



A socioeconomic perspective on the live reef fish food trade for small-scale artisanal fishers based on case studies from the Pacific¹

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This summary highlights some of the economic and social aspects of small-scale artisanal reef fisheries (SSARF) in Pacific Island countries (PICs) that need to be taken into account if a shift to a commercial fishery, such as the live reef fish for food (LRFF) fisheries, is to be considered. These observations are based on experiences gained during field surveys on the current status of reef fishery resources in PICs³.

The LRFF trade is one of the emerging fisheries that may add value to the region's reef resources and is considered as an attractive income generator for coastal communities in PICs. Case studies presented in Annex I illustrate that the LRFF trade may offer between three and five times the revenues that small-scale commercial reef fisheries generate. While an initial assessment of the opportunity to generate the much needed cash may be appealing, the introduction of a new fishery must take into account possible detrimental effects to the resource and the socioeconomics of the communities concerned. Some of the risks presented here are not restricted to the LRFF trade only. Many factors of concern discussed below also apply to other emerging small- to medium-scale commercial coastal fisheries in PICs, such as the aquarium fishery, beche-de-mer, and live rock and coral harvesting. The factors that are likely to be common across these various commercial fisheries have been used for a qualitative comparison of their likely magnitude of impact as presented in Annex II.

In terms of the LRFF trade, factors that need to be considered include:

- The LRFF trade is generally very selective in terms of target species and often targets spawning aggregations. The target species are also generally important fish for local communities.
- The sustainability of fishery productivity, and the impact of the possible resultant competition for species that are an important food species for the local community, need to be assessed.
- The LRFF trade is a commercial fishery but all members of the community may not be able to participate or benefit. This may result in detrimental social changes as there is a risk of inequities between groups in the community who do or do not have access to this fishery. This can lead to disputes and/or conflicts with regards to distribution of income, job opportunities, etc., from customary marine tenure (CMT) areas leased to the fishery.
- It is found to be the case that fishers who participate in the LRFF trade often abandon fishing for subsistence (home consumption). This pattern, coupled with increased cash income, may alter consumption patterns in favour of processed (i.e. tinned) imported goods, and create a burden of debts if the income flow is not continuous and does not support the increased household expenditure level. This may increase pressure on the social "share-and-care network" within a community.
- The LRFF trade is likely to be mainly – if not exclusively – participated in by men. The issue of gender participation in fisheries, including possible gender inequities with regard to access to the resource, equipment and in particular, changes in access to income, needs to be considered.
- Participation of community members in the LRFF trade may require them to obtain motorised boats and specialised equipment. While the necessary investment costs are usually met by the entrepreneur, instalment payments for boats and equipment are generally expected to be made by participating fishers, who will own these amenities in the long term.

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3. The Coastal Component of the European Union (EU) 8th and 9th European Development Fund (EDF) funded Pacific African-Caribbean-Pacific States (ACP) and the French Overseas Countries and Territories (OCT) Regional Oceanic and Coastal Fisheries Development Programme (PROCFish) is undertaking a comparative assessment of the status of reef fisheries, both resource and socio-economic, and development of indicators to assist future monitoring.

This arrangement involves risk of financial dependency and may influence local decision making regarding exploitation of resources, possibly leading to overexploitation (Hollup 2000).

- The LRFF trade is an export fishery, therefore the market is determined by external factors that drive demand and influence profit margins. The market can therefore fail due to political and/or economic situations external to and beyond the influence of the participating communities.
- The long-term success of the trade will also depend on the participation of local communities and fishers for whom catching fish to keep alive for market is a new concept. Because the participating communities lack experience, skills training may be required to equip community members and fishers accordingly.
- The LRFF trade generally requires licensing in most PICs. However, responsibilities for licensing, monitoring and compliance may be spread over a number of different governmental and non-governmental bodies. For instance, in the case of the aquarium trade industry in Vanuatu, foreign investors are required to have approval, and need to register with the Vanuatu Investment Promotion Authority (VIPA). Three distinct levels are involved as regulatory and management authorities, including the national government (VIPA, Department of Fisheries and the Environmental Unit for CITES), the provincial governments (six in total), and the resource owners under CMT (Hickey 2002). While such instruments aim to properly establish effective and efficient monitoring and surveillance mechanisms, insufficient technical expertise or management capacity, and confusion due to the various authorities involved, are major constraints in achieving sustainability of the trade.

