



Image source: novish.eu; plantbasedseafoodco.com; oceanhuggerfoods.com

Plant-based seafood alternatives: An introduction

Malcolm Beveridge and Nisha Marwaha
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About us

WorldFish is a nonprofit research and innovation institution that creates, advances and translates scientific research on aquatic food systems into scalable solutions with transformational impact on human wellbeing and the environment. Our research data, evidence and insights shape better practices, policies and investment decisions for sustainable development in low- and middle-income countries.

WorldFish is part of One **CGIAR**, the world's largest agricultural innovation network.



We conducted a futures-looking study on **alternative seafood and its implications for food and nutrition security, livelihoods and the environment**, with emphasis on Africa, Asia and the Pacific.

Working definitions

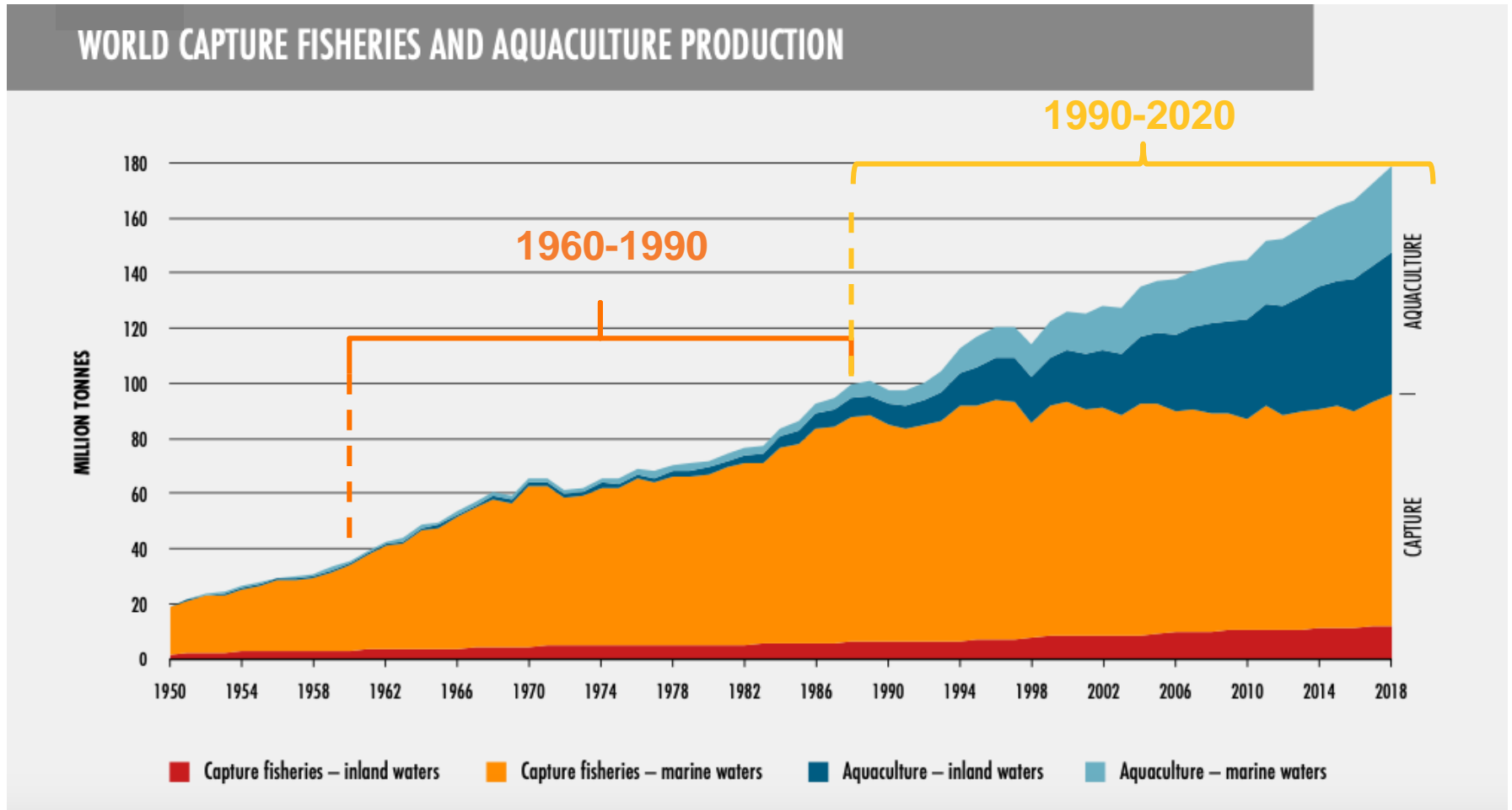
Aquatic foods, or seafood: Animals and plants grown in or harvested in the wild from water for food or feed. These include fresh, brackish and marine aquatic plants and animals, especially fish and shellfish (molluscs, crustaceans) but excluding aquatic mammals, that are regarded as food.

