

Fish, trade and food security: moving beyond ‘availability’ discourse in marine conservation

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ABSTRACT

The goal of food security increasingly serves as an objective and justification for marine conservation in the global south. In the marine conservation literature this potential link is seldom based upon detailed analysis of the socioeconomic pathways between fish and food security, is often based on limited assumptions about increasing the availability of fish stocks, and downplays the role of trade. Yet, the relationship between fish and food security is multi-faceted and complex, with various local contextual factors that mediate between fish and food security. We use data from interviews and food security assessment methods to examine the relationship between fish and food security among fishing households in San Vicente, Palawan province, Philippines. We highlight the local role of income and trade, emphasising the sale of fish to purchase food not easily accessible for fishers, particularly staples. In particular, we show that because rice is the primary staple of food security for these households, fish must be traded with the intent of buying rice. Trade is therefore central to household food security. We argue that the relationship between fish and food security must be considered in greater depth if marine conservation is to engage with food security as an objective.

Key words: food security; fisheries; livelihood; marine conservation; Philippines.

INTRODUCTION

Improved food security is increasingly highlighted as an objective and justification in the discourse of many contemporary marine conservation interventions (Mora *et al.* 2009; Pauly *et al.* 2009). It is commonly asserted that food security will improve as an outcome of improving the supply of fish through interventions such as marine protected areas (MPAs). Yet, the linkages between increased availability of fish and improved food security are not always so straightforward (Foale *et al.* 2013; Darling 2014). Many local societal factors mediate the relationship between fish and food security, although these more complex factors are rarely analysed in the marine conservation literature. We draw on evidence from fishing communities in San Vicente, Palawan province, the Philippines to highlight specific linkages between fish and food security. We focus on how fish contributes to food security through its primary role as a main source of income used to buy other important foods. Importantly, we highlight how coastal households use this income to buy rice sourced elsewhere, often not readily available, which forms the primary basis of food security for fisher households in San Vicente. We contrast the dominant discourse of food security in the marine conservation literature with that of various social sciences, including anthropology and international development studies.

A strong feature of the discourse in the marine conservation literature links food security to the available quantity of fish stocks. Overfishing and the degradation of marine ecosystems are said to lead to ‘serious food security issues’ (Pauly *et al.* 2005), or to ‘endanger food security and efforts towards the reduction of hunger’ (Mora *et al.* 2009: 1). Implementation of conservation interventions and other measures to reduce overfishing are therefore held to improve food security through increasing the availability of fish. For example, the Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security, a major inter-governmental agreement in the Asia-Pacific, has food security as one of its primary objectives. The primary

means by which it has attempted to achieve this is through the development of MPAs (Foale *et al.* 2013), which generate more fish. However, less attention is placed on the specific ways in which fish actually contribute to the varied aspects of food security at the household or community level and little, if any, attention is placed on the socio-cultural dimensions that mediate this relationship, including changing livelihood strategies and interactions with class, gender, and social norms surrounding food.

A second feature of the discourse on food security in marine conservation is a lack of emphasis on the role of trade in ensuring food security and a corresponding over-emphasis and prioritisation of the availability and the consumption of fish. Cruz-Trinidad and colleagues (2014), for example, suggest that the sale of fish merely ‘*augment[s]*’ (167) food supply, and that ‘fisheries play a significant role in maintaining food security at the local level *mainly* through fish consumed in households’ (177, emphases added). The role of trade is typically highlighted through its negative impacts on biodiversity and fish stocks (e.g., Jackson *et al.* 2001; Pauly *et al.* 2005; Brewer *et al.* 2012; Cinner *et al.* 2013; Sadovy *et al.* 2013)¹. As Loring and colleagues note: ‘fisheries are more commonly construed as a part of the world’s food security problem rather than as part of its possible solutions’ (2013: 15). The emphasis on negative environmental impacts is because the (understandable) goals of much marine conservation largely concern the preservation of biodiversity and maintenance of fish stocks as ends in themselves, rather than understanding and engaging food security in the context of human development (Foale 2001; Foale and Macintyre 2005).

While these characterisations of the availability of fish, food security and trade may not be incorrect there is limited attention to the complexity of the relationship between fisheries and food security. The marine conservation literature usually over-emphasizes ‘availability’ under

¹ There are alternative approaches that argue for compatible approaches to food security, trade and sustainability, which we return to in the Conclusion.

the assumption that food security will follow on naturally from increased fish stocks derived from better fisheries management or conservation. Yet in many cases improving the availability of fish does not necessarily improve food security. In a recent study in Kenyan coastal communities, for example, Darling (2014) found that two well-enforced MPAs had no effect on household food security. MPAs can actually have the opposite intended effect for some groups: while they may increase the availability of the overall food supply, by restricting local communities' access to fish, they can also have highly negative impacts on food security in the short term (e.g., Kamat 2014). Given the varied interpretations of food security and its complex, multi-dimensional nature, there is a need to be more specific and nuanced about any proposed linkages between the improved availability of fish and food security in coastal environments. As Burchi and De Muro note (2015: 2), the 'food availability' approach implied in much of the marine conservation literature is part of an older and broader discourse, linked to Thomas Malthus, that is overly narrow in its understanding of food security.

