



## Economic and market analysis of the live reef food fish trade in the Asia-Pacific region

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### Introduction

The Australian Centre for International Agricultural Research (ACIAR) and the Secretariat of the Pacific Community (SPC) hosted a workshop on the economics of the live reef food fish (LRFF) trade. The workshop was part of a three-year research project funded by ACIAR to study the economics and marketing of LRFF fisheries and trade and to identify the necessary conditions for sustainability of supply and the overall trade in the long term. The purpose of the project is to assist countries involved in the trade to ensure they secure adequate returns for fish supplied to the market, and to ensure that supply is sustainable in the long term, both from wild-caught sources and aquaculture. The project is being closely coordinated with a related ACIAR project on marine finfish aquaculture in the Asia-Pacific region, headed by Dr Mike Rimmer of the Queensland Department of Primary Industries and Fisheries (Australia).

The aim of the workshop was to familiarize and involve Pacific Island countries in the project, including through the sharing of information among fishery managers, and to evaluate the usefulness of the modelling approaches being developed by the project. A second workshop is planned for 2006 at the WorldFish Center in Penang, Malaysia.

The workshop was attended by participants from six Pacific Island countries (Fiji, Papua New Guinea, Kiribati, Solomon Islands, Federated States of Micronesia and the Marshall Islands) and by researchers from SPC, Australian National University, University of Western Australia, James Cook University, Bogor Agricultural University, ACIAR, Indonesia Research Center for Marine and Fish Product Processing and Socioeconomics, Queensland Department of Primary Industries and Fisheries and the WorldFish Center. Indonesian researchers were encouraged to provide the perspective of Asian countries involved in the trade.

### Background to the trade

Marine fish are an important component of the diet in Asia and the Pacific, and their capture and culture are important sources of income in coastal communities throughout the region. In Asia, including Hong Kong and mainland China, a number of higher value species are transported live to the market and freshly cooked. These products are often consumed on celebratory occasions, such as special family occasions and successful business events. In restaurants, the live fish are chosen from tanks by the customers just prior to cooking and serving. Restaurant prices are 100–200% higher than reported wholesale prices, with the preferred size being plate-sized, or 0.5–1.0 kilograms.

The demand for LRFF is substantial, with recent estimates valuing the trade at the retail level for Hong Kong and mainland China at more than 400 million United States dollars (Sadovy et al. 2003). Currently, approximately 20,000–25,000 tonnes (t) of LRFF are traded through Hong Kong annually. The rate of trade was substantially higher during the mid-1990s, prior to the Asian economic crisis. Both wild-caught and aquaculture-raised fish enter the trade and a substantial portion of LRFF entering Hong Kong is subsequently transshipped to mainland China. This proportion is currently estimated at 40–50%, according to the Hong Kong Chamber of Seafood Merchants (pers. comm. E. Lai, General Manager, Fish and Vegetable Marketing Organizations, Hong Kong, February 2005).

It has proved difficult to accurately quantify the volume of trade because fishing vessels operating out of Hong Kong that are licensed by China have been exempted by the Hong Kong government from the need to declare their imported fish. Consequently, the trade statistics supplied by the Hong Kong government exclude the catches from these vessels (although some traders have voluntarily reported their imports via these vessels; Sadovy et al. 2003). It appears that the absence of LRFF imported via China-licensed vessels in the

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database may lead to approximately 3000 t per year, or about 15% of total LRFF imports to Hong Kong, not being accounted for (Agriculture, Fisheries and Conservation Department 2003). Also, prior to 1997 it was not possible to identify individual species or even species groups, as live fish imports were recorded only as either food fish or ornamental fish.

Hong Kong has been the centre of demand for LRFF for many years. Demand for these fish increased strongly from the 1960s as personal incomes rose. Total annual reported imports of LRFF peaked in 1998 at approximately 22,000 t (Sadovy et al. 2003). In terms of the fish categories used by Hong Kong's Agriculture, Fisheries and Conservation Department (2003), "high value species" comprised approximately 1000 t, "other groupers" (medium priced) 5000 t, "snooks and basses" 1200 t and "other marine fish" 15,000 t. With the Asian economic crisis in 1999 and the eventual downturn in personal incomes in Hong Kong, reported imports declined by approximately one-third by 2003, to just under 15,000 t (Agriculture, Fisheries and Conservation Department 2003).

The Asian economic crisis caused some lasting changes in the market. Imports to Hong Kong of high value species grew steadily from approximately 1000 t in 1998 to 2500 t in 2003. During the same period, imports of lower value species (snooks and basses, and other marine fish) declined from 15,000 t to approximately 5000 t per year. LRFF prices have fallen steadily since early 2002 and different groups of consumers have reacted in different ways to the changing market conditions. Higher income consumers appear to have continued to demand the higher priced LRFF in increasing quantities, while lower income consumers have reduced consumption of LRFF.

