

Trash or Treasure? A Qualitative Exploration of Gleaning By-Products in Tourism Supply Chains in Remote Filipino Fishing Communities

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Received: 25 January 2021 / Accepted: 30 October 2021 / Published: 13 December 2021

► Porter, B. A., Orams, M. B., Lück, M., & Andreini, E. M. (2022). Trash or treasure? A qualitative exploration of gleaning by-products in tourism supply chains in remote Filipino fishing communities. *Advances in Southeast Asian Studies*, 15(1), 87-102.

Souvenirs have become an integral part of consumptive tourism with marine curios being a common offering in coastal destinations. The Philippines, an emerging coastal destination is also a large exporter of marine shells. There is some overlap in the species exported as shell souvenirs and those that serve as an important protein source for coastal residents. In some such communities, following consumption of the mollusc, the shell by-products are discarded. Given the state of poverty common to many remote artisanal fishing communities coupled with the tourism demand for shell curio and handicraft, it is expected that potential opportunities exist for small-scale revenue generation from the sale of discarded shells. Using supply chain theory, this paper investigates the post-consumption use of shells obtained via gleaning activities in four remote Filipino fishing communities. Qualitative interviews revealed potential gaps and breakages in the supply chain that currently limit the potential for transitioning shells as waste/by-products to souvenir products in the tourism sector. The findings are discussed in terms of potential applications for environmental management and social development. The results suggest the potential for the transformation of an existing practice – gleaning and its by-products – into an in-demand curio product as a supplemental livelihood for impoverished fishing communities.

Keywords: Gleaning; Shell Handicrafts; Souvenir; Supplemental Livelihoods; Tourism Development



INTRODUCTION

In the Philippines, a rapidly growing population and increasing illegal, unreported, and unregulated (IUU) fishing places Filipino fisher-folk among the most economically vulnerable (Castro & D'Agnes, 2008; Green et al., 2003). The incidence of poverty among fishing households in the Philippines is twice that of the national rate (Castro & D'Agnes, 2008), though it is noted that income-associated challenges cannot necessarily be equated to quality of life and occupation satisfaction (cf., Knudsen, 2016; Pollnac, 2001; Porter & Orams, 2014). As fishing households struggle to meet their daily needs, resource over-exploitation becomes common (Turner et al., 2007). Globally, near-shore fisheries are already

in decline (FAO, 2018) and previous research suggests that the degradation and decline of capture fisheries will continue (Belton & Thilsted, 2014). In the Philippines, the use of by-products for economic gain has been pushed to extremes. Especially in cities, it is common for poorer families to survive on *pagpag*, or food scraps scavenged from trash piles or waste facilities that are recooked and resold (cf., Pilario, 2014). While surviving on *pagpag* is less common in coastal areas where residents can supplement their diet with leftover catches or through gleaning, *pagpag* is an example of the use of by-products to, albeit grossly, extend or add value to a market supply chain. In coastal areas of the Philippines, gleaning, the collection of small molluscs for consumption purposes, is practiced by many households. Some of the same species used for consumption can also be found as parts of shell souvenirs throughout the country, and in other coastal locations across the globe. For those dependent on marine resources for livelihoods, the continued degradation of the near shore marine environment will likely result in the pursuit of alternative economic activities.

The Philippines is an example of a country with a highly developed shell trade (Floren, 2003). In the context of remote artisanal fishing communities, small marine molluscs obtained from gleaning practices are currently valued as protein or sold intact as a source of financial revenue for local members of fishing communities (Porter, 2014). The potential use of the discarded shells in the curio trade has been largely overlooked. This paper explores practices related to the harvest of small, shelled invertebrates from coastal communities in the Philippines. Supply chain theory is used to examine the potential overlap of gleaning of small marine-shelled organisms as a sustenance fishery and the potential for the shell by-products to be used in the souvenir trade. This research seeks to uncover issues impacting the current lack of engagement with the shell souvenir and handicraft production and trade in coastal communities where economic resources and opportunities are marginal. In doing so, it aims to address a current gap in the literature on poverty alleviation through souvenir production (Thirumaran et al., 2014), as well as the social implications and potential benefits of tourism development as they relate to production of souvenirs (cf., Swanson & Timothy, 2012).

