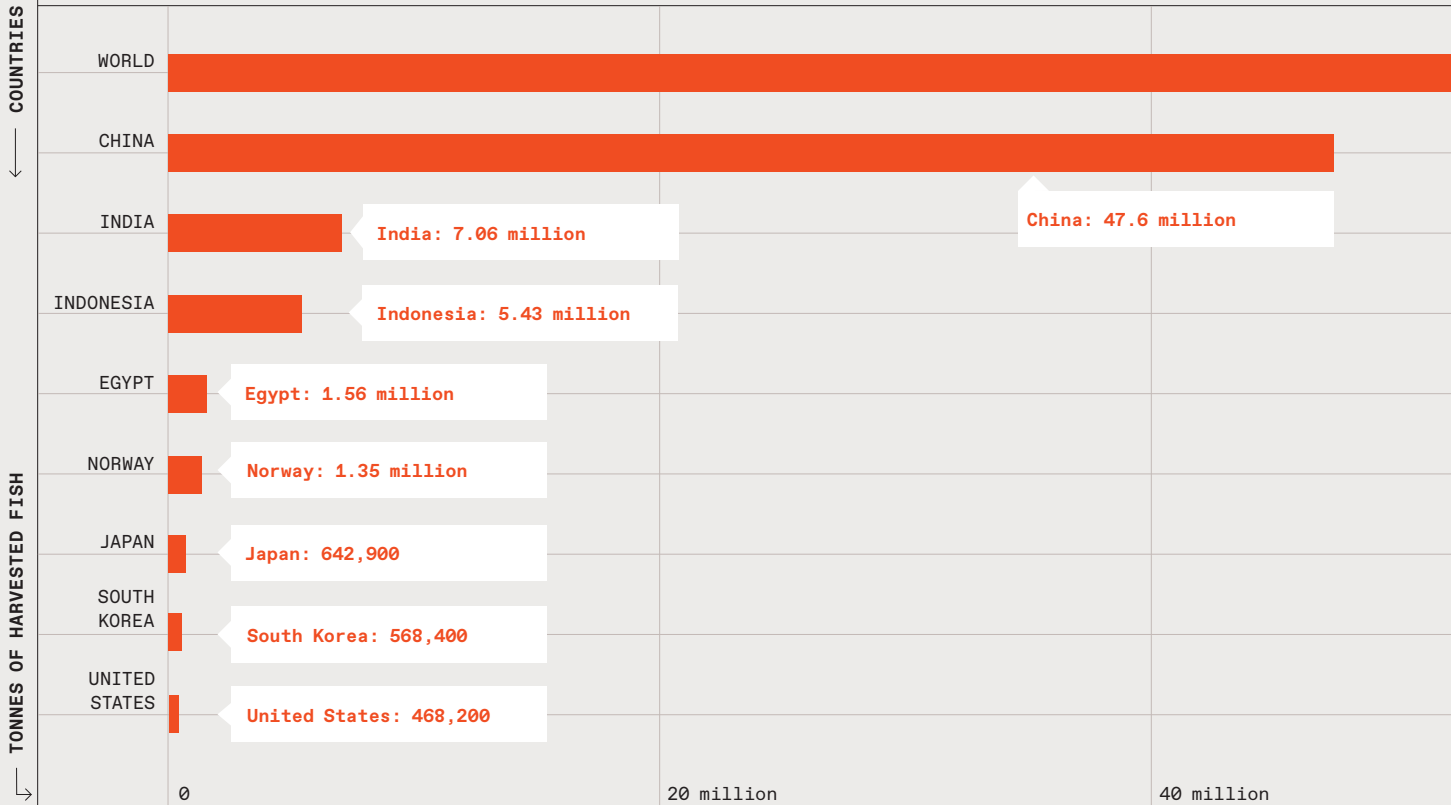


# Crosstalk



## Farming Fish

The 36-fold rise in aquaculture in the past 50 years is unparalleled in the history of food production

**D**uring the past 50 years, the world’s population has grown about 2.1 times, and consumption has grown more; for some goods, much more. Between 1968 and 2018 (the most recent year for which we have global data), production of both primary energy and of steel rose 3.4 times, that of meat grew 3.5 times, and that of grain grew 2.6 times. The total number of cars on the world’s roads rose sixfold, and the number of revenue-generating passenger-kilometers flown (an industry metric) grew by about 24 times. But the rise in aquacultural production beats them all.

