

Aquaculture Feeds

The Problem

Some forms of aquaculture are highly dependent on wild fisheries for feed inputs. As a result, they are net consumers of fish and can decrease the amount of fish potentially available for human consumption.

The Causes

Farming carnivorous species of fish, such as salmon, trout, tuna, grouper, and cod, requires a protein rich, high-energy diet. Commercially prepared feeds are given to these farmed fish, with much of the protein coming from fishmeal and much of the fat coming from fish oil.

Wild pelagic fish, such as anchovy, sardine, and mackerel, are used to make fishmeal and fish oil. These fish are caught, cooked, pressed, dried, and milled into a dry pellet form of feed. With this process it can take up to five tons of wild fish to produce one ton of fishmeal and 12 tons of fish to produce one ton of fish oil.

The Context

The fishmeal and fish oil content of feed and conversion rates vary according to the farmed species. Carnivorous fish require high levels of fishmeal and fish oil; for example, farmed salmon are fed a diet that contains approximately 40% fishmeal and 25% fish oil. In contrast, the diets of herbivorous and omnivorous fish, such as tilapia, carp, and catfish, require much lower levels of fishmeal and fish oil, usually less than 10% and 1% respectively.

In addition to fishmeal and fish oil, feeds may contain varying amounts of other animal proteins, plant proteins, vitamins, minerals, pigments, and binders.

It has been estimated that the production of one pound of farmed salmon requires the use of approximately three pounds of wild fish for feed. This conversion ratio can be higher for other carnivorous fish. For example, as much as 20 pounds of wild fish are used to produce one pound of farmed tuna.

Several types of aquaculture can be considered net producers of seafood. For example, farming mollusks such as clams, mussels and oysters, requires no feed at all and farming herbivorous and omnivorous fish, such as tilapia, carp, and catfish, requires few, if any, feed inputs from wild fisheries.

The ecosystem impacts of the industrial fisheries for the small fish that are used to produce fishmeal and fish oil for aquaculture feeds are poorly known. Nonetheless, the continued depletion of these fish populations for aquaculture feeds, as well as agriculture feeds, is expected to have impacts on higher-level predators, such as larger fish, marine mammals, and seabirds.

Further Reading

SeaWeb Aquaculture Issues: Aquaculture Feeds

www.seaweb.org/resources/aquaculturecenter/issue_feeds.php