OVERVIEW OF RELEVANT LITERATURE

Significance of Souvenirs

Research on souvenirs, though not new, continues to be sporadic. Swanson and Timothy's (2012) comprehensive review of literature on souvenirs identified three major themes: "souvenirs as holders of meaning, souvenirs as tradable commodities, and souvenirs as products of commodification" (p. 491). Trihnh et al. (2014) found similar themes regarding souvenirs when researching the perspectives of the retailers. Decrop and Masset (2014) proposed a typology of souvenirs defining four types of souvenirs and their associated role or function: (1) tourist trinkets: categorisation; (2) destination stereotypes: self-expression; (3) paper mementoes: connection; and (4) picked-up objects: self-creation. As general examples, these four categories incorporate cheap souvenir mugs or t-shirts, models of the place (e.g., a miniature Eiffel Tower), ticket stubs, and shell artefacts (e.g., gifted piece of coral), respectively

(Decrop & Masset, 2014). Cater and Cater (2007) noted that even rubbish, such as washed-up flip-flops, is being converted into innovative souvenirs such as key rings, bracelets, necklaces, cushions and mosaic pictures. More recently, Haldrup (2017) explored the ‘magic’ of the souvenir, noting that anything can become a souvenir; he describes the souvenir as an actant or ‘shape-shifter’ with the ability to transform, integrate, perform, and even manipulate spaces. Shifting from the importance of the souvenir in the tourism experience, there is increasing support from the literature on the role of souvenir development as it relates to host communities. For example, Swanson and Timothy (2012) suggest the need to better understand how communities may benefit from participation as souvenir producers. Similarly, Thirumaran et al. (2014) push for the inclusion of souvenirs in larger scale tourism development plans, suggesting souvenirs as a means of [economically] supporting rural handicraft producers. Despite its existence since the concept of ‘travel’, the souvenir remains a complex phenomenon (Thirumaran et al., 2014).

Marine Organisms as Souvenirs

The ideas presented by Decrop and Masset (2014), Cater and Cater (2007), and Haldrup (2017) postulate that any object found by a visitor can become a souvenir. This idea is especially relevant to the discussion of marine shells as souvenirs and souvenir materials given the popularity of beachcombing as a tourist activity (Kenchington, 1993). Just as collected shell specimens can become a treasured souvenir to a beachcomber, they also serve as materials in the production of more complex handicrafts (see Figure 1).



Figure 1. Shell chandeliers being sold at a souvenir booth on White Beach, Bolinao, Pangasinan, Luzon, Philippines. Bottles of small shells are also being sold as souvenirs (bottom right of photo). The shells used to craft these souvenirs are representative of the different shell organisms consumed by many coastal residents. (photo by Brooke Porter).

The use of marine organisms and by-products (e.g., sea turtle shells) for handicrafts have a long history as souvenirs and have been traded for centuries (Gössling et al., 2004). Mollusc shells are a predominant source of these ‘curio’ and souvenir products (Grey et al., 2005; Salvador et al., 2015; Wood & Wells, 1995). New and emerging coastal destinations have responded to significant tourism growth, and resulting increased demand for souvenirs and handicrafts, with an increased harvest of marine shells (Dias et al., 2011; Gössling et al., 2004; Shyam et al., 2017). Other research has indicated souvenir-related markets, such as the shell trade, offer direct access opportunities for members of fishing communities (Shyam et al., 2017). In addition, coastal areas that are not currently considered tourism destinations are taking advantage of the economic opportunities through the export of shells and shell-based products to be sold in other locales where tourism is present (cf., Dias et al., 2011). Notably, many of today’s souvenirs are sourced from regions where the shells, labour, and other supplies involved in creating the souvenir products are affordable (Notar, 2006).

