



## Important protein source for the world's impoverished in competition with aquaculture and animal feed

Tacon, Albert G. J. and Marc Metian. 2009. "Fishing for Feed or Fishing for Food: Increasing Global Competition for Small Pelagic Forage Fish." *AMBIO* 38 (6):294-302.

Worldwide, anchovies, herring, mackerel and other small pelagic (open ocean) forage fish are caught more than any other species. Most of these prey fish are not directly consumed by people, but are reduced into nonfood commodities, such as fishmeal and fish oil to feed farmed fish and other animals. Authors Albert Tacon and Marc Metian conducted a global analysis of the competition for small pelagic forage fish for direct human consumption and nonfood uses. Their results show that small pelagic fish are an important source of protein in many developing countries, yet increasingly, these fish are diverted into nonfood commodities. Competition for this resource can drive up the price of fish, pushing this important food source out of reach for many of the world's impoverished people.

### Fishing for feed or fishing for food?

The authors reported that per capita supply of wild fish for direct human consumption has been unable to keep pace with the protein needs of a growing human population. Yet, the proportion of total fish catch destined for other uses such as fish farming has increased. Although using small pelagic fish in animal feeds produces food for people, this indirect use is a far less efficient use of these small fish than consuming them directly as human food.

### Nonfood, fish commodities

Most pelagic forage fish are turned into fishmeal or fish oil rather than being directly consumed by people. The former have "nonfood uses," typically as ingredients in feeds for farmed fish and other animals, but can also be used in other applications such as soap manufacturing and leather tanning.

Most of the catch of small pelagic fish is reduced, or dehydrated, to make fish meal and oil which are used in manufactured animal feeds. While the proportion of the reduced catch has remained relatively static for the last 25 years, there has been a considerable rise in the use of unreduced forms of wild fish or "wet" forms (e.g., frozen or minced) for use in aquaculture, canned pet foods and fishing bait.