In this context, then, insights from the social sciences such as international development studies and social anthropology play a crucial role in providing a deeper understanding of the relationship between fish and food security. A wide range of social science research has highlighted how the institutional context (broadly defined) mediates between food supply and food security. Among others, Amartya Sen (1982) in particular has argued that the availability of food supplies are not the only or even the most important factor in understanding food security. Currently, in the wider sphere of international development, food security is defined as 'availability and adequate access at all times to sufficient, safe, nutritious food to maintain a healthy and active life' (World Food Programme 2015). Food security is therefore understood to be composed of three 'pillars': not only 'availability' that is stressed in marine conservation, but also 'access' (e.g., social, economic and institutional)

and ‘use’ (entailing a positive nutritional impact on people). The notion of ‘stability’ (relative vulnerability to food insecurity over time) is sometimes also included (Burchi and De Muro 2015).

In contrast to the marine conservation literature, much literature from the social sciences on fisheries has highlighted trade as key for food security, and that the ‘cash crop’ function of fisheries can be extremely important in the food security of fishing households (e.g., Béné *et al.* 2009; Allison 2011; Fiorella *et al.* 2014). An important debate about the effects of fish trade on food security (that we do not address here) remains unresolved, and the positive and negative effects are subject to much variation (HLPE 2014; Béné *et al.* 2016). Scale however is key here – while fish trade is undoubtedly a major contributor to the decline of fisheries stocks worldwide, trade is fundamental for livelihood and food security at the household level. Indeed, anthropologist Raymond Firth’s pioneering study of Malay peasant fishing communities noted long ago the crucial role of trade in fishing households when compared to agricultural households:

The agriculturalist’s main crop is usually also his staple food, but the fisherman does not mainly live on fish. He must also have rice or similar vegetable food as his staple. Hence for him exchange of his product, or part-time agriculture, is a necessity; full-time fishing, therefore, tends to be more definitely associated with an exchange economy than does full-time agriculture (1966 [1944]: 27).

A recent prominent report released by the FAO’s High Level Panel of Experts on food security and nutrition provides a useful summary of the complexity of the direct and indirect ‘pathways’ between fish, food security and nutrition:

Fish contributes to food security and nutrition directly through availability of nutrient-rich food both at the household and at local, provincial, and national market levels.

Indirect pathways involve the trade of fish and generation of revenues, at household level or at higher (national) levels, including through income for crew-members and for those involved in fish-related activities such as fish processing factory workers. Income allows access to other food commodities (including other cheaper fish products). (2014: 28; see also Béné *et al.* 2015).

Anthropological studies of ‘foodways’ have revealed the rich and diverse ways in which different cultures and societies relate to and interact with food (e.g., Mintz and Du Bois 2002; Wilk 2006). Different groups value, procure, prepare and eat food in very different ways, and this has implications for food security. For example, in Timor-Leste a cultural orientation towards the land and away from the sea has led to low levels of fishery exploitation, and consequent low levels of fish consumption (Población 2013). Wider sets of social relations also have powerful effects on food consumption and food security. Scheper-Hughes (1992), for example, highlights the role of political-economic inequalities in the problem of hunger in poor communities in North-Eastern Brazil. Gender inequalities also play important roles in the intra-household allocation of resources, including food (Mintz and Du Bois 2002; Geheb *et al.* 2008; Allison 2011; Hayes-Conroy and Sweet 2015).

Another social science perspective is more critical about food security. Drawing on the work of social movements such as Via Campesina (1996), this often promotes alternative visions of ‘food sovereignty’ (McMichael 2014), or critiques the dominant framings of food security in many international organizations that maintain a narrow emphasis on increasing food production and promoting large-scale free trade regimes (Lee 2013; Tomlinson 2015). Indeed, the concept of food security is so malleable and used in so many different ways that scholars often use the term to mean quite different things (e.g., see Burchi and De Muro 2015 for a review).

We use data from empirical research in the coastal Philippines to show how these complex linkages between fisheries, trade and food security at the household level unfold locally. While there are a wide range of factors that mediate the relationship between fish and food security, here we highlight the importance of fish as a source of income, and in particular to purchase rice. While our study is not representative of all fishing communities, even in the Philippines, we offer a tangible empirical window into some of the specific pathways in which trade and income are central to food security.

