BLUE FRONTIERS: Managing the environmental costs of aquaculture
KEY MESSAGES
** UNDER EMBARGO UNTIL June 14, 2011, 6:00 p.m. ICT**

A review of published results shows that aquaculture is one of the world's fastest growing food production sectors.

- Today, almost half of all seafood we eat originates from aquaculture.
- Production of farmed fish and other seafood reached 65.8 million tonnes in 2008. According to FAO, seafood exports from wild fisheries and aquaculture in 2008 had a combined value of US$102 billion, an 83% increase from 2000.
- Since 1970, aquaculture has been growing at 8.4% per year, far surpassing the growth of the world population.
- The worldwide trade value of (all) fish is 3 times greater than beef, pork, or chicken.

Our research shows that ecological impact is highly correlated to production.

- China produces 61% of the world's aquaculture. All of Asia produces ~90%.
- Chinese aquaculture and carp culture in particular, stand out as having the greatest impact.
- Shrimp, prawns other carnivorous fish species are biophysically demanding.
- Salmon production uses fishmeal for feeding increasing wild catch demands and biotic depletion.
- Eel production is especially demanding in its energy requirements.
- Bivalves (mussels and oysters) and seaweeds place low demands on the environment.
- New innovations in aquaculture production will help manage environmental impacts
- Improvements in ecological impact in all of Asia, and especially in Chinese aquaculture and carp culture will have a significant effect.

The ecological impact of the same kind of aquaculture varies greatly among countries. Use of 'best practices' can lead to ecological improvement

- The impacts from eutrophication (excess nutrients leading to oxygen depletion in the water) is moderate and biotic depletion (use of wild catch for feed) high in the salmon producing nations of north Europe, Canada and Chile, but these areas are more efficient than China and Asia across other environmental impacts.
- Shrimp and prawn culture in China is much less efficient, in relative terms, than other producer countries when it comes to impact on acidification, climate change and energy demand.
- There is significant potential for large improvements in efficiency through shared learning, investment in research and the right institutional, policy and market drivers.
- Research to reduce the current impacts of aquaculture will need to be focused in Asia where production and its consequent effects are highest.

The ecological impact of aquaculture is competitive with chicken and better than beef and pork.

- Fish are comparable to chicken and more efficient than beef or pork in transferring feed into protein.
- Fish convert more of what they eat into body mass than livestock.
- Products originating from aquaculture contribute less per unit weight to global emissions of nitrogen and phosphorus than pork and beef**.**
- Each animal production system makes different demands on environmental services. Aquatic products have some advantages but much depends on the species, systems and management practices.

A review of published results shows that aquaculture affects climate change and climate change will affect aquaculture.

- While aquaculture is a relatively small contributor to greenhouse gas generation, climate change will affect the industry.
- Climate change will directly affect aquaculture production through choice of species, location, technology and production costs.
- With expected trends in climate we can expect a shift in the location of aquaculture production as new areas become more suitable

The demand for fish products from aquaculture is likely to grow.

- Increasing prosperity and urbanization are key factors in the increasing demand for aquaculture products. History shows that as incomes rise, demand for fish follows suit.
- By 2025, almost six out of ten people on earth are likely to live in urban centers, and over half of these will live in the cities of developing countries. A move from rural to urban environments leads to a change in food preference with an increase in consumption of animal source foods.
- Global aquaculture production will probably continue to grow along a similar trajectory to the recent past for at least the next five years or so. Conservative estimates are that production in 2020 could be between 65 and 85 million tones with estimates of between 79 and 110 million tonnes by 2030.
- Asia will likely account for more than 90% of aquaculture production, Europe for 3-4% and Latin America, North America and Africa for 2% each.
- The aquaculture sector has the capacity to meet increased demand by enlarging the area currently in use and by increasing intensification.

The WorldFish Center is an international, nonprofit, nongovernmental research organization dedicated to reducing poverty and hunger by improving fisheries and aquaculture. WorldFish is one of 15 members of the Consortium of International Agricultural Research Centers supported by the Consultative Group on International Agricultural Research (CGIAR). The CGIAR is a global partnership that unites organizations engaged in research for sustainable development with the funders of this work. The funders include developing and industrialized country governments, foundations, and international and regional organizations.

The WorldFish Center is committed to meeting two key development challenges: 1) improving the livelihoods of those who are especially poor and vulnerable in places where fisheries and aquaculture can make a difference and 2) achieving large scale, environmentally sustainable increases in supply and access to fish at affordable prices for poor consumers in developing countries.

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