Taking into account the above arguments, we would like to highlight three major socioeconomic aspects that need to be considered for the introduction of the LRFF trade from the participating fisher and resource owner community's point of view.

Monetary and non-monetary resource values

While it is true that coastal communities in PICs are increasingly moving to a cash-based economy, the communities where reef fisheries play an important economic role (both subsistence and

cash) and which are potentially targeted for the LRFF trade are generally still more traditionally oriented. The introduction of a commercial fishery such as the LRFF trade often introduces a monetary value for the community's marine resources. Such new cash values may co-exist with, but at times can also compete with and impact on, the traditional social processes inherent in a traditional social system (reciprocal exchange system), such as contributions to food security, maintenance of networking and social coherence amongst community members, and the strengthening of social institutions (Iwariki and Ram 1984; Kronen 2004). In other cases, conflicts arise in fishery resource ownership, access rights, access fees and general jurisdiction over areas leased out to companies. Consequently, the risk of reducing social coherence and resilience in target communities should be considered.



Figure 1. A fisherman in the Lau Group, Fiji, uses a wooden boat equipped with a 30 horsepower outboard engine and appropriate store facilities provided by the local LRFF agent to pursue traditional fishing during absence of the LRFF mother boat (photo by Mecki Kronen).

Cost-benefit analysis (needs, risks and opportunities)

The need to generate income may be seen in relation to the current lifestyle and weighed against the productivity, viability and lifespan of a new commercially oriented fishery such as the LRFF trade (Adams 1998; Foale and Day 1997; Kinch 2002; Foale and Manele 2003). The socioeconomic consequences, and also the risk of detrimental and usually long-term ecological effects (Adam et al. 1997; Selvam and Ramasamy 2000; Krishnan and Birthal 2002), of fisheries that may only pro-

vide immediate or short-term wealth to a community need to be considered and compared to other fisheries and/or income alternatives. Promoting and introducing a fishery opportunity that needs a relatively high investment, given the usually cash-poor situation of most rural communities in PICs, may create “a culture of dependency” (Sauni et al. in prep.). Thus, a community may be forced into harvesting marine resources increasingly for export, or to collect and sell non-target species in exchange for a lifestyle of less quality (nutrition), higher dependency and reduced social coherence (Fitzhugh 2001).



Figure 2. Traditional paddle outrigger canoe used by fishermen on Efate, Vanuatu (photo by Mecki Kronen).



Figure 3. Traditional sailing outrigger canoe used by fishermen in the Maskelynes, Vanuatu (photo by Mecki Kronen).

Sensitivity analysis regarding sustainability and social and economic viability

The LRFF trade often involves the leasing of reef areas without properly defined boundaries, which increases the potential for conflicts and disputes in CMT areas. Principles such as benefit sharing, equity in access or use of land and sea resources are fundamental to traditional social networking and security (Taylor and Singleton 1993; Aswani 2002). Thus, there are possible effects of commercial fisheries such as the LRFF trade to be taken into account as they may provide economic benefit to a few individuals or families through use of common resources that also support the livelihood and food security of the entire community. The terms of the trade (and associated level of harvesting) are primarily determined by the export company (based on the principle of profit maximisation), with little attention paid to the sustainability of the resource. Local partners also run the risk of companies pulling out in the advent of the application of stricter environmental controls, customs regulations or application of management policies.

The above points are just some of the significant factors that should be taken into account by decision-makers and community leaders where a move from subsistence to one of these small- to medium-scale commercial fisheries is under consideration.