### **Key issues raised during the workshop**

Pacific Island countries are seeking more timely access to data on the market conditions in Hong Kong and southern China so that they can assess the fairness of prices being paid to local fishers. Market chain analysis is a valuable tool to enable countries to assess the fairness of returns being received by local fishers in price negotiations. This issue is central to their consideration of requests for access to their fishing grounds by foreign traders, as they have an interest in capturing resource rents that are commensurate with the benefits accrued by non-local fishing companies when accessing local fishery resources.

Another challenge for Pacific Island governments is ensuring that the benefits of this access are equi-

tably shared amongst fishing communities. The underlying legal basis of access may need to be clarified in national fishery legislation in order to better recognise the various tiers of resource ownership. Access to LRFF by foreign traders can adversely affect local subsistence catches of reef fish as well. There is need for a "balance sheet" approach that looks at both the potential benefits and the potential costs to the community of providing access.

The workshop participants agreed that the Pacific Islands should take a risk management approach to their wild-caught fisheries. For example, they should permit conservative access to the stock, but only as long as they include regular stock status monitoring (via vessel observers and fishery-independent resource surveys) as part of the management regime and recoup the costs of management from the fishing operations. They were also encouraged to clarify any legal ambiguity about fish stock ownership and management in legislation before granting licenses, to ban destructive fishing practices (penalized by the automatic loss of a license), and to close fishing grounds during spawning aggregation periods.

The question of how to determine sustainable levels of utilisation of wild fish stocks was recognised as being the key to establishing any long-term sustainable LRFF fishery in the Asia-Pacific region. Fishery managers require tools that enable them to assess optimal catch levels — that is, levels that are both sustainable and profitable — but the data needed to do this are currently unavailable. It was therefore considered worthwhile to develop some rules of thumb (ROT) on sustainable catch rates for guidance for Pacific and Asian fisheries. The need for such ROT was first brought up during the LRFF Trade Industry Standards Workshop organised by The Nature Conservancy (TNC) and the Marine Aquarium Council (MAC) in Townsville, Australia, in 2002. Some preliminary discussions on the appropriate rules that should be included in the LRFF Trade Standards took place during that workshop, but no such ROT appear to have been included in the Standards that were ultimately developed. The participants in this 2005 workshop reiterated the importance and need for such ROT. This project will review the work that has been done on this and continue the development of ROT that can serve as a useful tool for fishery managers.

The Pacific Islands have occasionally supplied small numbers of ciguatera fish to Hong Kong, resulting in ciguatera poisoning incidents that have affected dozens of consumers. These incidents have been well publicised in Hong Kong and internationally, resulting in the Pacific Islands acquiring

a reputation for supplying ciguatoxic fish. This has impacted the supply of LRFF from Pacific Island countries, as Hong Kong distributors have become cautious about importing fish from the region. In response, strategies for avoiding ciguatoxic fish in the supply of wild-caught LRFF from the Pacific Island region need to be developed.

Aquaculture technology is advancing rapidly, and higher value LRFF species such as the humpback (or highfin) grouper (*Cromileptes altivelis*) and coralgroupers (*Plectropomus* spp.) are now being raised from hatchery-reared seed stock in Taiwan. Monitoring the production effects of this development should be a priority over the next few years, as prices for wild product could be significantly lowered by production surges of cultured product.

There is a need to more closely examine LRFF trade flows into southern China, as it is anticipated that most of the growth in demand will occur there. Aquaculture production of LRFF in southern China is also increasing rapidly. The quality of demand and supply statistics for China is poor and will need to be improved in order to allow better tracking and understand of both these trends in the future.

### Next steps in the project

The papers presented at the workshop are currently being prepared for publication as workshop proceedings, which are expected to be available in late 2005. The proceedings will also include relevant papers that are available on the website of the Network of Aquaculture Centres in Asia-Pacific (NACA: [www.enaca.org](http://www.enaca.org)).

The ACIAR project will be conducted over the period July 2004 to December 2006. The principal researchers involved in the project are developing further papers on key aspects of the trade, including:

- Econometric analysis of the demand for LRFF in Hong Kong and mainland China.
- Analysis of supply relationships for wild-caught and cultured LRFF supply from the main supplying countries (Indonesia, Hong Kong and mainland China, Malaysia, Philippines, Vietnam, Pacific Island countries, Australia).
- Analysis of the cost components and risks of the market chain and development of spreadsheet models for cooperating countries (wild-caught and aquaculture models).
- Market chain analysis to test for market power and whether any part of the supply chain can set prices along the chain from fisher to retailer.
- Integration of demand and supply through development of models for projections.
- Assessment of consumer preferences for wild-caught versus cultured product.
- Use of bio-economic models and other econometric tools to identify policy options for future management of the LRFF trade to ensure it is sustainable in the longer term.

The expected outcome of the research is a better understanding of the marketing chain for LRFF, including how prices are set in the chain and how Pacific and Asian fishery managers can use the tools of economics to ensure — as far as is practicable — that fishers and their communities receive a fair return for the sustainable utilisation of their fishery stocks. As noted in the introduction, the purpose of the overall project is to assist countries involved in the trade to ensure that they secure adequate returns for fish supplied to the market and that supply is sustainable in the long term, both from wild-caught and cultured sources. Should readers seek further background information on this project, please contact the authors.

### References

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