METHODS AND RESEARCH CONTEXT

The data for this paper were collected using a mixed-methods approach in the municipality of San Vicente, Palawan province (Fig. 1). In August 2014 we conducted three focus groups in two villages in coastal San Vicente, and semi-structured and unstructured interviews with fishers, farmers and local government officials (~ 15 interviews). We asked about perceptions of the term food security, experiences with food insecurity, strategies to mitigate food insecurity, nutrition, taste, cooking and food preparation, food avoidances, and patterns of fish consumption. In July 2015 we returned to the same villages and conducted 34 semi-structured interviews with heads of fishing households (male or female, depending on who was available) that were focused on more specific elements of these topics. All interviews were conducted in Tagalog.

Figure 1: Map of Palawan province and the Philippines.

We also implemented two quantitative measures of food security, the Household Food Insecurity Access Scale (HFIAS) (Coates *et al.* 2007) and the Household Dietary Diversity Score (HDDS) (Swindale and Bilinsky 2006). The HFIAS includes a range of questions about the subjective experience of food insecurity over the last four weeks, and the HDDS

asks about the consumption of different types of food during the previous day and night. Measuring food security and food consumption presents many methodological challenges, and we did not aim to comprehensively determine the actual level of ‘food security’ among households. Instead, recognising that measures of quantity and diversity of food are both important indicators of food security (Maxwell *et al.* 2013), this information provided extra contextual data that added to our primary dataset derived from interviews.

Livelihoods in San Vicente

Palawan’s coastal fishing communities are composed largely of migrant settlers from across the Philippines. In recent decades, settlers have typically left locations of environmental degradation and social conflict for the relatively peaceful, resource-abundant ‘frontier’ environment of Palawan (Eder and Fernandez 1996; Eder 2008). Major ethno-linguistic groups living along the southern, central and northern coasts of Palawan include the indigenous Tagbanua (north-central), Pal’awan (central-south), and Molbog (south). Most settlers occupying coastal areas are from nearby island groups such as the Cuyonon and Agutaynen, and more recent arrivals particularly from the Visayas region (Fig. 1).

The fishing communities are often differentiated depending on socioeconomic status, partly defined by ethnicity, type of fishing capital they rent or own, the ways in which they engage in fisheries exchange (harvesters, buyers, and/or traders), and amount of land and type of tenure it is held under. Fishing households² derive their primary income from fishing, but are also often involved in supplementary income-generating activities such as farming rice, vegetables and livestock, selling mixed goods from small (*sari-sari*) stores, and participation

² Although women are usually heavily involved in fish processing, trading and marketing, fishers are usually male (Eder 2006; Fabinyi 2012).

in wage labour such as road construction (Eder 2008). Others may have non-fishing or farm-based income such as remittances from family members working in larger urban centres in the Philippines or overseas (e.g., Singapore or the Middle East). Most coastal households, even those receiving remittances, remain heavily reliant on marine resources for their livelihoods. Alternative livelihoods in many parts of coastal Palawan are limited by poor quality farmland, lack of secure land tenure, and physical isolation from infrastructure and major population centres (Eder 2008; Fabinyi 2012).

Facing the South China Sea (also referred to as the West Philippine Sea) on the west coast of Palawan province, San Vicente, with a population of 30,919, is 186km from the provincial capital, Puerto Princesa City (Map 1). Fishing is the major economic activity in the municipality, and a wide range of fishing activities and gears are present. At a small scale, fishers use hook and line or other simple gears from boats without an engine, fishing for lengthy periods in inshore waters. Other fishers own or work on a boat with an engine and fish using various types of gillnets for small pelagic fish, squid jigs for squid, or hook and line for live leopard coral grouper. At a larger scale are vessels that employ 20-30 crewmembers and use large ring nets (*talakop*) for small pelagic fish. Squid and live leopard coral grouper are traded through Manila for eventual export to East Asia, while the small pelagic fish are traded within San Vicente, neighbouring municipalities, the provincial capital of Puerto Princesa, neighbouring islands and Manila. Gleaning, diving for shells and using fish traps are other common fishing methods. There is significant livelihood flexibility, and fishers engage in different livelihood activities depending on a wide range of personal, financial and climatic factors. In this paper we focus primarily on migrant (non-indigenous) fishers, noting that although the sample is not comprehensive for the broader region, the vast majority of coastal residents in San Vicente are migrants.