Carp have been grown in inland ponds in China since ancient times and in parts of Europe since the Middle Ages. Fish have been farmed in Hawaii in ponds built with walls of lava rock in shallow coastal seas; some countries, notably Japan, also used such methods to produce crustaceans, mollusks, and algae. But until half a century ago, these practices were concentrated overwhelmingly in East Asia, particularly China, where the annual harvest (including all freshwater and marine animals and algae) was only about 3.4 million tonnes. That total more than doubled in the 1970s and grew even faster in the 1980s and 1990s before, inevitably, slowing down. Still, by 2018 the live-weight harvest of global aquaculture (20 percent of it protein) was about 114 million tonnes—36 times as much as in 1968. Algae accounted for slightly more than 30 million tonnes, fish from fresh water added about 51 million tonnes, and marine aquaculture about 31 million tonnes, bringing the 2018 harvest of fin fish, crustaceans, and mollusks to about 82 million tonnes.

Meanwhile, the haul of wild-caught fish continued to rise until the late 1980s, finally reaching a



AQUACULTURE OF FIN FISH, CRUSTACEANS, AND MOLLUSKS, 2018

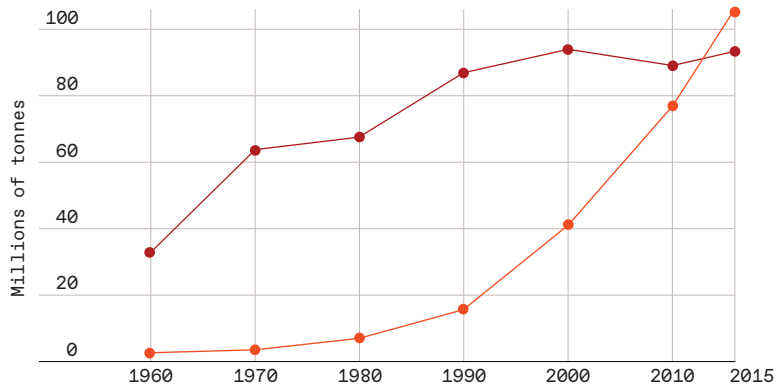


SOURCE: UN FOOD AND AGRICULTURE ORGANIZATION (FAO)

**WORLD FISH FARMING GROWTH**

Aquaculture's share of total fish consumption has risen from a rounding error to a majority in a relatively short time. SOURCE: UN FOOD AND AGRICULTURE ORGANIZATION (FAO)

- Aquaculture
- Capture Fisheries



60 million

80 million

100 million

plateau of around 96 million tonnes a year. This means that about 45 percent of all protein coming from aquatic species now originates in ponds, lakes, pens, and cages where the species are grown, with or without feeding.

China accounts for 58 percent of global fish-farming output, and its four traditional favorites—carp of the grass, silver, common, and bighead varieties—still dominate global aquaculture, accounting for just about a third of the total produced live weight. India is in a distant second place at about 7 million tonnes a year. Asia contributes 73 percent of the total, the Americas less than 5 percent, Europe less than 4 percent.

Besides carp, the most commonly cultured fish are Nile tilapia, catfish, and Atlantic salmon (now grown not only in European and Eastern Canadian coastal waters, but also in the U.S. Pacific Northwest, Chile, and New Zealand). Whiteleg shrimp and red swamp crayfish are the most commonly cultured crustaceans; cupped oysters, Japanese carpet shells, and scallops lead in the mollusk category.

**About 45 percent of all protein coming from aquatic species now originates in ponds, lakes, pens, and cages where the species are grown.**

The industry's principal challenge outside Asia is the consumers' preference for salmon, cod, and tuna, all of them carnivorous. Plant-eating carp can be fed cheap grain or cereal pellets, but salmon or tuna will not grow and mature without ingesting fish oils and fish protein, which must be prepared by catching smaller, less valuable sardines, anchovies, and mackerel and converting them into fish feed. The gain:feed ratio for the Atlantic salmon has been reduced to as low as 1:1.2. Tuna farming, which is much more challenging, is just at the beginning stage, and cod farming is even less advanced.

The industry is not without controversies. Densely stocked ponds and pens cause environmental problems, notably the release of organic materials, which promote algal blooms and the introduction of salmon that have been genetically modified to grow faster and use food more efficiently. But fish farming is now a global business worth more than US \$250 billion a year, and it will keep expanding, introducing new species to more consumers willing to pay for their favorite fish, crustaceans, and mollusks. ■

PORTRAITS BY SERGIO ALBIAC