



LESSONS LEARNED | 1903

AsiaFish: The best can become better

AsiaFish is the most comprehensive analytical model available for Asia's seafood markets, and additional funding and collaboration can extend it to enable more complex analyses and projections or to serve other regions

KEY MESSAGES

- Despite its importance to global food security, fish is rarely incorporated into food sector analytical models.
- AsiaFish models supply and demand for fish to guide policymakers and investors in nine Asian countries.
- Accurate analysis is essential as the global fish trade has expanded rapidly in recent years.
- WorldFish seeks additional collaborators and funding to expand the services that AsiaFish provides.
- AsiaFish can serve as a model for building tools to analyze fish supply, demand and trade in any country.
- Stakeholders interested in exploring how the AsiaFish model can guide pro-poor investments in fish production and trade should contact WorldFish.

Background

In response to a request from the governments of Bangladesh, China, India, Indonesia, Malaysia, Philippines, Sri Lanka, Thailand and Vietnam, the WorldFish Center embarked in 2000 on a project to help them predict future supply and demand for fish. Central to the project, which was supported by the Asian Development Bank, was the development of the AsiaFish model, which allows governments to make detailed projections and to develop strategies and options for sustaining and increasing fish supply up to 2020.

AsiaFish was later extended and modified to model the regional trade in reef food fish shipped alive to Hong Kong from China, Indonesia, Malaysia, Philippines and Thailand and to analyze the role of aquaculture as a user of trash fish in China, Indonesia, Philippines, Thailand and Vietnam. Some key results generated from these studies are presented below.

Looking ahead

AsiaFish is the most comprehensive model available for analyzing Asia's seafood markets, but it has limitations.

WorldFish therefore aims to further extend the model, incorporating more comprehensive trade linkages to enable analyses and projections of supply, demand and trade for multiple products. Accurate analysis is essential as the fish trade has expanded rapidly in recent years in response to growing global demand and falling tariffs and trade barriers. While rapid population and income growth and urbanization have raised demand for fish, supplies and fishery livelihoods are increasingly threatened by resource degradation, insufficient public support and investment, climate unpredictability, and inequitable trade regimes. Governments, nongovernmental organizations, private sector organizations and researchers need access to timely, authoritative information on changing fisheries and fish markets.

WorldFish looks forward to collaborating with economists and other researchers and planners interested in the future of Asian fisheries. It also seeks funding to expand the services that AsiaFish provides. Extending the model with trade linkages can generate a set of projections on domestic supply and demand, imports, exports, domestic prices, and international trading prices. Impact analysis can be conducted by altering variables in the baseline model and examining the resulting changes across markets. This will be useful for policymakers and investors, as projections generated by AsiaFish can guide their decisions that aim to sustain markets in the long term and ensure a more equitable flow of benefits to the poor.

AsiaFish is so named because it was developed at the request of the nine participating Asian countries. However, it can serve as a model for building tools to analyze fish supply, demand and trade in any country or region.

What AsiaFish does now

AsiaFish is a partial equilibrium model of fish supply, demand and trade in multiple markets. It can answer — for individual countries and subregions, and regarding major seafood and production categories — such important questions as the following:

- What are the prospects for fish availability in the coming years?
- Is there room for growth in fishery production?
- What impact would reducing fishing effort to conserve capture fisheries have on the structure of fish production and marketing?
- Can aquaculture fill the gap between supply and rising demand?
- Can the expansion of aquaculture be sustained?
- What significance attaches to the improved management of capture fisheries and technological progress in aquaculture?
- What are the options for meeting rising demand and improving fishery livelihoods?

These questions can be answered by exploring the following hypothetical scenarios:

- productivity improvements in aquaculture of both high- and low-value fish,
- changes in fishing effort,
- compliance with multilateral arrangements on food safety,
- changes in income,

Asia and fish

Asia accounts for over 63% of total fish production and as much as 90% of all aquaculture output. Aquaculture has become the region's fastest-growing food source, with production more than quadrupling from 14.5 million tons worth US\$46 billion in 1990 to 61.4 million tons worth \$69 billion in 2006. The steady growth of aquaculture takes up the slack left by capture fisheries that cannot grow because they are already fully exploited or worse.

