Commissioned by

HIGH LEVEL PANEL *for*
A SUSTAINABLE
OCEAN ECONOMY

BLUE PAPER

Summary for Decision-Makers

The Future of Food from the Sea

Fish[1] play an important role in global food provision, accounting for about 20 percent of animal protein and 6.7 percent of all protein consumed by humans globally.[2] This number is even higher in some regions and many small island developing states, which acquire 50 percent or more of their animal protein from aquatic foods (FAO 2018).

As the global human population grows and average incomes rise, the demand for ocean-derived food will continue to increase. By some estimates, nearly 500 million metric tons (mmt) of protein will be required to feed the global population in 2050 (FAO 2018, 2009)—food from the sea has a large potential to meet the majority of this need.

New analysis[3] has found that under optimistic projections regarding alternative marine aquaculture (mariculture) feed innovations and uptake, the ocean could provide over six times more food than it does today—more than two-thirds of the animal protein needed to feed the future global population. Food from the sea is uniquely positioned to contribute to food security as it is highly nutritious, containing essential vitamins, minerals, long-chain omega-3 fatty acids and other nutrients not found in plant-based or other animal proteins.

Meeting ocean production potential will require major strategic global policy shifts, including the following:

- Reducing the overfishing of wild fish stocks, which is driven by illegal fishing, capacity-enhancing subsidies, a lack of alternative livelihoods, a lack of incentives to protect the underlying resources, poor local and institutional governance and suboptimal management
- Sustainably expanding mariculture in a manner that minimises environmental and social impacts
    a. The cultivation of unfed species such as bivalves and seaweeds can substantially increase nutritious food without compromising the ecosystem integrity of the ocean and may in some cases enhance wild fisheries by creating artificial habitats.

    b. The expansion of mariculture of fed species such as finfish and shrimp can contribute significantly to food production, but is challenged by dependence on fishmeal and fish oil as critical feed ingredients. This highlights the importance of identifying and scaling adequate feed alternatives.

Food from the ocean plays a unique role in contributing to sustainable food security for five reasons:

Climate change: Many forms of protein from the ocean have lower greenhouse gas footprints compared with those of land-based animal proteins.

Feed efficiency: Compared with production systems for land-based animal protein, the production of marine-based protein is much more efficient when considering feed inputs, and some species cultivated in the ocean do not require feed inputs at all (i.e. unfed mariculture).

Production potential: Unlike land-based food production, cultivating food from the sea is not limited by constraints such as land and water availability.

Nutrition: In addition to protein, food from the ocean provides essential vitamins, minerals, long-chain omega-3 fatty acids and other nutrients not found in plant-based or other animal proteins.

Accessibility: Food from the ocean is readily available to most coastal populations and is an affordable and often preferred source of protein for many low-income coastal countries.

Future production of food from the sea will depend on the following:

- Physical factors (such as ocean warming and pollution),
- Policies (such as harvest fishery management, mariculture regulations and climate policy),
- Technology (such as advances in aquaculture feed, offshore mariculture technology and farming systems) and
- Institutions (such as access rights and trade arrangements).

Demand for food from the sea will depend on prices, consumer preferences and incomes. Approaches that may influence consumer preferences include education and campaigns related to product sustainability and health benefits. Local policies will have to promote affordable food prices for low-income communities.

Ensuring local and national capacities is crucial for implementing effective and innovative management approaches.

Opportunities for Action

Policymakers should carefully consider the scientifically informed pros and cons associated with different policy options, including inaction, and how different stakeholders may be affected by them.

GENERAL FOOD SYSTEMS

1. Consider food from the ocean in the context of global food systems—both as a source of feed for land-based animals as well as substitution across land- and ocean-based protein sources.
2. Consider the potential of increasing the share of low-carbon protein from the ocean as a substitute for emission-intensive land-based animal proteins as a climate change mitigation strategy.
3. Consider how food from the sea, including reformed capture fisheries and potential mariculture cultivation, can help address local alimentary deficiencies and needs given the nutrient-rich profile of seafood.

WILD FISHERIES

1. Conduct stock assessments of the species most important for food, livelihoods and ecosystem health.
2. Implement management that controls harvest levels, preventing overfishing.
3. Move towards rights-based fishery management, including frameworks that provide a platform for co-management, cooperatives and local ownership and stewardship.
4. Implement climate-adaptive fisheries management via transboundary agreements and adaptive harvest control rules.
5. Remove capacity-enhancing subsidies, particularly in fisheries, that lack sound management.
6. Regulate catches and utilisation of low-trophic species judiciously, as they serve an important role as the base of marine food webs and can be used directly as protein for human consumption.
7. Consider implementing appropriately sized marine protected areas and strengthen governance in places that suffer from severe overfishing.

MARICULTURE

1. Develop regulatory frameworks and revise existing regulations to address uncertainties and current barriers to sustainable mariculture expansion.
2. Actively update agencies and consumers about state-of-the-art sustainable mariculture practices.
3. Evaluate market failures and other impediments to technological innovations in mariculture feed, husbandry and farm design. Consider policy interventions such as taxes, subsidies, zoning and research that would remove these barriers to sustainable mariculture expansion.

The High Level Panel for a Sustainable Ocean Economy (Ocean Panel) is a unique initiative by 14 world leaders who are building momentum for a sustainable ocean economy in which effective protection, sustainable production and equitable prosperity go hand in hand.

Co-chaired by Norway and Palau, the Ocean Panel comprises members from Australia, Canada, Chile, Fiji, Ghana, Indonesia, Jamaica, Japan, Kenya, Mexico, Namibia, Norway, Palau and Portugal and is supported by the UN Secretary-General's Special Envoy for the Ocean.

The Ocean Panel gathers input from a wide array of stakeholders, including an Expert Group and an Advisory Network. The Secretariat, based at World Resources Institute, assists with analytical work, communications and stakeholder engagement.

The Blue Paper that this brief summarises is an independent input to the Ocean Panel process and does not necessarily represent the thinking of the Ocean Panel, Sherpas or Secretariat.

For more information, including the full report, visit **www.oceanpanel.org**

Endnotes

1 Defined by the United Nations Food and Agriculture Organization as fish, crustaceans, molluscs and other aquatic animals, excluding mammals and reptiles as well as seaweeds and other aquatic plants.

2 FAO (United Nations Food and Agriculture Organization). 2018. *The State of World Fisheries and Aquaculture: Meeting the Sustainable Development Goals*. Rome: FAO.

3 Costello, C., L. Cao, S. Gelcich et al. 2019. *The Future of Food from the Sea*. Washington, DC: World Resources Institute. Available online at www.oceanpanel.org/future-food-sea.