Marine Aquaculture
A Tool for U.S. Climate Action

Growing scientific evidence suggests that responsible marine aquaculture has the potential to increase the resilience of the global food system and mitigate climate change while feeding a growing population, making it a valuable tool for the U.S. to meet its climate goals.

Offshore aquaculture, farming beyond the nearshore and inshore coastal zone in waters greater than 65 feet in depth, is the most promising option for expanded sustainable seafood production.

The human population will continue to grow and is predicted to approach 10 billion by 2050. Global demand for protein will rise by as much as 88%. Properly executed aquaculture, paired with sustainable capture fisheries, has the potential to increase food security, sequester carbon, decrease the carbon footprint of protein sources, and stimulate economic activity in both coastal and inland communities. A clear and predictable legal and regulatory structure for marine aquaculture in the U.S. can help to achieve these objectives.

Farming seaweed in just 3.8% of the federal waters off the California coast has the potential to neutralize emissions from the state's $50 billion agriculture industry.

Protecting Ecosystems and Mitigating Climate Change

Some types of marine aquaculture, such as kelp and bivalve farming, can improve water quality, regulate ocean acidification, store carbon, protect coastlines, and provide habitat for other species, which can help marine ecosystems be more resilient to the impacts of climate change.

European Seabass (Branzino) is grown in open ocean pens in the Mediterranean. In 2017, 13 million pounds was flown 7,000 miles from Greece and Turkey to the U.S. We could greatly reduce this carbon footprint by growing more Striped Bass, White Sea Bass, or their hybrids in U.S. waters.

Climate-Friendly Protein

Increasingly, scientists are calling for future protein production to shift towards seafood, which is often more climate-friendly than other sources of animal protein. Food from the sea, produced using best practices, can have some of the lowest greenhouse gas emissions per unit of protein produced of all animal protein sources. Relative to other types of animal agriculture, marine aquaculture has lower feed use, less water use, and less land use.

Today, half of the seafood Americans consume is farm raised and 60-90% is imported, leaving a sizeable carbon footprint as that seafood travels around the world before it ends up our plates. Seafood's carbon footprint is primarily affected by fuel consumption. Seafood is frequently air freighted, making it 3-5 times more carbon intensive than highway freight and 31 times higher than sea-based freight.

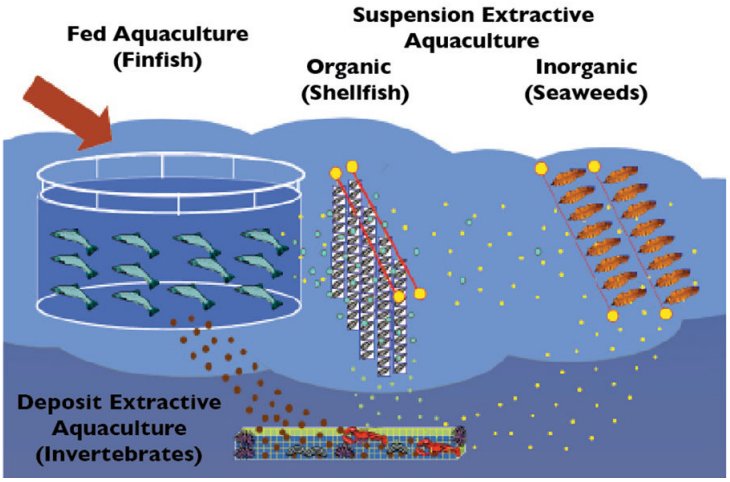
Distance from processing can also increase the carbon footprint. Shipping seafood for foreign processing and then importing it back for sale can skyrocket fuel and energy consumption, leading to higher emission rates. Growing and processing seafood domestically can shorten supply chains and reduce transportation emissions.

Resilient Food Systems

Improving the resilience of our global food systems is especially urgent in the face of increased frequency and duration of shocks associated with climate change. Crops, livestock, fisheries, and aquaculture occur in different locations and require different inputs, providing diversification and stabilization of food production in the face of shocks.

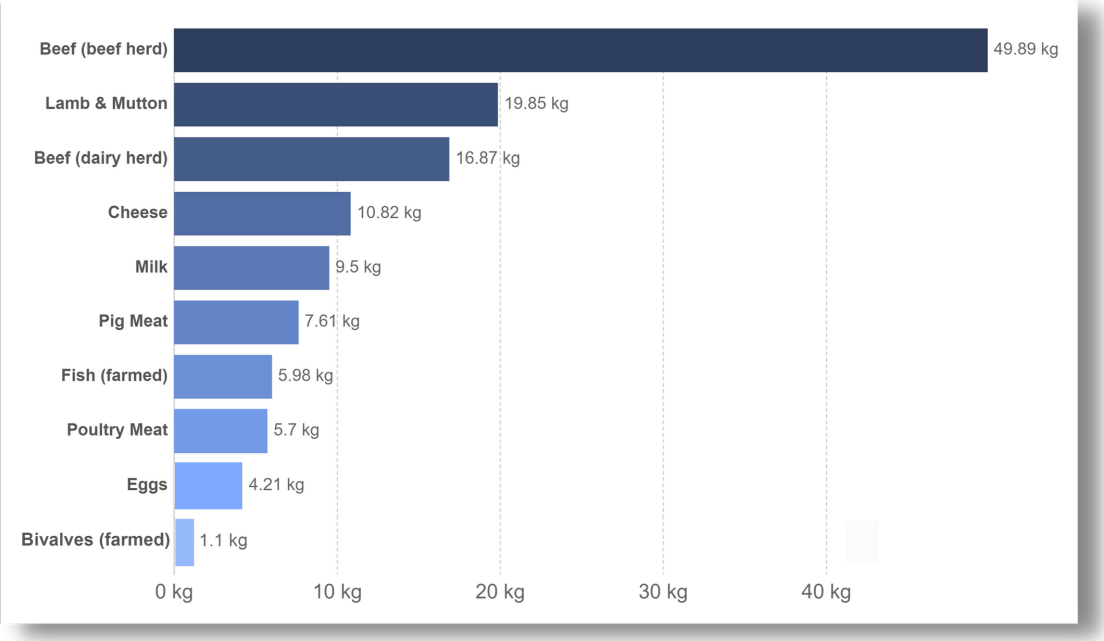
No sector is immune to shocks, but a robust U.S. marine aquaculture industry can provide meaningful resilience.

Shorter supply chains improve resilience to market and supply disruptions such as those seen during COVID. Aquaculture systems that can be moved throughout the water column may be more resistant to marine heatwaves that force fish to migrate and harm less mobile species.



Multi-trophic aquaculture could fit into a larger blue carbon initiative to mitigate and enhance resilience to climate change. High-protein seafood and seaweed grown together at the same farm site could potentially provide multiple ecosystem services while also providing a climate-friendly source of food, fuel, and other resources.

GHG emissions per 100 g of protein



*Farmed fish includes both freshwater and marine.

The Paris Climate Agreement called for efforts to limit global warming to **1.5°C** above pre-industrial levels. The Intergovernmental Panel on Climate Change says we must reach net zero global carbon emissions by 2050 to meet this goal. A 2020 study in *Science* found that even if we reduced industrial/energy emissions to near-zero by 2050, business as usual growth in food system emissions will still exceed **1.5** or **2°C**, thanks largely to growth in meat and dairy production and consumption.

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