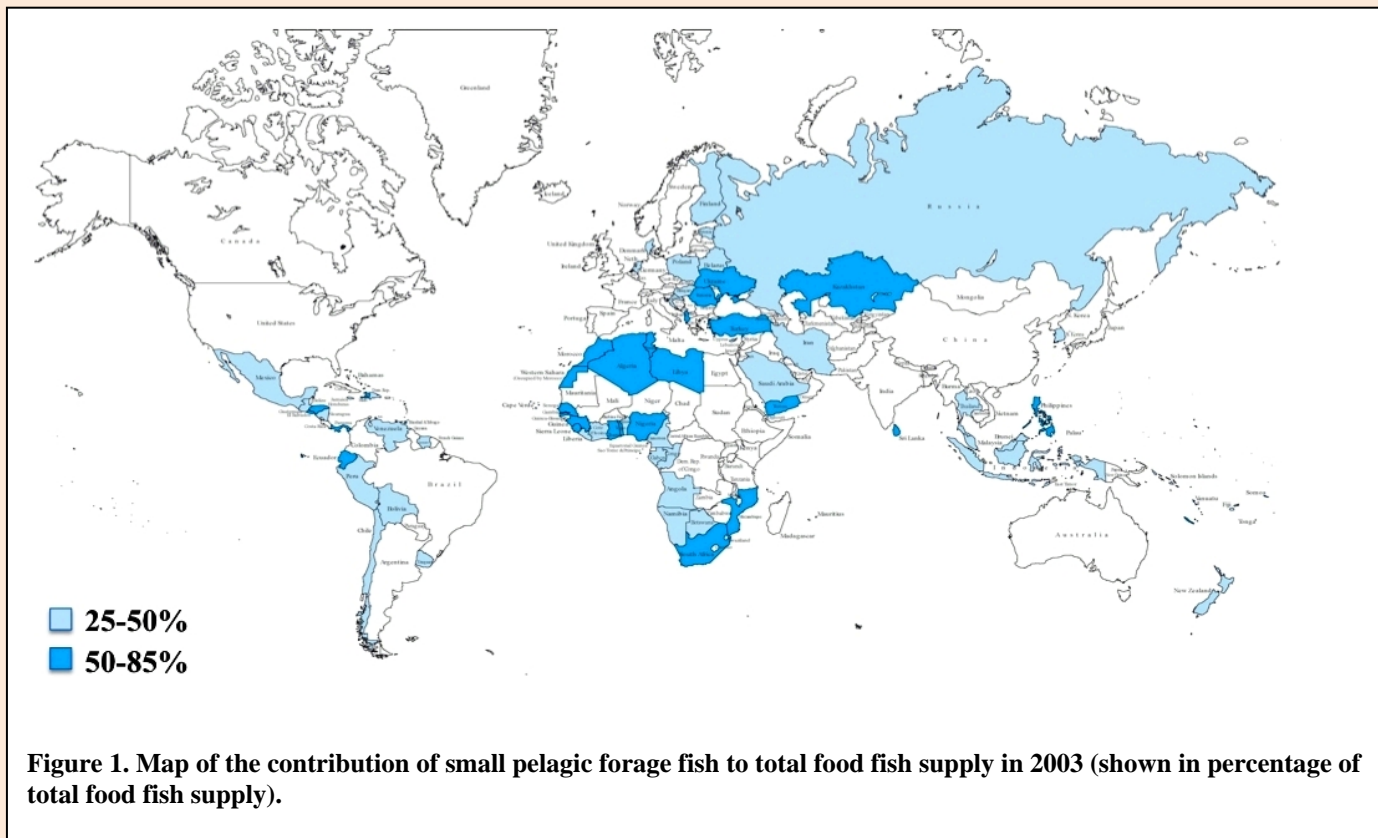
In both forms, small pelagic fish are now heavily used as fish feed. These fish are generally the only commercially viable source of long chain omega-3 fatty acids essential to diets for carnivorous farmed fish, such as salmon and tuna, which have high market value and are typically sold in wealthy, developed countries. For example, in 2006, aquaculture consumed 57 percent of fish meal and 87 percent of fish oil, globally, due both to rapid growth in fish farming and the willingness of aquaculture producers to pay high market prices for these commodities.

### Contribution of small pelagic forage fish to global food supply

Contrary to popular belief that most small pelagic forage fish are not suitable for direct human consumption, the authors found that these fish contribute more than 50 percent of the total food fish supply in more than 36 countries in Africa, Asia and elsewhere.

Interestingly, although more than one third of small pelagic fish are landed in South America, Europe is the largest producer, exporter and importer of processed small pelagic fish products for human consumption. Asia and Africa are also active in this trade: at the country level, Nigeria was the single largest importer of food-grade forage fish products in 2006. Such products are especially important to nutrition in sub-Saharan Africa, where more than half of the population receives 25 percent or more of its protein from fish (see Figure 1– next page).

Direct consumption of small pelagic fish has been limited by their rapid deterioration in storage. However, recent advances in technology, including improvements in fish freezing and chilling, now facilitate production of a variety of food products from small pelagic species.



### Obstacles to human consumption of small pelagic forage fish

Market competition determines whether small pelagic fish are destined for feed or destined for food. In some locations, the result is greater use of small fish as human food. However, when prices are high, the poor cannot compete with aquaculture producers for these resources. In Mexico, for example, California pilchard traditionally has been both reduced into fishmeal and processed for direct human consumption. Increased demand from tuna aquaculture operations has substantially raised the price of California pilchard, raising the prospect that fewer of these fish will be processed for human food.

### Recommendations to reconcile uses for small pelagic forage fish

The authors urge that the use of fish to meet human nutritional demands of impoverished communities needs to be a priority, consistent with the FAO Code of Conduct for Responsible Fisheries. Their recommendations include placing government limits on the use of fish as animal feed, initiating promotional campaigns concerning the value of small pelagic fish as food and reducing the use of food-grade fish as aquaculture feeds and fishing baits by finding alternative feed sources.

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