Fish is vital to Asian well-being and livelihoods, underpinning local food security and earning foreign exchange for national economies. For many of Asia's poor, fish is a major source of animal protein, sometimes the only source. In Bangladesh, Indonesia and Philippines, it supplies half or more of animal protein consumed by humans, while in Thailand and Vietnam this share is 40%. Asian countries earned \$28 billion in 2006 by exporting 41% of their fish production, or double the \$14 billion they earned only half a dozen years earlier in 1990 by exporting 24% of it. Through this trade, Asian fisheries significantly contribute to global food security.

- accelerated urbanization,
- changes in fish export prices,
- changes in imported fishmeal prices,
- changes in the output of fish types producing trash fish bycatch, and
- trade policy.

The AsiaFish difference

Despite the importance of fish to global food security, it has not been incorporated into food sector models developed by the Food and Agriculture Organization or others for studying the impact of technology and policy changes on agriculture. The International Model for Policy Analysis of Agricultural Commodities and Trade, developed by the International Food Policy Research Institute and WorldFish, includes fish but is limited by its reliance on synthetic, rather than estimated, supply and demand elasticities. Its failure to adequately disaggregate fish types is another shortcoming, as fish is a highly heterogeneous commodity.

Disaggregating by fish type matters for reasons of both supply and demand. On the demand side, consumption in Asia is not of the relatively interchangeable fish fillets familiar to Western consumers, but of whole fresh fish or various fish parts. This means that consumer preferences vary widely across fish types. On the supply side, fish comes from very different production systems within the two main categories of capture and culture. Analyses that disaggregate fish types and production systems are clearly more useful for such applications as allocating resources for investment and research, comparing the likely impacts of policy options, and evaluating market prospects in the fish sector over the medium and long term. AsiaFish can address these concerns.

Key AsiaFish findings

The following are some key findings derived from projecting supply, demand and trade to 2015 for the nine Asian countries covered by the AsiaFish model:

- Growth in fish production and international trade will be slower than in previous decades.
- Supply may increase to meet growing demand, with China, Malaysia and Thailand likely to record the largest increases in output as aquaculture widens livelihood opportunities.
- China will likely be the dominant exporter among the nine countries in 2020, accounting for 52% of total exports, while the Southeast Asian share of exports declines.
- Per capita consumption will probably decline in highly fish-dependent Bangladesh, Indonesia, and Philippines, as demand growth outpaces the growth of domestic supplies and imports.
- Dominant species groups, such as carp in China and India, will continue to be among the growth leaders in the foreseeable future, but growth will also be rapid in valuable brackish-water species, especially shrimp.
- Improvements in managing capture fisheries are not expected to have significant impact on production or consumption, unlike technological change in aquaculture.

Figures 1 and 2 show projected percentage deviations from the baseline growth rate in output, consumption and exports arising from the improved productivity of farmed low- and high-value fish.

Live reef fish. The trade in reef food fish shipped alive is regionally significant, with Hong Kong as the principal consumer and the major exporters in Southeast Asia and Australia. Key questions are (1) whether stagnant or deteriorating capture supplies will restrict the growth of this valuable trade, (2) what needs to be done to ensure its expansion, and (3) what significance attaches to the improved management of capture fisheries and technological progress in aquaculture. The following are key findings derived from a set of 10-year market projections obtained from the modified AsiaFish model:

- moderate decline in capture supplies and moderate improvement in aquaculture productivity;
- rapid expansion in the volume of the trade;
- prices tending to rise as demand outpaces supply;
- mainland China expanding export quantity more than other exporting countries as its export prices decline;
- declining exports from the Philippines, as it depends on capture fisheries and, like Indonesia, will likely see export prices rise more rapidly than will countries that depend on aquaculture; and

