



A sunset cast into aquaculture ponds, Queensland CSIRO Marine and Atmospheric Research

Aquaculture's feed demands are pressuring wild fish populations

In response to the recent *Ecos* article, 'The green frontier: RNAi biotechnology's promising applications' (*Ecos* 125), which made reference to aquaculture's offsetting of fishing intensity on wild fish stocks, Adele Pedder of the Australian Marine Conservation Society (AMCS) outlines how the feed demands of marine fish farms, producing carnivorous species such as tunas, salomids and barramundi, are in fact increasingly impacting on wild fisheries.

Seventy-five per cent of the world's fish populations are currently fully exploited, over-exploited or depleted by the global fishing industry¹. Farming of marine species in aquaculture production isn't expected to compensate for these impacts, and may well exacerbate them, particularly as aquaculture's demand for wild fish species for feed continues to rise^{2,3}.

The recently released Millennium Ecosystem Assessment report indicates that, while aquaculture production is increasing globally, it has come at the cost of greater pressure on wild fisheries for fish feed⁴. Farmed carnivorous marine species are fed on a protein-based diet that contains fishmeal and fish oil, made predominantly from pelagic fish taken in 'industrial' oceanic fisheries⁵. Marine fish farms actually use up more fish flesh than they produce, and hence could not replace wild capture commercial fisheries⁶. According to CSIRO researchers, fishmeal production is an unsustainable use of wild fisheries resources⁷.

To take an Australian example, the South Australian Pilchard Fishery can remove up to 51 000 tonnes of pelagic fish (mostly pilchards) from the southern marine ecosystems each season. More than

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90 per cent of these fish are used to feed aquaculture fish farms, such as those that fatten wild-caught southern bluefin tuna. For every kilogram of tuna that is farmed in South Australia, between 8 and 15 kilograms of feed fish are taken from the wild to fatten the aquaculture-farmed fish⁸.

Globally, vast quantities of small pelagic fish such as anchovy, jack mackerel, herring and sardine are removed from the world's marine ecosystems to service marine fish farms. The principal areas of



Jack mackerel caught by a Chilean purse seiner. Sardines, mackerel and anchovies, mainly supplied by South American fisheries, make up fishmeal. C. Ortiz Rojas/NOAA

fishing activity for feed fish fisheries include South America, northern Europe, the Far East and South-East Asia. Between 1997–2001, more than 21 million tonnes of fish were removed from the world's oceans destined for aquaculture farms. These 'feed fish' species are crucial components of numerous marine food webs, including those supporting large fish, sharks, dolphins, toothed whales and seabirds. Removing these fish can have serious flow-on ecosystem effects.⁵

Ecos will be examining the pros and cons of aquaculture in a future issue.

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