MPAs in the Philippines, Palawan and San Vicente

In recent decades, provincial, national and international conservation groups have heavily promoted the development of MPAs in the Philippines, and the country is regarded as a global pioneer in their use (Horigue *et al.* 2012). Of the more than 1700 MPAs, 84 are in Palawan province and five are in San Vicente's coastal waters (MPA Support Network 2014). The San Vicente MPAs were set up in the late 1990s by a joint project of USAID and the Philippine government, the Coastal Resource Management Project. As with other similar MPAs focusing on inshore coral reefs, the goals were to both conserve biodiversity and to increase fisheries production (Fabinyi 2012:121-148). According to an earlier ethnographic study of this conservation project, 'most residents seem at best ambivalent about marine sanctuaries' (Eder 2005: 159). Although many fishers liked the idea in principle, there was resentment at the fact that many MPAs disadvantaged poorer, inshore fishers who do not possess the motorized boats necessary to access fishing grounds beyond the MPA boundaries (ibid:158-159).

RESULTS AND DISCUSSION

Food consumption in San Vicente fishing households

The ways in which food is procured and consumed in the fisher households of San Vicente depend heavily on the role of the market. Fish are caught and eaten by residents, but the types of fish consumed are heavily dependent on their market price. Other foods, particularly the staple rice, are usually purchased through the sale of key fish species.

In the coastal Philippines, food and eating is intensely social and cohesive: meals are collectively oriented events, and guests (sometimes even strangers) will usually be invited to participate. Meals are composed of rice, which forms the 'core' of the meal (Mintz 1994), and a dish (*ulam* or viand) that complements the rice and provides the taste and extra

nutrition³.. The phrase *kumain ka na ba?* ('Have you eaten?') is also commonly used as a greeting. Three meals a day are usually eaten with rice, and are often supplemented by *merienda* (snacks) in between.

Fish

While there is a high level of availability of fish in San Vicente, there are many social factors that affect the types of fish eaten and the ways in which they are prepared and consumed.

Fish was consumed by all 34 of our respondents during the previous day. Households who fish as their primary livelihood activity usually eat fish several times a day, every day, usually taken from their own catch. The commonly observed pattern was sale of higher-value catch, and consumption of lower-value catch: thus a portion of a catch of small pelagic fish will likely be eaten by the fisher's household, but fishers who target live leopard coral grouper will very rarely eat leopard coral grouper. These fish will be sold, since live leopard coral groupers fetch extremely high prices (e.g., >PHP2000) and even leopard coral grouper that die during capture or transport still command a relatively high price (e.g., >P400).

Households of fishers that target leopard coral grouper will instead consume other types of cheaper reef fish that may have been caught during the trip as by-catch (*isdang bato*).

Consequently, small pelagic fish and to a lesser extent other cheaper reef fish are the dominant food fish in the study villages. The price of small pelagic fish (PHP25-30/kg, the lowest-priced fish on the market) means that household consumption represents an insignificant economic loss (Table 1).

Common English name	Local name	Scientific name	Number of times consumed in	Local market price in

³ In many Austronesian and mainland Southeast Asian groups, this relationship is mapped on to gender oppositions, with rice often associated with female deities (Janowski and Kerlogue 2007: 9).

			previous day and night ($n = 34$)	Philippine pesos/kg
Mackerel (small)	Lumahan, buraw	<i>Rastrelliger</i>	12	25-30
Ponyfish	Sapsap	<i>Leiognathidae</i>	8	25-30
Scad	Galunggong	<i>Decapterus</i>	7	25-30
Yellowstripe scad	Salay ginto	<i>Selaroides leptolepis</i>	3	25-30
Threadfin Bream	Bisugo	<i>Nemipterus</i>	3	25-30
Yellowtail scad	Kalapato	<i>Atule mate</i>	1	25-30
Sardines	Turay	<i>Amblygaster; Sardinella</i>	1	25-30
Barracuda	Torsillo	<i>Sphyraena</i>	1	50
Sweetlips	Lepti	<i>Plectorhinchus</i>	1	50
Mackerel/tuna	Tulingan	<i>Euthynnus affinis, Auxis rochei</i>	1	70
Grouper	Lapu-lapu	<i>Serranidae</i>	1	100
Dried small pelagics	Dain	Various	0	65-70
Bigfin Reef Squid	Pusit	<i>Sepioteuthis lessoniana</i>	0	1-500 (beach price)
Leopard coral grouper	Suno	<i>Plectropomus leopardus</i>	0	1800-3000 (live); 400

				(fresh/dead)
				(beach price)

Table 1: Common fish species consumed and sold in coastal San Vicente, Palawan

(Source: Fieldwork 2015)

Neighbours and friends also often give fish away, or exchange them through specific reciprocal relations. There is a strong emphasis on generosity, and those who have caught a lot actively give fish away in order to accrue social prestige that helps elevate their socio-political status (see Dumont 1992). On occasions when villagers (sometimes but not always kin) assist the hauling in of a commercial net they will receive a handful of fish in payment. In many instances, this help is not requested, and is sometimes regarded as ‘tolerated theft’⁴. Occasionally there is also barter between fishers and farmers: one cup of rice, for example (about 0.25kg), or four mangoes, may be exchanged for 1kg of fish. Root crops are traded less often for fish in the study site compared to more remote, mountainous areas in southern Palawan.

