

Understanding the sea cucumber (beche-de-mer) value chain in Fiji and Tonga

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Abstract

As reported in other Pacific island communities and many countries around the world, wild stocks of sea cucumber in Fiji and Tonga are declining because of unsustainable levels of fishing. The Pacific Agribusiness Research for Development Initiative (PARDI) is a partnership involving the Secretariat of Pacific Community, the University of the South Pacific and a consortium of Australian universities, funded by the Australian Centre for International Agricultural Research. PARDI seeks to create sustainable livelihoods by identifying constraints to economic development in the Pacific islands region, and by developing appropriate technologies or products to resolve these constraints. It is currently evaluating the sea cucumber industry and its contribution to community livelihoods in Tonga and Fiji. This paper presents preliminary literature search findings of the PARDI study into sea cucumber market chains in these two Pacific island countries. Although an initial literature review revealed a scarcity of reliable information, interim maps of the current supply chains of both Fiji and Tonga have been developed and are discussed here. Research outcomes may lead to improvements in processing, value-adding to beche-de-mer and identification of new niche markets, and may facilitate investment in sea ranching and aquaculture.

Introduction

Sea cucumber is a valuable resource for income generation for many remote coastal dwellers in Fiji and Tonga, but the fisheries have exhibited boom–bust cycles since the early 1800s (Kinch et al. 2008). Fresh harvested sea cucumbers undergo a series of cooking and drying processes to produce a dried, shelf-stable product (beche-de-mer) that can be shipped in ambient dry conditions to markets in Asia, where it is highly prized by Chinese consumers (Ferdouse 2004). There are many species exploited, with some commanding high prices, but there is significant variability in quality and grade of beche-de-mer (Choo 2008; Kinch et al. 2008).

As reported in other Pacific island communities and many countries around the world, wild stocks of sea cucumber in Fiji and Tonga are declining because of unsustainable levels of fishing (Kinch et al. 2008). Consequently, sea cucumber (particularly sandfish, *Holothuria scabra*) is becoming a priority group for development in the aquaculture plans of a number of countries, although, in reality, more development is needed before it can become a commercially viable alternative.

A new development initiative related to sea cucumber has been funded by the Australian Centre for International Agricultural Research (ACIAR): the Pacific Agribusiness Research for Development Initiative (PARDI). The partnership includes the Secretariat of the Pacific Community (SPC); the University of the South Pacific (USP); a consortium of Australian universities, including the Adelaide University Value Chain group, James Cook University and researchers from Southern

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Cross University; as well as industry representatives and government agencies in selected Pacific island countries (PICs).

PARDI seeks to create sustainable livelihoods by identifying constraints to economic development in the Pacific islands region, and undertaking research to develop appropriate technologies or products to resolve these constraints. Therefore, it is currently evaluating the sea cucumber industry and its contribution to community livelihoods in Tonga and Fiji. This paper presents preliminary literature search findings of the PARDI study into the sea cucumber market chains in these two PICs.

Methodology

In order to identify potential constraints to the sea cucumber industry in Fiji and Tonga, PARDI has adopted the following approach:

1. Review research and literature that have been undertaken in the Asia–Pacific region to identify gaps in our understanding of the whole value chain.
2. Analyse and map the existing value chain from harvesting → processing → export → distribution → consumption.
3. Identify key partners and stakeholders (public and private) willing to co-invest and contribute to the research process, and who are also willing to participate in implementing change and improvements.
4. Conduct research into constraints that limit the ability of these market chains to be more market responsive, equitable and, ultimately, more sustainable.

Results and discussion

Literature review

An examination of existing literature (currently in progress) has highlighted significant gaps in knowledge about the current status and long-term sustainability of the beche-de-mer value chains in both Fiji and Tonga. It indicates that there is a lack of coordination between participants dependent on financial returns from fishing, processing and export, and that the issue of overfishing will need to be addressed by participants. There are also some issues relating to the impacts of harvesting and processing methods (Ram 2008).