Figure 1: Higher productivity of low-value fish in aquaculture

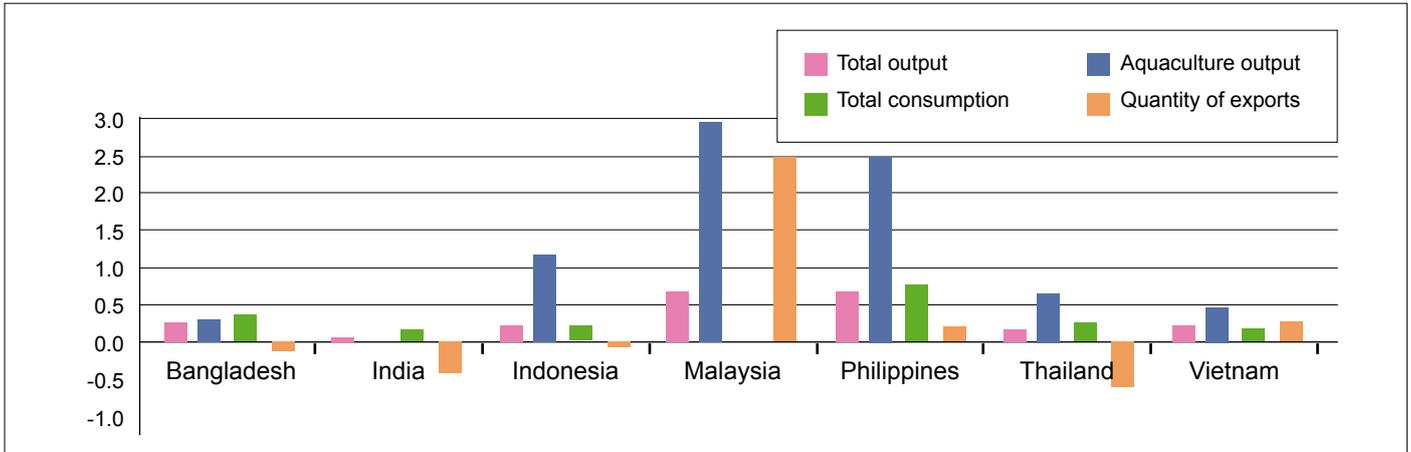
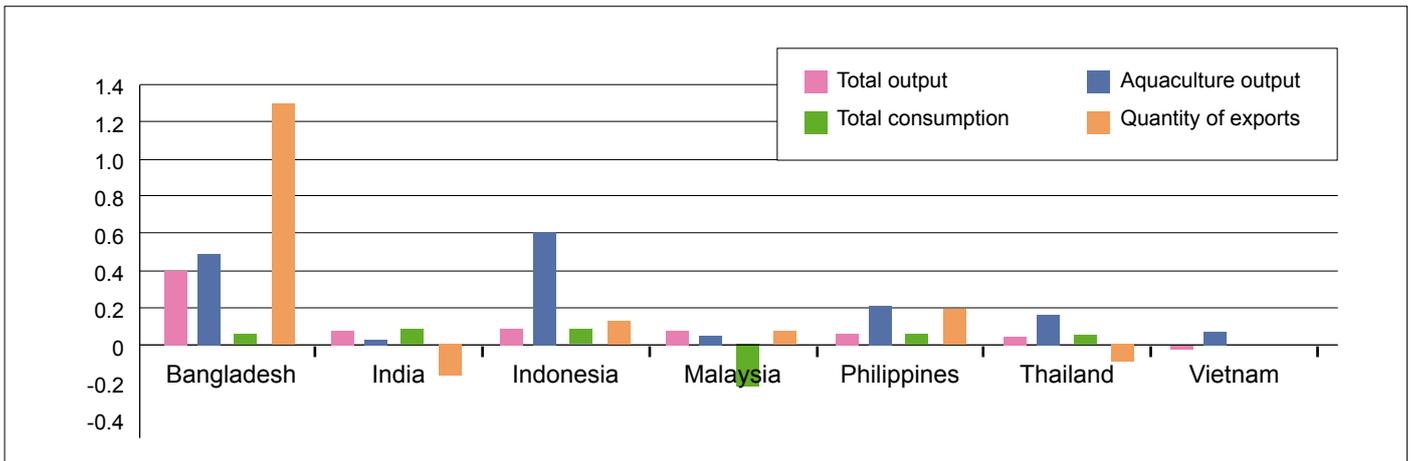


Figure 2: Higher productivity of high-value fish in aquaculture



- improvements in the management of capture fisheries and technological change in aquaculture both having significant impact on production and consumption in this particular market.

These findings suggest wide scope for expanding the volume and, to a lesser extent, the value of the trade through timely interventions in both the farming and the capture of reef fish for shipping alive. Figure 3 explores the effects of scenarios as percentage deviations from the baseline.

Trash fish. Aquaculture depends on capture fisheries to provide feed. Expanded aquaculture thus means more pressure on capture fishery resources that are already degraded. If national fishing fleets supply less trash fish and the price of imported feeds rises, the following are likely results:

- Growth in aggregate fish output will slow in line with slowing growth in capture fisheries and aquaculture.
- Slower growth in production will constrain export growth, with Indonesia likely to be the worst affected as its fish exports contract by 8.17% per annum, or 2.78 percentage points more than the baseline contraction.
- The poor will be greatly affected as they are direct consumers of trash fish.