Households farming part-time inland sometimes consume freshwater fish, including tilapia and local ‘mudfish’ (a type of catfish; *Ophiocephalus striatus*). However, these fish are not generally viewed as particularly pleasant to eat: they are often dried and then cooked in a heavy sauce of vinegar, garlic and soy sauce in part to overwhelm their unpleasant smell.

Larger fattier fish are preferred; mackerel, grouper, snapper and other larger fish are viewed as particularly tasty; however, they are rarely eaten because they are worth more when sold, generally well above PHP70/kg. Fish are considered very nutritious, especially if consumed

⁴ For similar practices in other parts of the Philippines, see Russell and Alexander (2000) and Segi (2014: 1233-1234).

fresh: fish left frozen for too long or canned are less favoured for their nutritional value.

Tinned sardines and tuna are enjoyed by children, but generally avoided by adults – at PHP18-P25 for a small can, they are more expensive than fresh fish and are not considered as nutritious, as one informant described:

‘Once when I was working in construction in Manila, I ate tinned fish every single day. Too much chemicals, I started to get headaches. After a week I could feel the scales growing on my arms!’

Most households consume their fish soon after it is caught and do not store it for long. Salting and drying fish is a common method of processing small pelagic fish that allows them to be stored much longer. However, because of the costs of labour and salt, they fetch a higher price than fresh small pelagic fish (about PHP65/kg), so are rarely consumed by fishing households but rather are usually sold to Manila.

Apart from some poisonous fish such as pufferfish (Family Tetraodontidae), fishing households avoid few fish. Pregnant women are sometimes advised to avoid tuna and other fish that are particularly bloody, older people and children do not eat fish with lots of bones, and followers of the Seventh-day Adventist Church avoid shellfish. Soup is highly popular in the Philippines and the most common cooking method for fish is in a sour soup (*sinigang*). Most commonly tamarind-based, the soup can also be made with other sour fruit such as batuan (a fruit endemic to Palawan, *Garcinia lateriflora*) or unripe mangoes. Commercially sold *Sinigang* sachets are also sometimes used. Another common cooking method for fish is frying in oil. Grilling is popular especially for larger types of fish, while a vinegar-based broth (*paksiw*) is used for smaller types of fish. In some instances, soups and fried fish ‘keep’ longer, allowing consumption over several days (with scraps given to dogs and cats). There

are no common or explicit rules regarding men and women eating together, or regarding who is allowed to eat first: everyone eats ‘*sabay-sabay*’ at the same time, or when they can.

Rice and other side dishes

Rice is the staple food that forms the basis of all meals in most parts of the Philippines: without rice the meal is not considered to be a ‘real’ meal. There are separate words for cooked rice (*kanin*) and uncooked rice (*bigas*), and people carefully distinguish among closely related varieties of rice on the basis of color, texture, smell and taste.

Generally, in coastal San Vicente fishing households purchase their rice. Those who own or work on a rice paddy, or have upland swidden plots, rarely sell any of their harvest (due to limited surplus). The price of rice varies somewhat depending on the season and point of origin (upland rice costs PHP10-15 more than lowland varieties). In the Philippines, there is a price ceiling set by the National Food Administration (NFA) for rice sold by NFA–licensed agents. While it is significantly cheaper than locally grown rice, it is deemed to smell unpleasant and the texture too hard. While poorer residents buy NFA rice because of the cheaper price, if they are able they buy other rice and mix them to make a tastier meal. The purchasing of rice forms a significant component of household budgets. (Table 2)⁵.

Food Group	Number of times consumed in previous day and night (<i>n</i> = 34)	Common Examples and Prices in Philippine Pesos
Grains	34	<ul style="list-style-type: none"> • Rice (34-42/kg)
Roots/tubers	13	<ul style="list-style-type: none"> • Ginger (100/kg) • Garlic (130/kg) • Cassava (20/kg)

⁵ Rice cost PHP34-42/kg during the 2015 fieldwork.