Given that the economic utilisation of marine shells for the purpose of the souvenir/curio trade often extends well beyond the initial harvest site, there has been an associated commodification of shells. Such a use of ‘foreign’ marine resources, resulting from the globalisation of shell-based souvenirs, has an obvious environmental footprint; however, it may also impact the authenticity of the touristic experience. An example of this begins in the Philippines and ends in Hawai’i. The shells used in the iconic ‘Hawai’ian’ shell *lei* (necklace) are commonly imported from the Philippines (e.g., Natural Shell Jewellery, n.d.). The idea of being greeted with a *lei* is part of the iconic Hawai’ian tourist experience (Linnekin, 1997); yet these imported shell *lei*, manufactured in the Philippines (or elsewhere), are neither authentic nor representative of the host culture. This example of shell *lei*, beginning in Southeast Asia and ending in Hawai’i is indicative of what Chutia and Sarma (2016) refer to as sponsored commercialisation; in other words, the intermediaries are responsible for the decisions related to the product rather than the artisans. Similarly related to the context of souvenir out-sourcing, Notar (2006) describes this loss of authenticity, explaining that “a souvenir should carry the spirit of the place where it was purchased (or found, or taken)” (p. 65). It is important to note that in the wake of a global pandemic, communities are reconsidering their roles in creating tourism. Considering previously overlooked aspects of communities’ roles in tourism, such as pride in place and product (see also, Porter et al., 2014), may become increasingly important. Finally, in addition to the loss of destination-associated authenticity, and negative environmental impacts of out-sourced souvenirs (Appukuttan & Ramadoss, 2000; Kowalewski et al., 2014; Newton et al., 1993; Notar, 2006), the removal of mollusc species may impact the food security of coastal residents in lesser-developed regions.

Souvenirs or Sustenance?

Some of the smaller mollusc species harvested and removed for trade into the souvenir market are considered an important source of sustenance for many coastal residents in lesser-developed regions (Dias et al., 2011; Wood & Wells, 1995). While such marine by-products may provide an important trade/economic activity in the tourism sphere or elsewhere, the sale of marine by-products is influenced by the

comparative economic value of their potential as a source of food (Wood & Wells, 1995). In the Philippines, the shell trade is a well-established and important economy (Dolorosa & Dangan-Galon, 2014; Floren, 2003), with over 1,000 documented species of molluscs being exported (Woods & Wells, 1995). Similarly, in India, Shyam et al. (2017) found that small molluscs as bycatch generated an important product for fishers. In addition to providing economic opportunities, many of the described smaller molluscs also serve as an essential food and protein source for coastal residents (Appukuttan & Ramadoss, 2000; Floren, 2003). In the Philippines, as well as other coastal areas, smaller-shelled invertebrates are gathered in coastal fishing referred to as 'gleaning'. Gleaning is considered a subset of artisanal fishing (see Figure 2) and is practiced commonly by both women and men in coastal areas of the Philippines and in other coastal communities in the Coral Triangle region (Kleiber et al., 2014; Nieves et al., 2015; Weeratunge et al., 2010).



Figure 2. Women gleaning on the coast of Dimipac Island, Coron, Philippines. (photo by Brooke Porter).

In remote artisanal fishing communities in the Philippines, it is common for coastal residents to utilise gleaning activities as an important food source (cf., Porter, 2014). Despite this widespread practice of gleaning and the associated by-products of shells and an established market for them (Dolorosa & Dangan-Galon, 2014), it is unclear why more coastal residents do not participate in the sale of these shells, as previous research suggests that members of such fishing communities consider their situation as impoverished (Porter & Orams, 2014).

RESEARCH DESIGN AND METHODS USED

A Supply Chain Lens

Both formal and informal economies are important in the lesser developed regions (Bacchetta et al., 2009). Bacchetta et al. (2009) estimated that up to 60% of workers in lesser-developed regions are employed in informal economies. Fisheries and other artisanal-level activities (e.g., handicrafts, souvenirs) often go undocumented and, thus, are considered informal activities. Swanson and Timothy (2012, p. 493) define the souvenir supply chain, saying that:

The souvenir supply chain represents the flow of goods from point of production to point of consumption, or the distribution of the souvenir product from producer/manufacturer to final tourist consumer. The supply chain includes producers who convert raw materials into souvenir products; manufacturers who mass produce souvenir products on a large-scale; wholesalers who facilitate distribution by buying larger quantities of souvenir goods and reselling smaller quantities to other suppliers; and retailers who sell products to consumers-tourists who derive personal benefits from the object and the experiences it represents.

Thus, we approach this study through a supply chain lens with emphasis on the producers while noting the relevance of supply chain theory, which applies to and often combines both formal and informal economies (e.g., Holt & Littlewood, 2014). In addition, supply chain theory is a well-understood and commonly applied concept in small-scale rural markets and entrepreneurial processes in lesser-developed nations (Holt & Littlewood, 2014); it is also a common approach used by international development and aid agencies (cf., e.g., Chorn et al., 2015). Rural product supply chains may be established opportunistically or may occur in a more organised manner. A common characteristic of these supply chains are the opportunities at each stage for value extraction (see Figure 3).