References

- Adams T. 1998. The interface between traditional and modern methods of fishery management in the Pacific Islands. *Ocean and Coastal Management* 40:127–142.
- Adam M.S., Anderson R.C. and Shakeel H. 1997. Commercial exploitation of reef resources: Examples of sustainable and non-sustainable utilization from the Maldives. p. 2015–2020. In: Lessios H.A. and Macintyre I.E. (eds). *Proceedings of the 8th International Coral Reef Symposium*, Panama City, June 24–29, 1996, v 2.
- Aswani S. 2002. Assessing the effects of changing demographic and consumption patterns on sea tenure regimes in the Roviana lagoon, Solomon Islands. *Ambio* 31(4):272–284.
- Fitzhugh B. 2001. Risk and invention in human technological evolution. *Journal of Anthropological Archaeology* 20:125–167.

- Foale S. and Day R.W. 1997. Stock assessment of trochus (*Trochus niloticus*) fisheries at West Nggela, Solomon Islands, with notes on management. *Fisheries Research* 33:1–16.
- Foale S. and Manele B. 2003. Privatizing fish? Barriers to the use of marine protected areas for conservation and fishery management in Melanesia. *Resource Management in Asia-Pacific Working Paper No. 47*. Canberra: Resource Management in Asia-Pacific Program, Research School of Pacific and Asian Studies, the Australian National University.
- Hickey F.R. 2002. Vanuatu marine ornamental workshop. National multi-stakeholder workshop and introduction to MAC certification, Port Vila, Vanuatu, November 11–12, 2002.
- Hollup O. 2000. Structural and sociocultural constraints for user-group participation in fisheries management in Mauritius. *Marine Policy* 24:407–421.
- Iwariki S. and Ram V. 1984. An introductory study of the socio-economic aspects of household fisheries in the small islands economies of the South Pacific. *Mem. Kagoshima Univ. Res. Centre S. Pac.* 5(1):53–65.
- Kinch J. 2002. Overview of the beche-de-mer fishery in Milne Bay Province, Papua New Guinea. *SPC Beche-de-mer Information Bulletin* 17:2–16.
- Krishnan M. and Birthal P.S. 2002. Aquaculture development in India: An economic overview with special reference to coastal aquaculture. *Aquaculture Economics and Management* 6(1–2):81–96.
- Kronen M. 2004. Fishing for fortunes? A socio-economic assessment of Tonga's artisanal fisheries. *Fisheries Research* 70:121–134.
- Sauni S., Kronen M., Sauni L.F., Vunisea A., Vave R.D. and Labrosse P. (in prep.). An assessment of the live coral and rock extraction fishery at Muaivuso *qoliqoli*, Fiji Islands.
- Selvam S. and Ramasamy C. 2000. Socio-economic and environmental impacts of shrimp farming. p. 52–58. In: Krishnan M. and Birthal P.S. (eds). *Aquaculture development in India. Workshop Proceedings 7*. New Delhi: National Centre for Agriculture Economics and Policy Research.
- Taylor M. and Singleton S.G. 1993. The communal resource: Transaction costs and the solution of collective action problems. *Political Science* 21:195–215.

Annex I. Case studies comparing possible gross revenues (in USD/hour of fishing time) from small-scale commercial and small-scale traditional fisheries in selected communities of Fiji, Kiribati and Vanuatu.

a) Comparison of the LRFF trade and small-scale traditional fin fisheries in the Lau Group, Fiji.