		<ul style="list-style-type: none"> • Sweet potato (45/kg)
Vegetables	28	<ul style="list-style-type: none"> • Eggplant (50/kg) • Okra (6/bundle) • Squash (40/kg) • Bitter gourd (60/kg)
Fruit	21	<ul style="list-style-type: none"> • Bananas (35/kg) • Mangoes (50/kg)
Meat	5	<ul style="list-style-type: none"> • Chicken (170/kg) • Pork (160-170/kg) • Beef (200-250/kg)
Eggs	10	<ul style="list-style-type: none"> • Chicken eggs 8 per piece
Seafood	34	See Table 1
Legumes	9	<ul style="list-style-type: none"> • String (yardlong) beans (6/bundle) • Mung beans (110/kg)
Dairy products	15	<ul style="list-style-type: none"> • Milk (109/330gm packet)
Oil	28	<ul style="list-style-type: none"> • Vegetable oil (30/385ml bottle)
Sugar	32	<ul style="list-style-type: none"> • Sugar (54/kg)
Condiments	34	<ul style="list-style-type: none"> • Coffee 3-in-1 sachet (8 per sachet)

Table 2: Common foods consumed in coastal San Vicente, Palawan, number of times consumed in the previous day and night, and prices.

Source: Fieldwork (2015).

Twenty-eight of 34 households had consumed vegetables in the previous day and night, while nine consumed legumes and pulses. Some fishermen may grow small amounts of vegetables

around their house, and fishers who also own or work on a farm may have a larger area dedicated to vegetable production, but among full-time fishers, vegetables are generally purchased and seldom grown. Common vegetables include eggplant (*talong*, *Solanum melongena*), squash (*kalabasa*, *Cucurbita maxima*), bitter melon (*ampalaya*, *Momordica charantia*), string (yardlong) beans (*sitaw*, *Vigna unguiculata*), okra (*Hibiscus esculentus*) and water (Ceylon) spinach (*alugbati*, *Basella rubra*). Ten households consumed eggs and 15 consumed dairy products in the previous day or night.

Meats such as chicken, pork and beef are rarely consumed because they are expensive.⁶ Pork, for example, costs PHP160-170/kg, chicken costs PHP170/kg and beef costs PHP200-250/kg. Only five out of 34 households had consumed meat during the previous day and night.

Residents varied in their assessments of the nutritional value and taste of land animal meat: for many, meat was valued highly because they rarely had the chance to eat it: ‘we hardly ever eat it, so it is delicious when we do!’ However, many also believed meat, especially pork and beef, to have a negative effect on blood pressure and general health.

Other staple foods include cassava (*Kamote kahoy*, *Manihot esculenta*) and sweet potatoes (*Kamote baging*, *Ipomoeo batatas*), commonly grown within home-gardens and nearby hills behind the fishing communities. Cassava is sometimes mixed with sugar and coconut to create a sweetened cake that is eaten as a snack, but cassava is also occasionally eaten as a substitute for rice when rice is not available (see below). Common fruits grown in the area are bananas and mangoes. Sugar and coffee is commonly consumed.

⁶ Meat is also more expensive and less accessible because most fishing households are tenure-insecure coastal dwellers with few flatter plots of lands suitable for animal husbandry. They may keep a few chickens and a single large pig, usually tethered next to the house or under a shade tree. Herds of pigs and cattle are rare amongst such households. Few households have the necessary capital assets (apart from land) to tend livestock. Veterinary support is inconsistent or absent in many rural areas, so that most attempts at animal husbandry fail due to disease and improper animal nutrition (see also Dressler 2009).

Income, trade and livelihood activities therefore play fundamental roles in influencing what specific types of food are consumed and how they are procured. While full-time fishers have ready access to fish, only cheaper types of small fish are usually consumed. Larger fish and processed (dried) fish are sold because of their greater economic value. Apart from some fruits and vegetables that are often grown nearby, most other foods, including rice, are purchased with cash derived from fishing activities.

Food insecurity in San Vicente fishing households

The perceptions and experiences of food insecurity among San Vicente residents reflect the role of income in influencing food security. Among full-time fishers, income is largely determined by the ability to sell fish and is crucial to purchase rice, which forms the basis of food security.

Perceptions and status of food security

When asked about the concept of food security and what it meant to them, most households simply did not know the meaning of the phrase most commonly used in policy documents (*seguridad sa pagkain*). As discussed, this highlights the malleability of the phrase and the potentially very broad range of meanings connected with it. Many respondents emphasised the role of income and economic activity in food security: ‘food security is having a budget for daily consumption’ one fisher noted. ‘If you have a livelihood, you have food security’ stated another. Others described their view of food security in terms of personal attributes: ‘you have food security if you work hard; those who are weak don’t have it’ stated one rich fish trader. ‘If you strive, you have food security’ noted another fisher. Another household defined food security as simply ‘the ability to eat rice every day.’