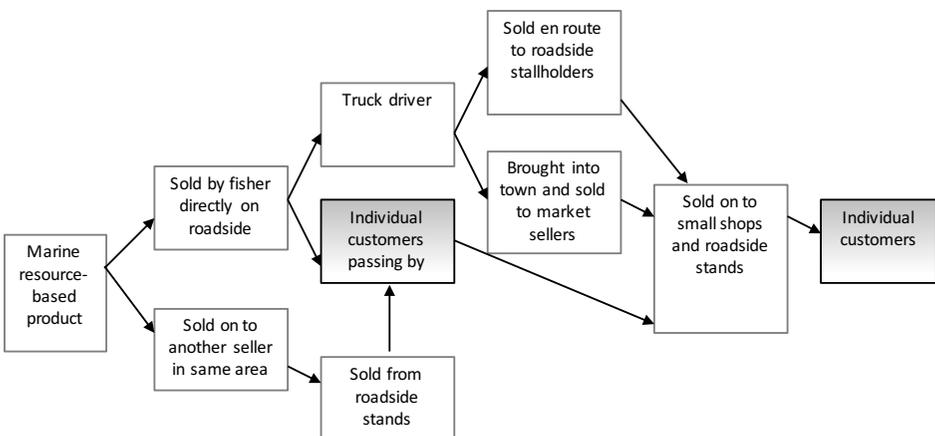


Figure 3. Example of a marine product supply chain. The product journeys through varied and multiple stages before arriving at the consumer/customer. (adapted from Holt & Littlewood, 2014, p. 203).

This paper explores such scenarios associated with gleaning in four coastal fishing communities in the Philippines. It has been argued that fisher-folk should be considered central persons in coastal and fisheries research (Grafton et al., 2006), because they are permanent residents, have familiarity with their local resources, and are able to accurately describe the fisheries and accompanying processes (Bunce et al., 2000; Turner et al., 2007). Building on this idea of fisher-folk as gatekeepers of important fisheries and environmental knowledge, semi-structured group interviews were used to collect qualitative data. Members of fishing households from four coastal communities in the Luzon region of the Philippines were interviewed by the primary researcher (see Figure 3). The locations were chosen out of convenience based on availability of local guides, translators, and in-kind support (e.g., accommodation). In all locations, interviews were supported by the help of translators and local guides. Interviewee responses were immediately translated from Bolinay, Visaya, or Tagalog to English. Due to the larger sizes of group interviews at Natipuan (fourth research site), the recorded interviews were transcribed by a native Tagalog speaker. Semi-structured interviews are considered important in social fisheries research to generate detailed qualitative information (cf., Bunce et al., 2000). In all locations, purposive and snowball sampling were used to recruit participants. Participation was voluntary and confidentiality was maintained. Participation in the group interviews was restricted to persons at least 16 years of age residing in a household where fishing was an important activity undertaken by themselves or other members of that household.

Group interviews occurred in two main stages. The first stage of data collection included three research sites bound primarily by *barangays*, which are the smallest administrative divisions in the Philippines: (1) Barangay Victory; (2) Barangay Decabobo; and (3) Dimipac Island (Barangay Quezon) (see Figure 4).

The first stage of fieldwork focused primarily on understanding fishing activities and livelihoods. As part of these interviews, participants were asked about their gleaning activities and their practices using shell by-products. Data from the first stage revealed the discarding of shell by-products as a frequent practice. As a consequence, the second stage of interviews was designed to gain a better understanding of why shell by-products were often being discarded rather than used in the shell souvenir industry. The second stage of fieldwork was conducted

