



Local Institutional Responses to Global Market Pressures: The Sea Cucumber Trade in Yucatán, Mexico



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SUMMARY

The expansion of global seafood trade creates opportunities as well as risks for small-scale fisheries (SSFs) livelihoods. Markets provide economic opportunity, but without effective governance, high demand can drive resource degradation. In the context of small-scale sea cucumber fisheries in Yucatán, Mexico, this study documents local governance responses to new markets and identifies factors driving those responses. We conducted a comparative case study of two SSF communities, collecting participant observation and interview data during 16 months of fieldwork. Our study found that local rules-in-use did not match government regulations and that the emergence of local rules was shaped by relations of production in each study site. Specifically, patron–client relationships promoted an open access regime that expanded local fishing fleets while fishing cooperatives attempted to restrict access to local fishing grounds through collective action and multi-level linkages with government. We propose that the different material incentives arising from the way that patron–client relationships and cooperatives organize labor, capital, and profits help explain these divergent governance responses. We hypothesize that this finding is generalizable beyond the study context, especially given that patron–client relationships and cooperatives are common throughout the world's SSFs. This finding builds on previous research that indicates local institutions can mediate the effects of market pressures, showing that the emergence of local rules depends on how resource users are organized not just in relation to resource governance but vis-à-vis the markets themselves. Therefore, effective policies for SSFs facing market pressures require a greater emphasis on regulating local-level trade and governing the commercial aspects of fishing livelihoods. These lessons are relevant to the estimated 540 million individuals whose livelihoods SSFs support who may increasingly engage in the global seafood trade.

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1. Introduction

Seafood is one of the most traded food commodities in the world and the volume of seafood exports has continued to expand in recent years (FAO, 2014b, 2014c). The intensification of global seafood trade has generated both optimism and concern for the well-being of small-scale and developing country fisheries. Revenue from high-value seafood exports may contribute to food security in developing countries and enhance small-scale fishing livelihoods (FAO, 2014c, Asche, Bellemare, Roheim, Smith, & Tveteras, 2015). However, the evidence is inconclusive regarding whether trade benefits actually reach producers (Béné, Lawton, & Allison, 2010; Smith *et al.*, 2010). Furthermore, market pressures often correlate with degradation of fisheries resources, threatening small-scale fishing livelihoods (Berkes *et al.*, 2006; Brewer, Cinner, Fisher, Green, & Wilson, 2012; Cinner, Graham, Huchery, & Macneil, 2013; Cinner & McClanahan, 2006).

Small-scale fisheries (SSFs) constitute 90% of the world's fishers and contribute nearly half of the global fish catch (FAO, 2014b). Governed appropriately, they can play an important role in promoting poverty alleviation and food security around the world (Béné, Macfadyen, & Allison, 2007; FAO, 2015). Many SSFs are located in developing countries where they increasingly contribute to seafood exports (Lem, 2003; Purcell & Pomeroy, 2015). Therefore, understanding the factors that contribute to sustainable and unsustainable resource governance under market pressures stands to benefit the hundreds of millions of livelihoods that SSFs support (FAO, 2014b).

Local self-governance institutions play a particularly important role in SSFs, but faced with market pressures, local governance can be fraught. Many SSFs operate in countries with limited government capacity for fisheries management and enforcement, increasing the burden on resource users themselves to safeguard resources through local institutions (Berkes, 2001). But it is unclear

whether or not local institutions are robust to market pressures (Cinner & Aswani, 2007). In some SSFs, the presence of market pressures correlates with the erosion of local tenure regimes (Cinner, 2005; Cinner, Sutton, & Bond, 2007) while in others, market connections seem to strengthen local governance (Hviding, 1996; Ruddle, 1993).

We aim to contribute to a better understanding of why some local governance regimes gain strength while others falter in response to market pressures. To this end, our study investigates how the two most common relations of production in SSFs (fishing within associations or as individuals for a capitalist) influence different local institutional responses to market pressures. We research these questions in the context of sea cucumber fisheries, a globally traded seafood destined for Asian markets and sourced primarily by small-scale fishers in the global South (Purcell *et al.*, 2013).

Through a detailed analysis of sea cucumber governance in two small-scale fishing communities, our study demonstrates the influence different relations of production have over the governance of highly-valued resources. We find that well-organized fishing cooperatives can more easily find incentives to develop rules-in-use to control access and use. Yet their effectiveness is limited by the intra-community dynamics between fishing cooperatives and patron–client relationships, which ultimately shaped how each community governed their local fishing grounds in our study. The implications for designing effective management of SSFs under market pressures are twofold. First, formal regulations that are coherent with local incentives and capabilities for enacting and enforcing rules are more likely to be effective. This requires paying attention to the existing relations of production in place at the local level. Second, settings where national policies favor relations of production that discourage fishers from organizing into associations and encourage them to individually contract with a patron or capitalist will find it challenging to withstand global market pressures on the supply of local resources, to the detriment of the well-being of their coastal inhabitants.

