

FACTS ABOUT FINFISH AQUACULTURE

Development of feeds for sustainable fish farming

How to Feed the Fish of the Future?

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The formulation and management of feed significantly influence the economic, environmental, and social sustainability of fish farming. Each dimension of sustainability is affected by feeding practices, ingredient choices, and the overall aquaculture system (Garlock et al., 2024). With an expected increase in aquafeed demand, it is important (now more than ever) to investigate and utilize aquafeed ingredients with minimal impact on natural resources and, instead, may have positive impacts to help control climate change.

The economic viability of European fish farming largely depends on feed costs, which represent a significant portion of operational expenses. Rising demands for raw materials, especially fishmeal and fish oil are jeopardizing the profitability of aquaculture, with fluctuating feed prices leading to financial instability for fish farmers (Arru et al., 2019). Volatile agricultural product prices also significantly impact fish feed costs, influencing the economic sustainability of aquaculture operations. Fluctuations in the prices of key feed ingredients, such as soybean meal and corn, directly affect the cost of producing aquafeeds (Colombo and Turchini, 2021).

The role of feed in the environmental sustainability of aquaculture is a critical aspect, impacting efficiency, resource use, and ecological consequences of aquaculture practices. Feed production is responsible for more than 70% of emissions of most aquaculture technologies. The growing demand for aquatic food, driven by population increases and dietary shifts, necessitates sustainable feed strategies to mitigate environmental impacts, including resource depletion and pollution. Alternative feed sources and other ingredients produced through the circular bioeconomy can improve aquaculture's sustainability by reducing its environmental footprint in terms of water and land use, CO₂ conversion, GHG emissions, nutrient recycling and wastewater remediation. These alternatives also can help stabilize the economic conditions for fish farming while lowering the pressure on natural fish stocks, thus fostering long-term profitability (Colombo and Turchini, 2021).

The social sustainability of aquaculture feeds is often closely tied to the environmental and economic sustainability of the sourcing of their raw materials. For example, fish meal and fish oil is socially sustainable when sourced from by-products of fish processing or from responsibly managed, renewable wild fish stocks, without compromising the domestic human consumption. (FAO, 2024).

Reflecting on these sustainability challenges, the development of fish feeds has undergone a significant transformation in recent years, also driven by the increasing demand for aquaculture. One of the main focuses of these developments is to reduce the heavy reliance on marine resources as traditional fish feed ingredients. In recent years, there has been a notable shift towards incorporating terrestrial plant materials and animal by-products into aquafeeds, as well as improving circularity and efficiency in the use of fish trimmings and by-products from the seafood processing industry.