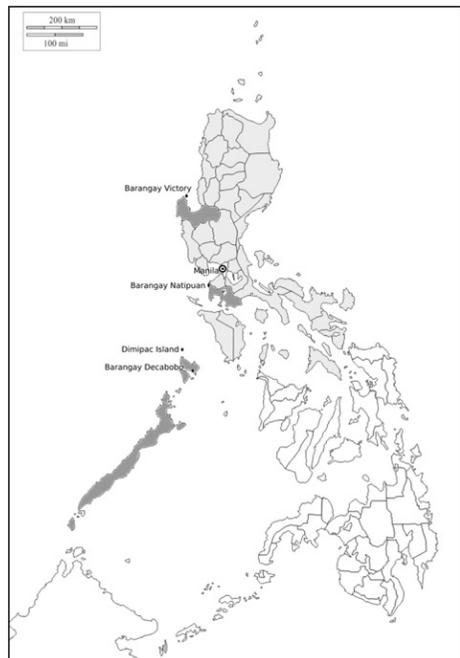


Figure 4. Map of the research sites. The research sites are indicated by black dots. The entire region of Luzon has been shaded light grey, while the provinces of the research sites appear in a darker shade of grey. (authors' compilation).

in the coastal community of Natipuan, in the Luzon region (see Figure 4). During this stage, interview questions were developed to collect exploratory data on gleaning activities and to investigate in more detail the community members' use or non-use of shell by-products in the shell souvenir trade. Results from the two stages of field-work are presented below. Table 1 provides a summary of the interviews undertaken at the four study sites.

Research site	Number of participants	Total number of interviews
Victory	21	12
Decabobo	7	4
Dimipac	16	3
Natipuan	12	2
Total	56	21

Table 1. Summary of interviews undertaken. (authors' compilation).

RESULTS

Gleaning was considered a 'way of life' for most participants. In total, 49 participants reported they regularly undertook gleaning for gastropods (see Figure 5). Participants reported eating the meat (average size 1 cm³) collected from these shells using a small pin or needle. During the interviews from Stage 1 of the study, it was common to observe large piles of discarded shells (primarily small gastropods) near or around participants' homes. At each of the research sites, the majority of, and in some cases all, residents reported discarding the shells collected from their gleaning activities as opposed to selling them into the souvenir trade (see Figure 5).

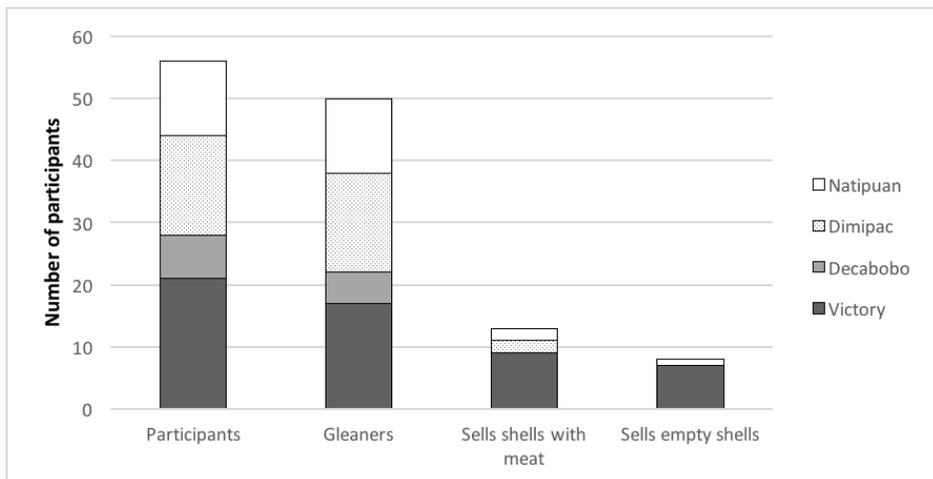


Figure 5. Gleaning activities and shell economies in four Philippines coastal communities. The stacked bars in each column are representative of the four research sites/communities. (authors' compilation).

The gender representation in gleaning was near equal with slightly more male ($n = 27$) than female gleaners ($n = 22$). In Natipuan, participants specified that gleaning is done by both genders: “It can be either men or women. There are also children”. Figure 5 highlights the number of respondents participating in gleaning. Nearly 90% of respondents reported participation in gleaning activities. Only 14% of gleaners reported active or partial participation in the sale of empty shells. A common response was that gleaning catches were “only for meat”. It was slightly more common for participants to sell shells with meat for profit (22%). A representative statement of this was, “sometimes we eat the meat, sometimes sell it [shell with meat]. But [when we eat the meat] we throw away the shells”. It is also worth noting that most of the respondents participating in the sale of shells related to souvenirs came from Barangay Victory. Likewise, the majority of those selling shells with meat came from Victory; however, two similar cases were reported in Decabobo and two in Natipuan. Whereas most participants stated that their gleaning catches were for “eating only”, two women from Victory declared an active participation in the souvenir trade, with one of these women stating the buying and selling of shells for shell craft as her primary occupation (see Figure 6). She stated, “I sell the shells and eat the meat”. The other woman, who identified her primary occupation as a housewife, reported sometimes making shell crafts saying that “I use them [the leftover shells] for crafts.”



