FACT SHEET

Blue Frontiers: Managing the environmental costs of aquaculture

This fact sheet presents the main findings from a global review of aquaculture conducted by the WorldFish Center in collaboration with Conservation International. The report "Blue Frontiers: Managing the environmental costs of aquaculture" aims to inform policy makers about the impacts of aquaculture on the environment and to stimulate debate on the optimal animal food production systems for tomorrow.

Today, almost half of all seafood we eat originates from aquaculture

Aquaculture is one of the world's fastest growing food production sectors, with a global annual rate of 8.4% since 1970, and reached 65.8 million tonnes of cultivated fish and other seafood in 2008. Asia accounts for over 90% of the supply and is predicted to remain the dominant aquaculture producing continent for years to come.

Whilst supplying the world's demand for seafood, aquaculture's growth raises concerns about impacts on biodiversity, environmental degradation and depletion of wild fish resources. To ensure its sustainability, the environmental impact of the sector must be assessed and science-based management measures implemented.

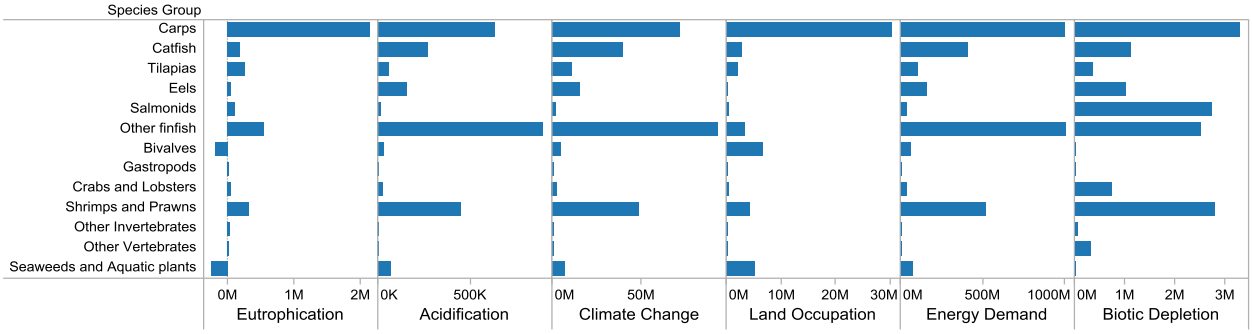
FINDINGS FROM STUDY – **CORE FACTS**

More production means more impact

For all impact categories, aquaculture production volumes were positively correlated with degree of impact: more production leads to greater effects on the environment, with greater impacts in the largest producing countries and regions especially China and Asia.

- Inland pond culture and carp farming have the highest absolute impact
- Shrimp, prawns and other carnivorous species stand out as especially biophysically demanding. Salmonids are demanding as a result of the use of fishmeal for feeding
- Bivalves and seaweeds place low demands on the environment and actually reduce eutrophication

Figure 1. The absolute environmental impact of 2008 aquaculture production categorized by species group



Environmental Impacts: Eutrophication (t PO_4 eq); Acidification (t SO_2 eq); Climate Change (t CO_2 eq); Land Occupation (ha eq); Cumulative Energy Demand (Gj); Biotic Depletion (t)

Production systems and species play an important role

Production processes at farm level were the main contributor to eutrophication. For salmon, demand for feed was shown to be the largest contributor to all impact categories. When species were compared per unit production, shrimp and prawn culture stand out as particularly biophysically demanding, especially with respect to climate change contribution.

Aquaculture performs well compared to other animal production systems

Products originating from aquaculture contribute less per unit weight to global emissions of nitrogen and phosphorus than pork and beef.

Fish, as compared to either pork or beef, convert a higher percentage of the food they eat into consumable protein.

Environmental performance across countries and regions varies significantly

For the salmon producing nations of north Europe, Canada and Chile, the impact from eutrophication was moderate and biotic depletion high, but they were more efficient than China and Asia across the other four environmental impacts – acidification, climate change, energy demand and land occupation. For shrimp and prawn culture, China is much less efficient, in relative terms, than other producer countries when considering impact on acidification, climate change and energy demand.

FUTURE GROWTH / TRENDS

Driven largely by increasing wealth and urbanization, published estimates suggest aquaculture production will reach between 65 and 85 million tonnes by 2020 and between 79 and 110 million tonnes by 2030.

SOLUTIONS

- Research to reduce overall environmental impact in large producing regions, particularly Asia.
- Identify the better performing systems, and widely share and promote such systems through regional learning networks for both policies and technologies.
- Invest in innovations in feed technologies and feed management to reduce dependency on fishmeal and fish oil and other environmental impacts.
- Improve energy efficiency throughout value chains to reduce the sector's impact on both climate change and acidification
- Use water and energy audits and management tools and practices to identify and reduce biophysical resource demands.
- Aquaculture has, from an ecological efficiency and environmental impact perspective, clear benefits over other forms of animal source food production for human consumption. In view of this, where resources are limited, the relative benefits of policies that promote fish farming over other forms of livestock production should be considered.
- The growing need for aquaculture to contribute to food security, especially in African and Asian countries, requires governments to actively support growth of the sector and stimulate private sector investment.
- Impact related to climate change can be addressed through energy efficiencies and siting of new aquaculture enterprises away from locations that are already high in sequestered carbon such as mangroves, seagrass or forest areas.
- Policy makers support innovative and technological developments, ensuring a suitable regulatory framework that captures environmental costs within aquaculture processes, building capacity for monitoring and compliance, and encouraging research on the supply and demand for fish and fish products.

For more information and a copy of the full report: www.worldfishcenter.org/global_aquaculture/
The WorldFish Center, May 2011