cause conflict even between countries that historically cooperated closely. It has been estimated that many of the world's EEZs are likely to receive one to five new, climate-driven transboundary stocks by the end of the century. Climate change has also estimated to reduce marine fishable biomass on average between 7 percent and 21 percent globally, depending on emissions, by the end of the century, and in over 48 countries and territories by over 30 percent. There are a lot of uncertainties in these predictions, but there is no doubt we are not ready to face these challenges. FAO is working on three fronts. First, bring forward the best evidence for action at relevant scales; Second, developing adaptation strategies focused on institutional adaptations, livelihood adaptations and risk management; and third, implementing projects on the ground to assist countries prepare and adapt, though these programmes are still few and far between. Our message is very clear: the ocean is not just a sink of CO_2 and heat, it is where hundreds of millions of people obtain their food and livelihood. They are at risk too.

***Q:** Another negative aspect of climate change has been the rise in the frequency and severity of weather events at sea. How is FAO is working to enhance the safety and productivity of fishers at sea, particularly the small-scale sector?*

FAO has designed safer, stronger, better fishing boats

A: Climate change is affecting water temperatures, wind patterns, ocean currents, and increasing storm frequency and intensity. These changes worsen working conditions and raise the risk of accidents and deaths at sea, which already cause an estimated 30 000 deaths a year. FAO works to improve safety at sea: we have a programme of trainers, available in 15 languages, on safety at sea, which delivers safety training in many regions including Grenada, Nicaragua, Philippines and Sri Lanka. We have also developed an e-learning course on "rules of the road for small- scale fisheries" available on the FAO Academy: https://elearning.fao.org/course/view.php?id=704. We collaborate with ILO and IMO in the development of safety codes, fishing vessels construction standards, and safety guides for fishing crew; and with WHO on drowning prevention. Together with Lloyds Register Foundation and others, we are building a Global Safety roadmap. Some field projects support safer fishing vessels designs, promoting a shift from wooden to unsinkable, damage-resistant plastic hulls. Our Fishing Vessel Design Database provides technical drawings and manuals to help build small-scale fishing boats worldwide .

Finally, our Blue Ports initiative promotes sustainable harbour operations, including improvements in vessels and fishers' safety. In short, we work across the board to enhance the safety of fishing vessels and reduce the number of accidents in the sector.

***Q:** Moving on to ocean conservation and health, and focusing on two major areas of continuing concern: pollution and illegal, unreported and unregulated (IUU) fishing. Under SDG 14.1, the international community has committed itself to preventing and significantly reducing marine pollution of all kinds by 2025, particularly from land-based activities. Meanwhile, SDGs 14.4 and 14.6 seek to minimize IUU fishing and prohibit certain forms of fisheries subsidies which contribute towards over-exploitation. If you had to write a report card on the global progress towards meeting these Goals, what would your conclusions be?*

A: The United Nations Agenda 2030 is a relevant framework as a clear statement of global priorities and a tool for tracking progress. Take SDG14.1 on reducing marine pollution: through global programmes like GloLITTER, we are helping reduce marine-source pollution, while the global community is close to agreeing on a globally binding treaty to address the use of plastic and its disposal. For SDG14.4, FAO works with experts around the world to monitor overfishing, currently affecting one in every three fish stocks; and provides regional sustainability information that underpins our capacity building efforts on data collection, fisheries assessment and management. Excellent examples of progress are evident, like in FAO Area 81 (southwest Pacific), where over 96 percent of the landings are now from sustainable stocks. SDG14.6 is complex but it has led to a major success: the Port State Measures Agreement, now covering ports of fishing nations responsible for the landing of over 85 percent of the total marine catch. These are major, often overlooked and undervalued achievements. Without Agenda 2030, these globally relevant but country-led objectives, would have been extremely difficult to pursue. To quote the late Hans Rosling: I am a possibilist, someone who neither hopes without reason, nor fears without reason, and the data tells us there is hope, and it is anchored in reason, not belief.

***Q:** And finally, perhaps we can leave readers with your thoughts on a somewhat philosophical question on people and the planet: in a June 2023 interview, you were quoted as having said "the ocean is not an aquarium". Could you elaborate on this?*

A: It is interesting you bring this up, as others have done so too. I have worked as a fisheries observer, a fisheries scientist, a fisheries manager, but also as a marine scientist, contributor to science processes such as the IPCC, and director of research institutions. At times, I have been frustrated to hear aquatic systems discussed as if the global goal was to fence them off "for nature", as if humans were not part of nature. Humans have always turned to oceans and rivers for food, livelihoods and opportunity, and that won't change. What we can and must do is manage those interactions responsibly. Thus, my goal is to support management, as best we can, because management is the best conservation tool we have. It allows us to manage the actions of the hundreds of millions who rely on aquatic systems, using the best expert opinion, collectively, and recognizing that we need trade offs to marry a diversity of objectives and values. That's why I use the image of the ocean "not being an aquarium". Because it is not something to observe through goggles or from a sailing boat. We come from the ocean and we are part of, not apart, from it.