Figure 6. Barangay Victory resident (woman with hand on chair) selling shell necklaces to visitors. (photo by Brooke Porter).

Natipuan

Interview questions in Natipuan focused on better understanding gleaning waste. Barangay Natipuan community is a coastal town situated in close vicinity to tourist resorts. Many of its members actively participate in the fisheries to supplement their

incomes. A total of 12 community members were interviewed in two interview groups. All participants were female as this research was combined with a separate inquiry. The all-female sample was thought to have positively impacted the data as it is generally women who are responsible for shell handicraft production. Interview questions related to gleaning and shells as by-products focused on participation in the gleaning fishery, the use and sale of gleaning catches, and participation (or lack thereof) in the souvenir trade/industry. All of the Natipuan participants reported being members of gleaning households who regularly relied upon gleaning catches for protein sustenance. None of these participants reported active participation in the souvenir trade, including the processing or selling of shells leftover from gleaning catches. One woman reported the occasional and opportunistic sale of shells stating that she will sell the shells as souvenirs, “if someone will buy it”. However, in Natipuan, it was common for participants to decorate their homes with the shell by-products. Participants described the various uses, mostly as outdoor decor, of washed shells post-consumption: “We put it [the shells] in the plants, ... in the garden, ... inside a vase, ... in the pots, ... on the side of the pots”. Still others recognised that, although shell handicraft was not common in Natipuan, “in other places they are doing that [creating souvenirs] ... they are creating lamps, curtains”. When asked why this does not happen in Natipuan, some felt there were only enough shells for consumption: “We don’t have enough shells here ... only enough for food”, or that the shells were too small and too few: “We don’t have much shells here”. Other participants, responding to the question as to why they don’t make handicrafts to sell with the shells post-consumption (e.g., shell chandeliers, necklaces), felt they did not have the knowledge or skill necessary to produce shell handicrafts or souvenirs. A consistent response regarding knowledge-base was, “we don’t know how”, accompanied by embarrassed laughter.

DISCUSSION

The combined data sets from face-to-face, semi-structured interviews showed that many participants were reliant upon gleaning as a staple food and protein source. Despite a large and globally significant shell trade in the Philippines, many participants (43 in total) reported discarding rather than selling the leftover shells. While some reported selling gleaning catches (shells with meat) for supplemental income, few regularly sold empty shells post consumption. Specific to Natipuan, some participants reported washing and using the shells post consumption as decorative ornaments for personal households. The results from Natipuan, where the practice of decorating gardens and houses with shells was common, suggest that, in some cases, participants are associating an aesthetic value with shelled organisms used for sustenance. This finding is loosely supported by Swanson and Timothy (2012) who described the utilitarian uses of handicrafts in traditional societies; however, their research found that in many places ‘kitsch’ items desired by tourists, despite their lack of relevance to the host culture, were being produced due to a demand by tourists (e.g., carved masks). Remarkably, the consumption of the gastropods requires the removal of meat, resulting in a ‘clean’ and potentially market-ready shells. Thus, it could be argued that they are missing supplemental livelihood opportunities associated with the production of handicraft and souvenirs.

The souvenir industry is worth billions of dollars globally, and souvenirs have become an inseparable part of the consumptive tourism experience (Swanson & Timothy, 2012; Thiruaman et al., 2014). Previous research has documented the importance of the shell souvenir industry in the Philippines (cf., Floren, 2003). Participant responses demonstrated the existence of rural supply chains for marine resource-based products, such as gleaning catches (meat included), with some selling catches; however, the supply chain typically ends post-consumption. The data from the second stage of the research provide insight into such potential issues. In general, there are numerous factors that may influence the efficacy of a supply chain. We simplify these into two broad categories: product-related and market-related. Examples of the first category include product quality and available quantities. Examples of the latter category include market saturation and market linkages. Data from this study indicate particular issues with market linkages. Factors are discussed individually below.