Alternative seafood: All plant-based, fermentation-derived and cell-based seafood alternatives that mimic the taste, texture, appearance and/or nutritional properties of conventional seafood.

Plant-based seafood alternatives: Plant-, algae- or fungus-derived foods designed to emulate sensory, and sometimes nutritional, attributes of conventional seafood; “visceral equivalents”

Cell-based seafood: Animal-based seafood produced through the cultivation of aquatic animal cells that aim to replicate the sensory and nutritional profile of conventional aquatic animal-based seafood; “biological equivalents”

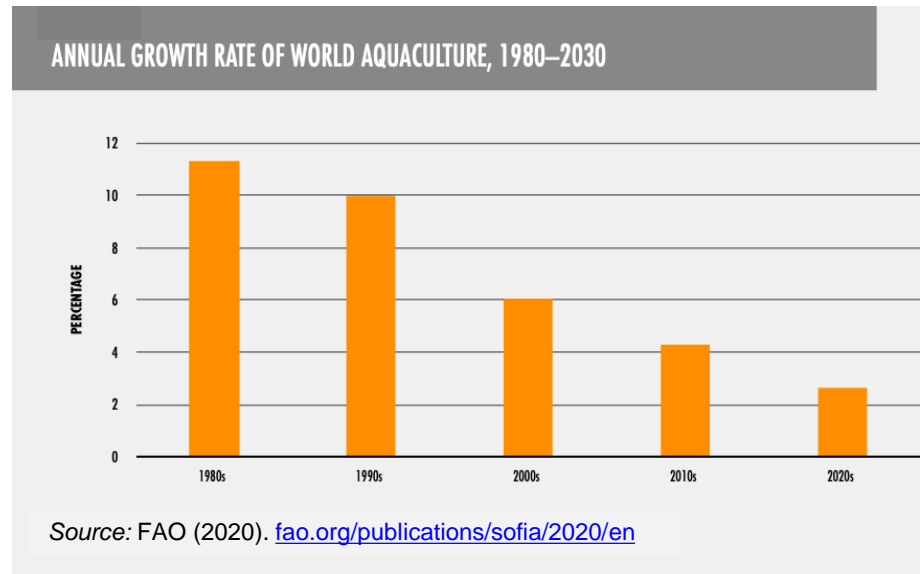
Global seafood production has risen five-fold in 60 years, aquaculture is now the major source



Source: FAO (2020). [fao.org/publications/sofia/2020/en](https://www.fao.org/publications/sofia/2020/en)

But growth in supplies is insufficient for all, and what is the cost?

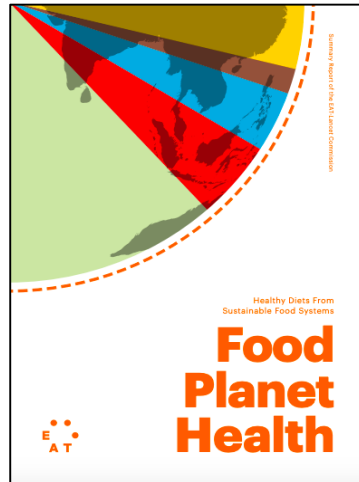
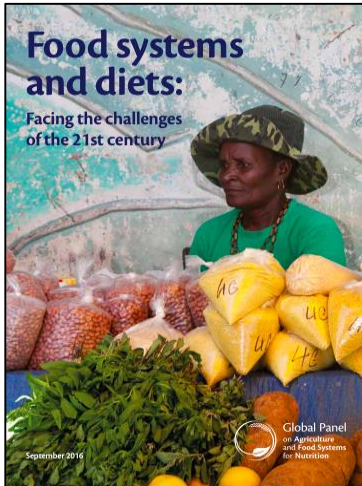
Growth in global seafood production is slowing and will likely leave many low- and middle-income countries, especially in Africa, with unmet demand.



