

Doing Blue Foods Right: Safeguards for an Equitable, Humane and Sustainable Transition

A COP30 Brief by the Just Food Transition Network



Blue foods, which consist of a highly diverse range of aquatic production systems from both aquaculture and fisheries, yield thousands of different species of plants, algae, and animals intended for human consumption.¹ These include oysters harvested by subsistence fisherfolk and thriving underwater seaweed farms to industrial fishing vessels and intensive fish farms, and even emerging cell-based foods.

They provide critical nutrition for more than 3.2 billion people and livelihoods for an estimated 800 million globally.² Yet blue foods are far from uniform. Their environmental, animal welfare, and social impacts vary greatly depending on species, production systems, and governance contexts.³ Without robust safeguards, scaling up blue food production risks repeating the environmental degradation, social inequities, and animal welfare issues seen in intensive terrestrial agriculture.⁴

Environmental Impacts

Industrial fishing and intensive aquaculture contribute significantly to greenhouse gas (GHG) emissions. Fuel combustion accounts for over 80% of fisheries' direct emissions, with global fishing-related CO₂ emissions rising by nearly 30% between 1990 and 2011.⁵ Meanwhile certain types of



aquaculture can produce some of the most emissions-intensive foods: farmed catfish generates emissions on par with beef⁶ and farmed crustaceans are associated with higher GHG emissions than pork.⁷ In contrast, farming of low-trophic species like bivalves and seaweed can result in near-zero or even negative emissions by sequestering carbon and filtering water.⁸ Research shows that poor welfare practices in aquaculture can also increase emissions intensity, as stressed animals have lower feed conversion efficiency, higher mortality, and are more prone to disease, resulting in additional feed use, energy expenditure, and environmental waste.⁹

However, the impacts go far beyond GHG emissions. Overfishing renders aquatic species vulnerable to ecological extinction,¹⁰ harmful fishing gears destroy marine habitats, and, along with indiscriminate fishing, cause high levels of bycatch, resulting in increased threats to imperiled species, avoidable mortality of sentient aquatic life, and food waste. Feed-intensive aquaculture further amplifies pressure on wild fish populations by relying on fishmeal and fish oil derived from capture fisheries, while also contributing to ecosystem degradation through eutrophication and recurrent harmful algae blooms, pesticide contamination, plastic pollution (including abandoned, lost or otherwise discarded fishing gear), and pathogen transmission — including antimicrobial resistant strains — to wild fish that seriously threaten the health and viability of these ecosystems, and in turn the health and wellbeing of humans.^{11, 12, 13, 14}

Social Impacts

Industrial blue food production also raises human rights and animal welfare concerns. Coastal and Indigenous communities are often displaced when industrial fleets expand into nearshore waters, and labor exploitation has been documented in seafood supply chains worldwide.¹⁵ Aquatic animal welfare remains poorly regulated. Billions of fish are farmed each year,¹⁶ while another 2 to 3 trillion fish are caught in the wild and killed for human consumption,¹⁷ the majority of which die without humane stunning or slaughter, despite scientific consensus on fish sentience and their capacity to suffer. Aquatic animals experience pain, fear, and stress. Fishing and farming systems that disregard welfare also tend to reflect and reinforce systems of human exploitation and ecological injustice. Welfare is therefore a core social justice issue embedded within the broader concept of a just transition.

What Equitable, Humane and Sustainable Blue Food Systems Look Like

Equitable, humane and sustainable blue food systems balance productivity with ecological integrity, animal welfare protection and social equity whilst promoting local and democratic governance. Seaweed and bivalve aquaculture can enhance biodiversity and improve water quality. Community-based fisheries management strengthens resilience and supports local economies. By contrast, practices like bottom trawling, high-density shrimp farming, and feed-intensive carnivorous aquaculture degrade ecosystems, generate high emissions, and exploit workers and animals.

Although the push to increase blue foods is often driven by claims of food and nutritional security, it's important to note that there are pathways to healthy diets that do not include aquatic animals. Many of the nutrients found in animal-based blue foods, such as essential omega-3 fatty acids, can also be found in flax seed, seaweed, and other plant-based sources. **Thus it is imperative that we avoid a blanket push for all “blue foods”** and instead distinguish welfare-positive, ecologically restorative systems that provide fair wages and dignified working conditions for fisherfolk from those that cause social harm, biodiversity loss, and systemic animal suffering. Only systems that are low-impact,



socially just, and welfare-aligned should be eligible for recognition as sustainable blue foods.

Equitable, Humane and Sustainable Blue Food	Industrial-Scale Blue Food
Smallholder producers and their support systems Small-scale, low-impact fishing that is highly selective and safeguards animal welfare	Bottom trawling that destroys seabeds and releases carbon
Low-stress, minimal handling, and humane stunning (must render the animal immediately and fully unconscious) prior to slaughter	Rough handling and inhumane killing including asphyxiation and live gutting
Community-managed, small-scale fisheries with secure access rights	Industrial fleets that displace local fishers and exploit labor
Humane aquaculture prioritizing low trophic species, robust animal welfare standards, controls on plastic use and pollution, and minimal antibiotic use	High-density carnivorous aquaculture reliant on wild fish feed
Electrified or hybrid vessels and efficient cold chains	Diesel-intensive fleets with no decarbonization plan
Mangrove and seagrass protection and restoration that support biodiversity and natural habitats for aquatic species	Mangrove-clearing shrimp ponds and nutrient-polluting farms

Policy Safeguards for Blue Food as a Climate Solution

To ensure blue foods contribute meaningfully to climate action while protecting ecosystems, people, and animals, governments and multilateral institutions should establish the following safeguards:

- Develop eligibility criteria for climate finance that prioritize welfare-positive, low-trophic systems and exclude inhumane or ecologically destructive practices such as trawling or high-density confinement / mangrove conversion.
- Integrate One Health and One Welfare principles into national licensing frameworks, covering aquatic animal welfare, water quality, disease prevention, and Anti Microbial Resistance (AMR) control.
- Protect and restore blue carbon ecosystems: mangroves, seagrasses, and tidal marshes.
- Invest in electrification of fishing fleets and low-carbon cold chains to reduce reliance on diesel fuel.
- Phase out wild-fish-based and soy-derived feeds through incentives for algae and microbial protein alternatives.
- Channel climate finance directly to small-scale and Indigenous producers. Funding should be conditional on demonstrable welfare, social, and ecological outcomes.
- Enforce fair labor standards, remuneration, gender equity, and safe working conditions consistent with ILO Convention 188.
- Use public procurement to create demand for locally-sourced, sustainable, welfare-compliant blue foods. Public institutions should only source aquatic products certified to meet welfare and sustainability standards.
- Support transparent data collection/reporting and participatory research to monitor GHG emissions, welfare indicators, and social outcomes as part of national sustainability metrics.

A just transition in blue foods must be inclusive, humane, and grounded in social justice and equity. Governments can achieve this by combining targeted finance, capacity building, and international cooperation that place people, animals and ecosystems at the center of food-climate policy.



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