Product-Related Issues

With regard to product-related factors, product quality, both structure and colour, are concerns within the shell trade (Nijman et al., 2015). However, the smaller sizes of the shells collected by gleaners (e.g., *cikad*) makes them less susceptible to breakage and colour-type imperfections. Thus, quality, in the case of gleaning by-products, is considered to have a negligible influence on the supply chain. Further, given that the shells under discussion are the result of a subsistence practice and an existing by-product, it would be possible for participants to discard poor quality shells while still building up a stock of premium-quality specimens. This suggestion is further supported by researcher observation: During the first stage of fieldwork, metre-high piles of discarded shells, seemingly suitable for shell handicrafts, were observed around participants' homes. Kleiber et al. (2014) demonstrated the frequency and importance of gleaning as a fisheries subset and, similar to this study, they showed that both women and men frequently participated in gleaning. Given the importance of gleaning for sustenance and the frequency with which it occurs (Floren, 2003; Kleiber et al., 2014), a surplus of shell by-products would be expected at a collective community level. Again, given the establishment of the gleaning as a mostly subsistence fishery, it is unlikely that fishing effort would need to change to utilise discarded shells as handicrafts for what would be a theoretically supplemental livelihood. Thus, our findings and interpretations indicate that product-related factors are unlikely to impact the participation of remote artisanal fishers in the shell souvenir trade.

Market-Related Issues

Although product-related issues were not apparent, it is likely that there are potential issues with market-related factors. The Philippines has a substantial influence on the global shell trade; however, despite consistent collection efforts, reported catches are in decline (Floren, 2003). This decline in catch indicates that stock depletion is more likely to influence the supply chain than market saturation. Thus, we attribute that market-related issues such as gaps in market linkages may be present. For example, the geographical remoteness of a location may affect participation in a supply chain;

another potential limiting factor is economic capability (Holt & Littlewood, 2014). Geographical remoteness is an issue for many remote fishing communities; given that the four research sites could be considered remote, location may impact the ability of a community to participate in the shell souvenir trade. However, participation in other fisheries-related supply chains (e.g., live reef fish trade, aquarium trade, food fisheries) found in the four communities surveyed present evidence of efficient and functioning options for the transportation of goods. Economic capability was not thought to be a limiting factor as the ‘supplies’ necessary to participate are already on-hand as by-products of an existing practice. Instead, our findings suggest that the most likely limiting factor is a lack of awareness of market opportunities and a lack of perceived skill (Palmer, 2007; Thirumaran et al., 2014). This was emphasised by participants indicating their lack of knowledge and skill in transforming shell by-products into desired souvenirs (e.g., necklaces, chandeliers, lamps, and sculptures). Participant responses explaining this lack of knowledge, such as “We don’t know how to [create curtains or lamps]”, were often marked by embarrassed laughter. Indeed, while souvenirs such as shell chandeliers require some skill to create (see Figure 1), the skills needed to create many types of shell souvenirs are basic (e.g., the single-strand necklaces being sold in Figure 6). Figure 7 focuses on issues within the first stage of the supply chain (expanded upon from Figure 3). The first stage, marine resource-based products, has been expanded to include product- and market-related issues based on our findings.

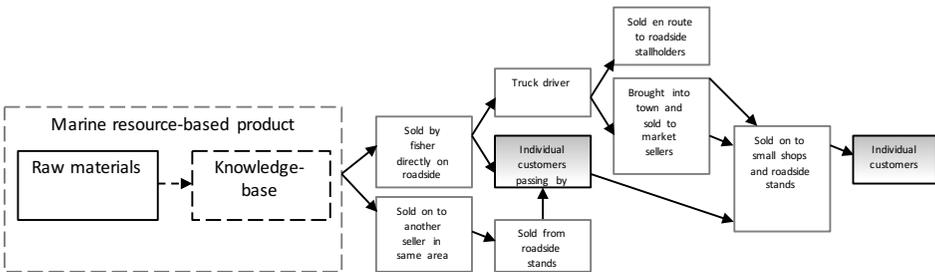


Figure 7. A closer look at the product and production in a marine resource-based supply chain. The dashed lines indicate issues impacting the supply chain. (authors’ compilation).