When implementing the HFIAS, there were numerous cases where households reported struggling to find enough food to eat. Out of a potential score from 0-27, where 27 represents the highest degree of food insecurity, and 0 the lowest, responses varied from 0-27, and the mean response was 8.4. Commonly, households reported feelings of worry and anxiety about not having enough to eat, skipping meals, eating food that they did not really like, and eating smaller quantities of food than they wanted to. Very rarely did respondents report that they had experienced some of the more extreme situations described in the HFIAS, such as not eating for an entire day, or going to sleep hungry. As the HFIAS asks about experiences over the last four weeks, responses are strongly affected by the timing of interviews and seasonality. The most difficult season in terms of food security varies depending on the particular type of fishing activity a household is involved in, but for most fishing households in San Vicente, the toughest period is during August. This is the height of the northeast monsoon (*habagat*), and a period when strong storms often make fishing difficult, particularly in smaller boats. At the time of our interviews in early July 2015 the previous four weeks were considered to be relatively stable.

During the semi-structured interviews, households described in detail the ways in which they were affected by food insecurity, and the strategies they employed to have enough food to eat. Those fishers who have additional sources of income from farming – seaweed, rice or swidden products being the most common types of farming – may try to sell these products if they can. Parents often skipped breakfast or other meals so that their children could have enough to eat. Others would simply eat smaller quantities throughout the day. Another common response is to borrow food from neighbours, friends and relatives, often informally, as one fisher described: ‘when we have fish, we give to them, and when they have fish, they give it to us.’ On some occasions, households borrow more formally for rice from richer members of the community such as fish traders, boat owners, or from moneylenders, who

usually more strictly monitor their loans. Interest is often high on these loans: one woman described, for instance, how if she borrowed two sacks of rice, she would have to repay three sacks.

If no food is available to prepare a side dish, households create a watery rice porridge (*lugaw*), or use whatever they have at hand, such as coffee, cooking oil and soy sauce, to create a substitute: ‘If we have no *ulam*, we just use soy sauce!’ was a common cheerful response. While these substitutions do not provide much nutrition, they at least provide the sensation of taste to what would otherwise be a bland meal of rice alone. Several households had regularly eaten meals like these in the previous weeks, sometimes every day for breakfast, for example.

Income, rice and food security

Unsurprisingly, the poorest households struggle the most with food security. In much of coastal Palawan, earlier migrants are usually better off than more recent migrants, with greater land holdings and stronger social networks. Indigenous households usually tend to be associated with lower levels of material assets (Dressler 2009). (Table 3).

Class	Assets	Ethnicity
Lower	Few household assets: simple house made of bush materials, minimal livestock, buckets, machete; no formal land tenure. May own small dug-out, paddle-driven boat without an engine. Some fishing gear such as hook and line.	More recent migrants (occasionally intermarried with indigenous Tagbanua). Indigenous Tagbanua.
Middle	Some household assets: more livestock (some raised), de facto land tenure (tax declaration).	Settled migrants.

	Will own a small boat with an engine. More gear such as hook and line and gillnet.	
Upper	<p>Significant household assets: household appliances (e.g. television, concrete house). Usually will hold formal land title over their household land.</p> <p>Those also involved in farming will own more livestock including water buffalo; de jure land holding in lowland and uplands.</p> <p>May own a large boat and expensive gear (e.g. ring-net) that employs crew of 20-30, or will own multiple smaller boats that fish for live fish, squid. Will finance cash for other fishers.</p>	Settled migrants.

Table 3: Class differentiation in coastal San Vicente, Palawan.

Source: Fieldwork 2014-2015.

Usually, poorer fishing households do not own their own boat or other expensive fishing capital (e.g., engines or gears), and work on other peoples' boats. Profits are divided between capital and labour costs, to the advantage of boat owners over fishermen – for example boat owners often work on another boat or engage in another income-generating activity while other fishermen are working on their boat. Crewmembers, however, have to fish for all of their income. Even poorer households who do own a boat do not have the wherewithal (e.g., an engine) to catch large amounts of fish. Possession of fishing capital is therefore a key factor influencing food security.

While we did not aim to determine income levels in detail, most fishing households in San Vicente reported earning under PHP5000 per month. According to the Philippine Statistical Authority, during the first half of 2014 a family of five needed a monthly average income of

at least PHP6125 to meet basic food needs, and at least PHP8778 to meet both basic food and non-food needs (PSA 2015). Average household size among our respondents was 5.9⁷. For the poorer households in San Vicente, housing is usually made of thatch and other bush materials; electricity and potable running water are not available, and households possess a very limited range of assets. Poorer fishing households often do not own the land they live on: in the Philippines, much coastal land is classified as public, and residents are often vulnerable to attempts at eviction (Fabinyi 2012; Knudsen 2012) (see also footnote 7).