Figure 4 shows the likely affects of a decline in the supply of trash fish from national fleets on production, consumption, export and import growth as deviations from the baseline growth rate.

Figure 3: Projections for Hong Kong fish import quantity and value by scenario

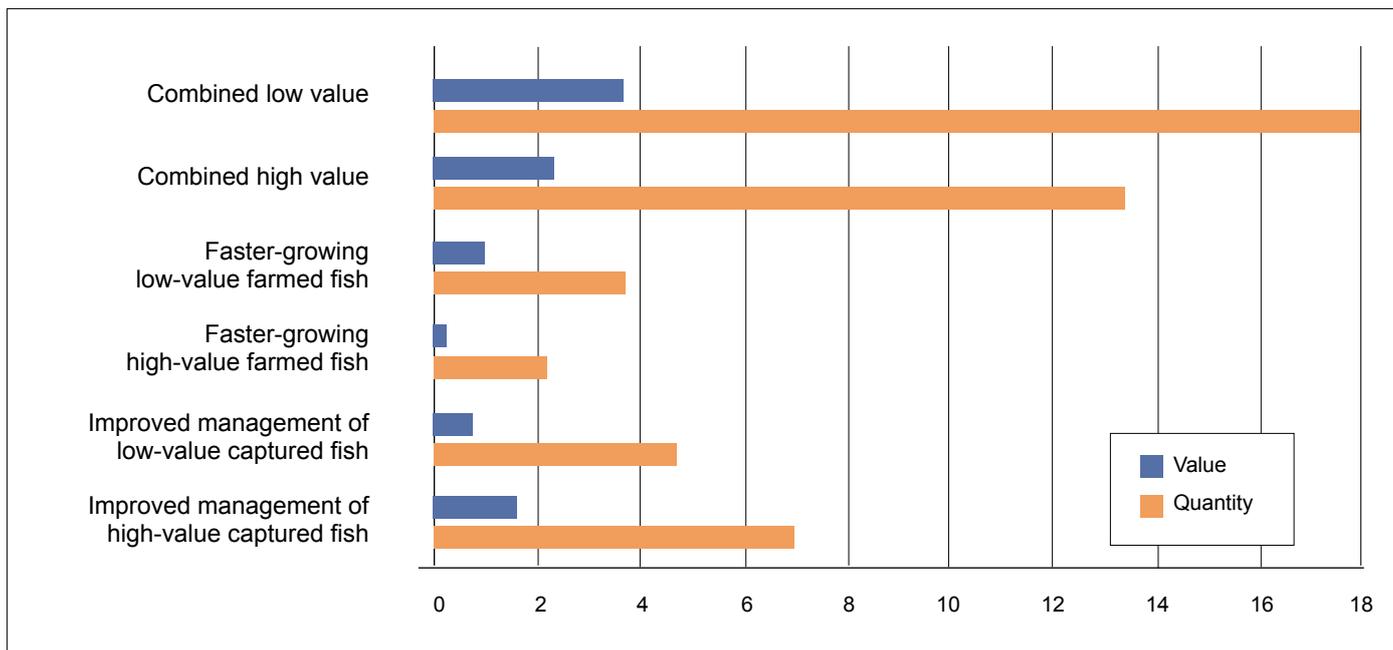
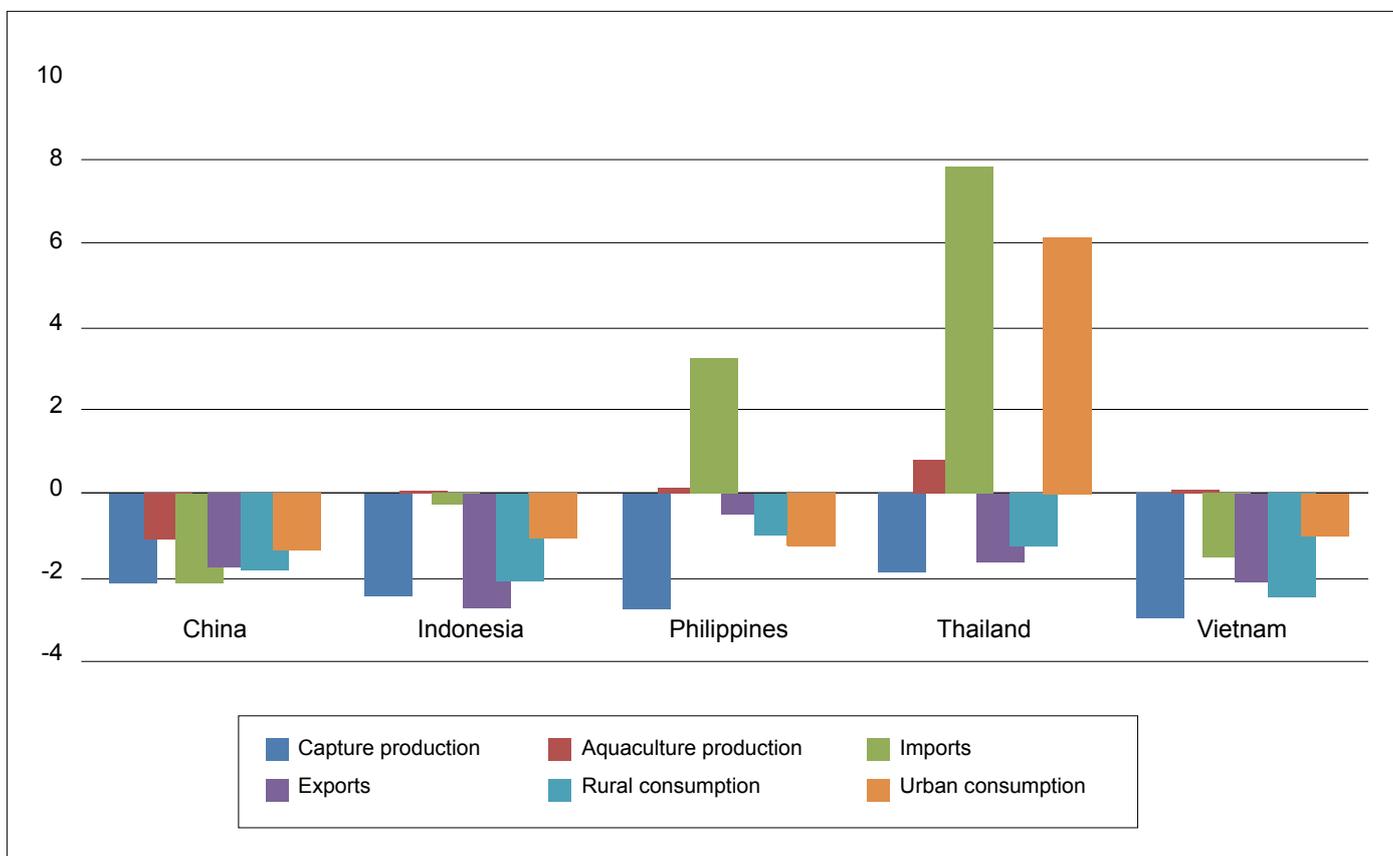