	LRFF trade Lau Group Fiji presence of mother boat	LRFF trade Lau Group Fiji absence of mother boat (middleman)	Small-scale traditional fin fisheries Lau Group Fiji
Average fishing time (hr)	49.5 (per week)	6 (per week)	654 (per year)
Average catch (kg)	345 (per week)	30 (per week)	1,293 (per year)
Price (USD/kg)	1.66	1.48	1.18 (average)
Total revenues (USD)	571.68 (per week)	44.39 (per week)	1530.40 (per year)
Revenue (USD/hr-fished)	11.55	7.40	2.34

The Lau Group case study is based on average figures from interviews conducted with 25 small-scale traditional fishers (four of whom also participated in the LRFFT fishery) in Nukunuku village, within the framework of the DemEcoFish/PROCFish/C project, Secretariat of the Pacific Community, September 2002 (FJD-USD exchange rate: 0.59180).

b) Comparison of live coral and rock extraction fishery and small-scale traditional fin fisheries in Muaivuso, Fiji.

	Live coral and rock extraction fishery Muaivuso Fiji	Small-scale traditional fin fisheries Muaivuso Fiji
Average fishing time (hr/week)	20	25
Average revenue (USD/week)	10.36	11.84
Revenue (USD/hr-fished)	0.52	0.47

The Muaivuso case study is based on average figures from interviewing 28 households in August 2002 within the framework of the PROCFish/C project, Secretariat of the Pacific Community and collection of

complementary information on live coral and rock extraction fishery only in May 2003. Details of the Muaivuso case study are given in Sauni et al. (in prep.) (FJD-USD exchange rate: 0.59180).

c) Comparison of the aquarium fish trade and small-scale traditional fin fisheries in Christmas Island, Kiribati.

	Aquarium fish trade Christmas Island Kiribati	Small-scale traditional fin fisheries Christmas Island Kiribati
Average fishing time (hr/year)	312	800
Average catch	flame angel: 20 (specimens) lemon peel: 20 (specimens) gold flake: 1 (specimen) blue tang: 20 (specimens)	2300 kg
Price (USD)	flame angel: 1.00 (per specimen) lemon peel: 0.80 (per specimen) gold flake: 10.00 (per specimen) blue tang: 2.00 (per specimen)	0.50 (village)
Total revenues (USD/year)	4128.00	1150.00
Revenue (USD/hr-fished)	13.23	1.44

The Christmas Island case study is based on average figures from three aquarium fishers and 21 small-scale traditional fin fishers interviewed in Tabakea, August 2004, in the framework of PROCFish/C project, Secretariat of the Pacific Community (AUD-USD exchange rate: 0.75979).

d) Comparison of beche-de-mer fishery and small-scale traditional fin-fisheries in Moso, Vanuatu.

	Beche-de-mer fisheries Moso Vanuatu	Small-scale traditional fin fisheries Moso Vanuatu
Average fishing time (hr/year)	120	128
Average catch (kg/year)	lolifish: 50 greenfish: 50 others: 150	320
Price (USD/kg)	lolifish: 1.65 greenfish: 2.75 others: 3.66	1.83 (village)
Total revenues (USD/year)	769.44	586.24
Transport cost to Port Vila	36.64	–
Revenue (USD/hr-fished)	6.11	4.58

The Moso case study is based on average figures from beche-de-mer and small-scale traditional fishers interviewed on Moso Island, October 2003, within the framework of the PROCFish/C project, Secretariat of the Pacific Community (VUV-USD exchange rate: 0.00916).

Annex II. Selected factors to compare the LRFF trade to other commercial and small-scale artisanal reef fisheries (0 = lowest, 3 = highest).

Parameter	LRFF trade	Aquarium trade fisheries	Live coral & rock fishery	Beche-de-mer fishery	Reef fishery
Selection of target species	3	3	3	3	1-2
Target species are also used for subsistence	1-2	0	0	1	3
Income opportunities	3	3	2-3	3	2
Catch may be used in non-monetary exchange	1-2	0	0	1	3
Gender involvement	men	men	men/women	men/women	men/women
Investment needs	3	3	1	1 (3)	1-3
Special skills needed	2	3	1	1 (3)	1-3
Dependency on a particular marketing network	3	3	2	2	1
National market demand	1	0	0	1	3
International market demand	3	3	3	3	1
Licensing requirements	3	3	3	3	1