Industry structure

There are a large number of operational steps and participants involved in the industry, particularly once the beche-de-mer is exported. PARDI investigations have identified some key knowledge gaps in both the supply and demand sides of the industry in both countries, and a picture of the flow of value in transactions from fishing to consumption is emerging. Interim maps identifying key components of the current supply chains in both Fiji and Tonga have been developed (Figures 1, 2).

While there are purported to be up to 19 buyers and processors listed in Fiji, the industry appears to be consolidating, and a number of operators have left the industry. The estimated harvest volume and value presented here is based on data provided by Fiji Fisheries (FITIB 2009). In Tonga, sea cucumber harvest volume and value are estimated from Fisheries Department data. However, the economic returns and importance to the three island regions participating in this industry require further substantiation. The amount of sea cucumber collected live (fresh:dried = 12:1) (Skewes et al. 2004; Purcell et al. 2009) has been used to estimate beche-de-mer export volumes across all species; however, drying conversion ratios vary between species and may require further validation.

Preliminary estimates indicate that the value of the raw commodity when consumed by restaurant patrons in China and other markets in Asia is increased in value many times. Further research interviewing participants in target markets will be undertaken.

Chain orientation

Both Fiji and Tonga beche-de-mer industries are very much ‘supply driven’, where fishers, processors and exporters push product down to the next part of the chain. There are no industry development plans, and the literature search found little evidence of collaboration or flow of information between the fishing community, processors, exporters, customers and consumers of beche-de-mer in international markets.

Flow of value and information

Well-processed and dried beche-de-mer is an internationally traded commodity in high demand, but the flow of commercial value (cash income) from value-adding and marketing is tightly held by a few operators, and value returns to fishers from the resource are limited. Remote communities, whose

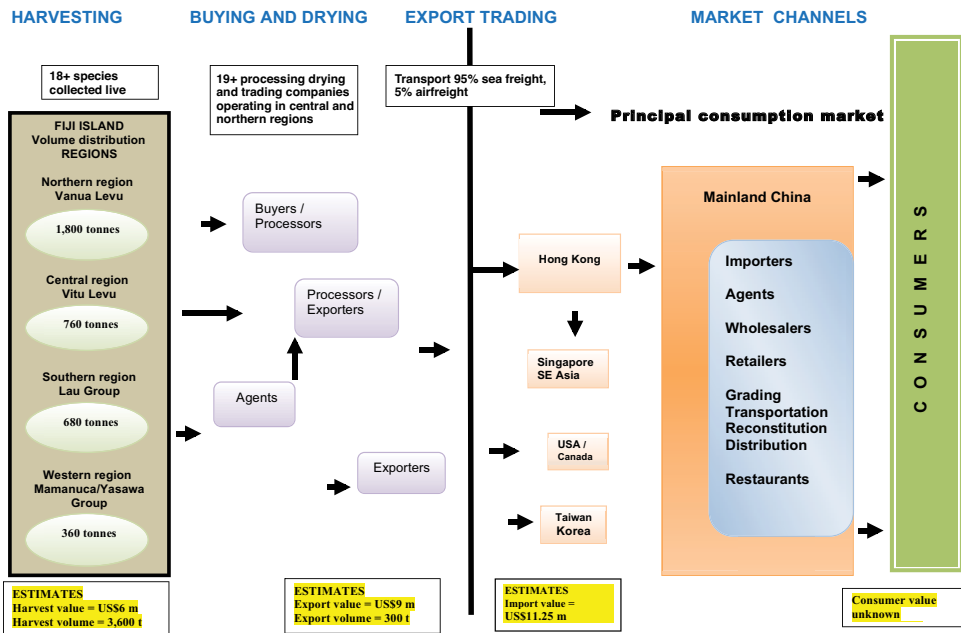


Figure 1. Proposed Fiji beche-de-mer value-chain map based on information gathered by PARDI to date, and supply-chain information from Brown et al. (2010)