(a) Sea cucumber fisheries under market pressures

Sea cucumber has been traded for over 1,000 years (Friedman, Eriksson, Tardy, & Pakoa, 2011). However, since the middle of the 20th century global catch has increased more than 13-fold from about 2,300 mt to 30,500 mt and stocks are being discovered and exploited at an increasingly rapid rate (Anderson, Flemming, Watson, & Lotze, 2011). Hong Kong, the largest importer of sea cucumber, reported nearly 6,000 mt of imports in 2011 at a price of 64 USD per kilogram (Figure 1). As sea cucumber fishing has undergone a geographical expansion outward from primary markets in Asia, many stocks have been subsequently depleted (Figure 2).

More recently, as sea cucumber demand has remained strong and modern trade networks have become increasingly efficient, this pattern of geographical expansion has given way to a situation in which almost any stock is within reach of Asian markets. Although production has peaked and subsequently declined in Hong Kong's main sea cucumber sourcing countries, overall imports have remained high, in part accomplished by sourcing sea cucumber from 48 new countries during 1996–2011 (Eriksson & Clarke, 2015; Eriksson *et al.*, 2015). As a result of trade, the status of sea cucumber stocks around the world is dire, with 14% of the world's sea cucumber fisheries fully exploited, 20% depleted and 38% overexploited (Purcell *et al.*, 2013).

The stakes are high for solving the management crises pervading sea cucumber fisheries. Overfishing is likely to bring structural changes to ecosystems including vulnerable coral reef systems (Friedman *et al.*, 2011). If sustainably managed, sea cucumber fish-

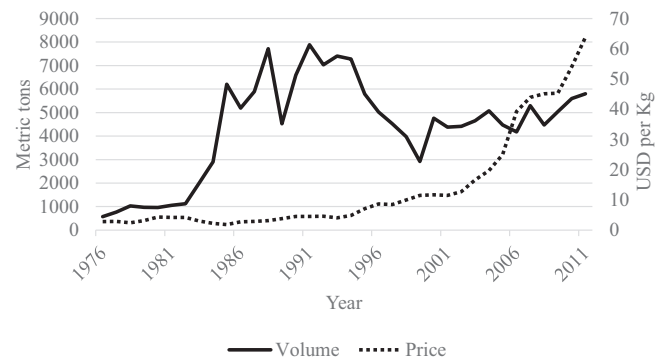


Figure 1. Hong Kong sea cucumber imports: Volume and price. Data retrieved from FAO (2014a).

eries can confer substantial livelihood benefits on an estimated three million fishers worldwide (Purcell *et al.*, 2013). Many communities have already become dependent on the high income the fisheries can generate (Anderson *et al.*, 2011; Dissanayake, Athukorala, & Amarasingi, 2010; Joseph, 2005; Toral-Granda, Lovatelli, & Vasconcellos, 2008).

Governments have employed a range of management tools in efforts to avoid degradation of sea cucumber populations. Common regulations include minimum size limits, individual or seasonal quotas, gear restrictions, closed seasons, and controls on the number or size of fishing vessels (Purcell *et al.*, 2013; Toral-Granda *et al.*, 2008). Management measures that are highly conservative in terms of fishing effort, levels of extraction, and duration of fishing seasons have been effective when coupled with continual re-evaluation of stock status (Léopold *et al.*, 2013). Adaptive precautionary fishery closures that are responsive to changes in fishing effort and abundance have maintained healthy stocks (Eriksson, De La Torre-castro, & Olsson, 2012) and marine reserves have seen some success in sustaining sea cucumber populations (Cariglia *et al.*, 2013).

However, most examples of sustainable sea cucumber management are from countries in the North where enforcement capacity and the complexity of regulations is high (Akamine, 2005; Clark, Pritchett, & Hebert, 2009; Purcell, Lovatelli, Vasconcellos, & Ye, 2010; Purcell *et al.*, 2013). These management models do not transpose easily to sea cucumber fisheries in the South. Indeed, some management measures that are effective in the North such as rotational zoning systems may actually put sea cucumber populations at further risk of collapse in low-income countries that have limited capacity for enforcement and knowledge of target species' biology (Purcell, Eriksson, & Byrne, 2016; Purcell, Uthicke, Byrne, & Eriksson, 2015).

The vast majority of the world's sea cucumber fisheries are located in tropical countries in the South where management is troubled. More than one third of sea cucumber fisheries lack any management measures at all (Anderson *et al.*, 2011; Toral-Granda *et al.*, 2008). Catch and abundance data as well as basic biological information about commercially targeted species are frequently missing, undermining management efforts (Anderson *et al.*, 2011; Friedman *et al.*, 2011). Even where substantial governance institutions have been developed, for example the adaptive co-management regime in the Galapagos Marine Reserve, conflict and illegal fishing are pervasive (Defeo *et al.*, 2014; Hearn, 2008). Enforcement is limited in many countries, with more than a quarter of fisheries operating illegally even after the establishment of moratoria (Purcell *et al.*, 2013). Hong Kong has reported 1.3 times greater annual import volumes than all global exports combined, underscoring the magnitude of illegal and unreported catches (Anderson *et al.*, 2011).

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