Rising concerns

- **Environmental** – overfishing and ecosystem disruption, habitat degradation, GHG emissions, pollution
- **Public health** – contaminants, zoonotic diseases, antibiotic resistance, mislabelling and fraud, nutrient content
- **Ethical** – human rights, animal welfare

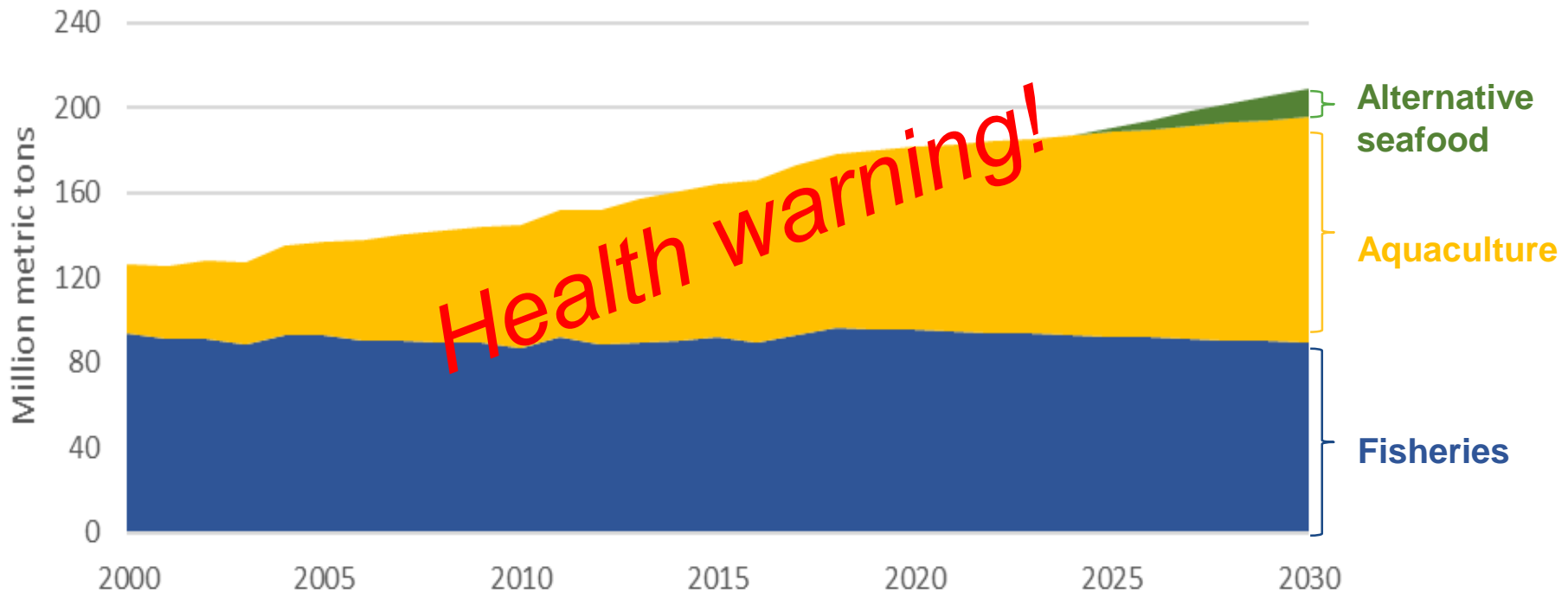
Resilience and sustainability of our global food system are questioned



- Current food systems are unsustainable and vulnerable to shocks
- 820 million food-insecure people
- Hundreds of millions consume low-quality diets
 - Micronutrient deficiencies
 - Diet-related obesity, diet-related non-communicable diseases (e.g. diabetes)