Figure 4: Effects of declining trash fish supply from national fleets



Further reading

- Bruinsma, J. ed. 2004. *World Agriculture: Towards 2015/2030*. Food and Agriculture Organization, Rome.
- Delgado, C., N. Wada, M. Rosegrant, S. Meijer and M. Ahmed. 2002. *Fish to 2020: Supply and Demand in Changing Global Markets*. International Food Policy Research Institute, Washington, and WorldFish Center, Penang.
- Dey, M.M., R.M. Briones and M. Ahmed. 2005. Disaggregated Analysis of Fish Supply, Demand, and Trade in Asia: Baseline Model and Estimation Strategy, *Aquaculture Economics & Management*, 9:1, 113–139.
- Dey, M.M., R.M. Briones, Y.T. Garcia, A. Nissapa, U.P. Rodriguez, R.K. Talukder, A. Senaratne, I.H. Omar, S. Koeshendrajana, N.T. Khiem, T.S. Yew, M. Weimin, D.S. Jayakody, P. Kumar, R. Bhatta, M.S. Haque, M.A. Rab, O.L. Chen, L. Luping and F.J. Paraguas. 2008. *Strategies and Options for Increasing and Sustaining Fisheries and Aquaculture Production to Benefit Poorer Households in Asia*. WorldFish Center Studies and Reviews No. 1823, The WorldFish Center, Penang, Malaysia, 180 p.

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