The results from this study indicate the presence of problems in the first stage of this rural supply chain. Many participants simply did not have the knowledge and/or confidence to transform the shells from gleaning by-products into shell handicrafts or souvenirs. It is noted that some participant responses indicate market-related issues (e.g., finding a buyer); however, it is likely that problems with the creation and production of shell products are more pressing. Thus, on-the-ground efforts, as well as future research, should focus on education and training in handicraft production. Whereas learning exchanges with communities actively involved in the shell souvenir trade may seek to resolve some market-related issues (Dolorosa & Dangan-Galon, 2014), previous research suggests that market-related issues be successfully addressed through the inclusion of souvenir development in broader tourism planning (cf., Thirumaran et al., 2014).

CONCLUSIONS

The importance of the souvenir in travel is unlikely to wane. This research explored issues related to production in the shell-souvenir supply chain in four impoverished coastal fishing communities in the Philippines. In doing so, it provided an interdisciplinary look at the economic, environmental, and social role of souvenirs. The findings contribute to previously identified gaps in the literature, such as rural/souvenir supply chain (Swanson & Timothy, 2012) and the nexus of tourism souvenir development (Swanson & Timothy, 2012; Thirumaran et al., 2014). In addition, this research advances the discussion on the potential for tourism and tourism-associated activities, such as shell-handicraft production, as a potential supplemental livelihood for fishing communities (Porter & Orams, 2014; Shyam et al., 2017; Swanson & Timothy, 2012; Thirumaran et al., 2014; Trihnh et al., 2014). Finally, it also provides insight on potential future response strategies for the degradation of near-shore marine resources associated with souvenir-related shell harvest (Floren, 2003).

With the notable existing market for shell souvenir products originating from the Philippines, our data revealed a lack of participation in this sector from the four communities. This was attributed to a poor understanding of market opportunities in the souvenir supply chain, rather than a lack of desire to engage in the sector. Feasible efforts, such as training and knowledge sharing (Dolorosa & Dangan-Galon, 2014), may address these market-related issues by creating a value-added benefit to an existing waste product of gleaning. Such skills trainings, combined with a change in current practices from discarding shell by-products to building raw product reserves, have the potential to provide sufficient stock, both in quantity and quality, for participation at a cottage industry level in the shell souvenir tourism trade.

On a larger scale, the issues revealed in this research may be addressed at various governmental levels through future inclusion of souvenir development in tourism planning efforts (Thirumaran et al., 2014). The findings of this study also suggest a lack of linkage between commercial and sustenance fisheries in the context of molluscs (shelled organisms). While, currently, the fisheries are functioning in separate capacities, a continued decline in commercial harvest coupled with a consistent or increased demand in shell souvenirs may force stakeholders to source products from communities, such as the ones described in this research.

We agree with previous scholars that issues surrounding souvenir production are in need of more research (Swanson & Timothy, 2012; Thirumaran et al., 2014). The results from this study emphasise a need to better understand if and how education (e.g., artisanal skills to create shell souvenirs) impacts participation in the shell souvenir supply chain at a rural level. An additional area of consideration for those working on ecosystem management and resilience would be exploring how the use of post-consumption waste from gleaning could serve to alleviate some direct commercial fishing pressure on shelled marine invertebrates through the use of any already harvested resources. Souvenirs, in general, are a consumptive part of the tourism experience. Ideally, this sector needs to be formally recognised and subsequently organised to promote social, economic, and environmental benefits, especially at the cottage level. This research demonstrated the potential of

transforming existing post-consumption (by-product) waste from a coastal fishery into a consumptive souvenir product that is synonymous with the tourism experience.



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ACKNOWLEDGEMENTS

This research would not have been possible without the in-kind support of staff from the Coral Triangle Conservancy (ree.ph), namely Scott Countryman, who provided lodging, transportation, and logistical support for fieldwork at three research sites. In addition, the authors would like to extend their thanks to Dr. Annette Menez and all of the Bolinao Marine Science Institute, who provided incredible logistical support, as well as acted as local guides for one field site; Joanne Garcia, who provided translations at two field sites, as well as helped care for the lead researcher's child at two field sites; Beth Uy, who assisted with the interviews; Dr. Mianne Silvestre, who provided translations, as well as invaluable medical support to participants in Napituan; and finally, the respective Local Government Units of the four baranagays, who supported the research and facilitated access to their esteemed community members.