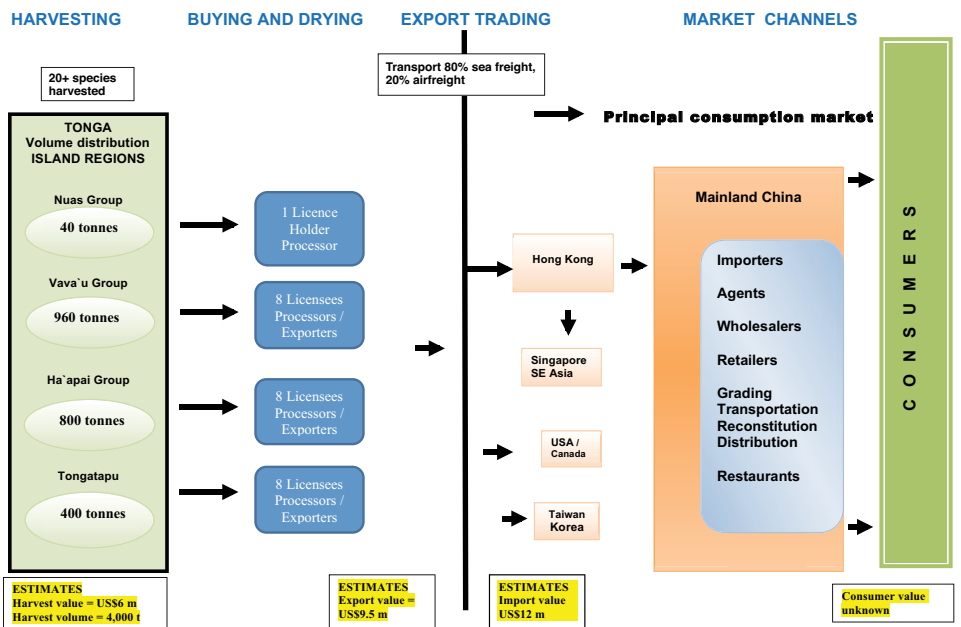


Figure 2. Proposed Tonga beche-de-mer value-chain map based on information gathered by PARDI to date, and supply-chain information from Brown et al. (2010)

livelihoods depend on the harvesting and processing of sea cucumber, have little understanding of export customer and consumer requirements, and are at the mercy of local middlemen and traders.

Beche-de-mer is generally not consumed locally but exported, mainly to destinations with large Chinese populations (Akamine 2009). However, the lack of publicly available knowledge around the structure of the distribution channels in Asia makes it difficult to collect information that will encourage changes to practices, and improvements in returns to participating communities. There was no public information available about assessing the economic impact of the decline in the wild resource, and it is difficult to determine what livelihood returns are generated to flow back to communities.

Processing and export

From the supply side, researchers have identified that there is some waste of the resource that occurs during the harvesting and processing stages of beche-de-mer (Ram et al. 2008). Production losses, due to undersized product, low-value species, postharvest damage and poor processing, may require intervention if deemed significant. PARDI has commissioned a new scoping study (to commence in 2011) on processing improvements, which will attempt to address these issues.

In Fiji, some processors have raised concerns about the viability of the industry as catches decline, and they fear that declining stocks in Tonga may lead to a flood of new traders setting up new harvesting and processing arrangements in what is already a diminishing resource. Fiji and Tonga fisheries agencies have a history of regulating the exploitation of the fishery (Adams 1993).

There are many markets around the world that import beche-de-mer, particularly in Asia (Choo 2008). Little is known about the structure and role of agents, processors, licensees and exporters in these markets. Export volumes, species, quality and grades, sizes and value (Figures 1, 2) are estimated, and it is unclear which destination markets are exploited when, why and by whom? The market that has the most influence is mainland China, which traditionally has used Hong Kong (*duty free entrepôt*) to access sea cucumber and other dried marine products from all parts of the world. These markets are principally located in the southern province of Guangzhou, with product traded to many markets throughout China. The growing affluence and opening up of China is

changing these trading patterns, and may provide opportunities to identify new market channels and consumer segments.