Paradigm shift from **feeding** to **nourishing** people with sustainable diets

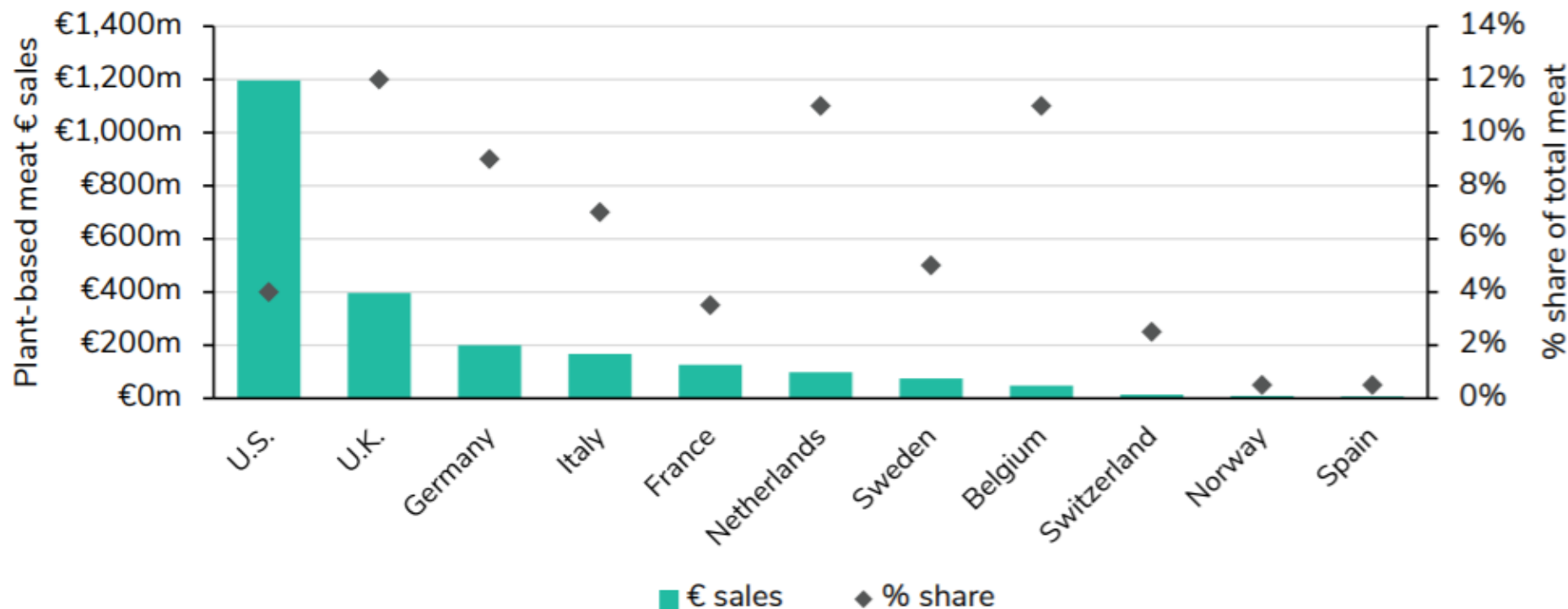
Plant-based alternatives only expected to secure small market share (<0.2%) by 2030



Source: Historical data (2000–2018) from FAO (2020; [fao.org/publications/sofia/2020/en](https://www.fao.org/publications/sofia/2020/en)) and projections to 2030 from Searchinger et al. (2019; [research.wri.org/wrr-food/course/increase-fish-supply-synthesis](https://www.research.wri.org/wrr-food/course/increase-fish-supply-synthesis)).

Plant-based meat market share is higher in Europe than in the US

Plant-based meat market value sales and percent share of total meat market, by country
2018



Note: source data includes tofu in its definition of "plant-based meat"

Data source: FAIRR, "Appetite for Destruction" (July 2019) – Analysis by Barclays Research, Euromonitor

Source: The Good Food Institute (2020). [European Plant-Based Food Market Overview \[webinar\]](#).

Plant-based seafood alternatives are made of terrestrial and marine plants

Plant protein(s) – soy, wheat, pulses, rice, fungi, seaweed, whole vegetables



And water, fat (algal and/or plant oils), flavouring, binding agents, colouring agents

Many companies have emerged to meet demand for plant-based alternatives, mainly in the US and Europe



Image source: The Good Food Institute (2020). gfi.org/seafood

Increasing support from incumbent protein companies

- Investment and partnerships allow protein companies to
 - broaden consumer base,
 - appeal to younger generations,
 - increase sustainability and social responsibility,
 - diversify supply and investments to increase resilience to shocks.



Certification may help drive environmental and social standards

The World Sustainability Organization will begin certifying plant-based seafood alternatives under their Friend of the Sea program.



Requirements:

- Environmental management, ecosystem protection
- Biological control, reduced synthetic inputs
- Water conservation
- Improved soil health
- Renewable energy, reduced emissions
- Social responsibility

Plant-based meat and seafood labelling in the EU

Plant-based meat producers **must**

- comply with the Food Information to Consumers Regulation (e.g. clear, accurate and not 'misleading')
- label genetically modified ingredients

No EU-wide legal judgement on the use of denominations for plant-based meat alternatives

The EU has not developed general labelling principles towards plant-based seafood alternatives.

Thank You

- Delvene Boso, Chin Yee Chan, Kazi Ahmed Kabir and Baasita Rose Komugisha (WorldFish)
- Timothy Sulser and Keith Wiebe (IFPRI)
- Jen Lamy (GFI)

For further information see:

- [Alternative seafood: Assessing food, nutrition and livelihood futures of plant-based and cell-based seafood](#) (WorldFish)
- [The Good Food Institute's Sustainable Seafood Initiative](#)
- World Sustainability Organization's [Friend of the Sea](#) certification for plant-based seafood alternatives – [guidelines](#), [blog post](#), [press release](#)
- [European plant-based market demand](#) (The Good Food Institute)