Markets and consumers

No reliable information on beche-de-mer exists that identifies the current structure and performance of market channels and participants in the export trade. Further research is required to identify data collected on the volume, value and destination of product exported from Tonga and Fiji. The preliminary value-chain maps (Figures 1, 2) describe the elements of each market chain. These are based on beche-de-mer research from Asia and the trading structures of other commodities exported to these markets (Brown et al. 2010).

Consequently, little baseline information about wholesale and retail market channels, and the purchase behaviour and consumption of beche-de-mer by consumers, can be presented. Potential improvements in returns based on innovative product packaging or other specifications are therefore difficult to estimate. However, there is an expectation that, with growing expansion of the economy, the demand for beche-de-mer among Chinese consumers will continue to grow in both volume and value terms in the future.

Once beche-de-mer is exported from the Pacific region, it undergoes many changes in handling, and passes through many destinations before it ends up in a restaurant on a plate. Further grading and reconstitution is undertaken and, in some cases, the product is sold in forms other than for food consumption. The product's uses are diverse, and the value of the resource in these applications may need to be further understood.

The lack of information on consumer preferences for the end product means that there are very few options for resource owners to exploit.

Recommendations for further research

In order to better understand the value chain and complete its mapping, the following research is recommended:

1. conducting a supply-side study to understand the collection and harvesting of sea cucumber at the village scale
2. conducting a supply-side study to understand the economic value and the income to communities,

- and to develop ‘what-if’ scenarios where new options of restructuring the processing distribution and marketing can be evaluated
3. investigating the collection, purchasing, value-adding and processing industry status. Operators in the sea cucumber industry need to be involved, and their role and contribution towards the future of the industry better defined
 4. conducting a demand-side study on market research to identify and understand current market destinations, channels, channel players, tax structures, pricing and profit margins
 5. investigating the demand-side of the export industry as it currently operates, including export destinations, market values, desirable species and grades, and packaging. These insights may help to establish clearer product knowledge, and enable better industry development plans to be initiated
 6. conducting consumer research in key markets (e.g. China, Hong Kong, Singapore) to better understand purchasing and consumption behaviour, perceived product benefits, and the many ways the product is presented, prepared and consumed. Consumer insights can then be used to improve existing product and packaging standards, and food safety and product handling procedures. Aspects such as place of origin, nutritional aspects, ethical marketing and sustainable environmental practices can be leveraged for the development of superior marketing and selling campaigns. New niche-market channels may be identified in markets willing to pay more for elaborately processed or partially processed products, packaged and labelled in non-traditional ways that can be unique and highly differentiated
 7. reviewing new technologies to match consumer requirements (new processing, preservation, packaging, transportation–distribution channels, and buying techniques) for the development of products that are unique and that capture product benefits.

Other research topics that would be useful include:

1. developing new models to enable fishers and key stakeholders to work together, create value-driven organisational structures and develop new market niches
2. facilitating customs, finance and treasury agencies in developing new policy settings for investment attraction

3. collecting, analysing and disseminating industry data that can be used to develop sustainable industry plans.

Conclusions

Further analysis in unlocking the true state and economic benefits of the beche-de-mer value chains in Fiji and Tonga will be important in determining appropriate future interventions. PARDI will seek to engage fishing communities, processors, exporters and other industry stakeholders. They can play an important role in identifying ways to draw the attention of different stakeholders to opportunities for improvement at different stages in the value chain. Research outcomes may lead to improvements in processing, value-adding to beche-de-mer and identification of new niche markets, and may facilitate investment in sea ranching and aquaculture.

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