When the weather is so bad it precludes fishing only those who have some savings or other sources of income are able to buy rice. One resident, for example, described how, as a ‘backup,’ he grew seaweeds that could be sold when he was unable to go fishing. In contrast, those without savings or alternative sources of income struggle to get enough to eat. For example, another fisher explained how he had few other options when he was unable to go fishing on his neighbours’ boat for live leopard coral grouper: he simply went into debt, and ate less food. He, his wife and two children were all visibly malnourished. Other fishing households may struggle to go fishing when their fishing gear and/or boat breaks down, or if they are unable to secure sufficient capital for fuel and supplies to go on a fishing trip.

While people are able to cope in the short-term without fish or vegetables as a side dish, it is very difficult to survive or stay healthy for long without rice. As many people said: ‘*bahala ka kung walang ulam, basta may kanin*’. (‘You can decide to go without a side dish if you want, as long as you have rice.’) When we asked about which was more important, rice or a side dish the response was unanimously in favour of rice.

For most of our informants rice is only available through purchase and is also more difficult for coastal dwellers to obtain because most fishers are not involved in rice growing. As one

⁷ Family planning services are not available in much of the rural Philippines, where the Catholic Church has long imposed its views against contraception (Bautista 2010).

fisher pointed out: ‘it’s easy to get an *ulam*, you can just grab a banana or use coffee if you have to, but rice is much harder to get.’ A considerable proportion of household budgets are spent on rice. Rice is sold in 50kg sacks, by *salop* – a local measure of approximately 2.5kg – or by the kg. However, using kgs as a measure relies on scales, which are often difficult to come by in rural areas. *Salops* are the most common measure, because most households cannot afford to buy sacks. A family will usually eat about one *salop* of rice a day (sold at PHP100-120). The plots of those involved in part-time farming are not usually large enough to cover their annual consumption so they still need to supplement their own production with purchases. This highlights the direct role of fish sales bringing in cash for the purchase of rice and other vegetables, particularly among land poor and tenure insecure coastal dwellers. This has implications for marine conservation.

CONCLUSION

Marine conservation often implies that greater abundance of fish (availability) is a key driver of local food security, and that fishing effort reductions from MPAs are the best way to achieve this (Foale *et al.* 2013). Correspondingly, the fish trade is frequently depicted as a threat to food security. In this paper, however, we have drawn on interviews with fishing households to show how the relationship between fisheries and food security is more complex than often characterised in the marine conservation literature. We have shown that despite relative fish abundance, food insecurity is still often present because of broader issues related to household incomes and trade. Furthermore, while fish trade may reduce fish stocks, it is also a vital component of the livelihoods of full-time fishing households – incomes derived from fish trade support the purchase of rice, which forms the primary basis of food security in San Vicente. The importance of trade for food security is well established in the wider social science literature (e.g., Béné *et al.* 2009), yet is understated in much marine

conservation literature because of a focus on the potential ecologically deleterious effects of fish trade.

In the coastal regions of San Vicente, the highly depleted fish stocks characteristic of other parts of the Philippines is not currently a major issue for most of the types of fishing – a report from 2011, for example, found that although catches are declining for many species, ‘the fishery resources remain abundant’ (Palawan State University 2011: 99). Fish is currently plentiful, and fishing is the major livelihood for most coastal residents. Apart from rice, fish is the most common food among residents, and provides an important source of micro-nutrients (Kawarazuka and Béné 2011; HLPE 2014). Yet, despite the adequate fish harvest and the fact that fishing households consume fish several times a day, every day, fishing households are often food insecure because, in many cases, the availability of fish is only indirectly related to the food security status of a household. For example, bad weather or a lack of access to credit for fishing trips may limit the ability of fishers to catch large numbers of fish to sell, reducing their income and ability to buy rice, the basis of food security for fishing households. For these households, income from the sale of fish does not merely augment their food security as suggested in some of the marine conservation literature, but, by providing the means to purchase rice, is the very basis of their food security. While there will clearly be great variation in these relationships among different communities, we suggest that similar patterns may be true for other full-time fishers. Full-time fishers therefore differ from full-time agriculturalists, who often grow their own staple foods, and can participate in a fluctuating mix of both market and subsistence production (Firth 1966; Eder 2008; Dove 2011).

Rather than being a threat to local livelihoods, trade is thus central to supporting locally defined and relevant food security among fishing households in the rural Philippines – a position with important policy implications for marine conservation. At the most basic level

is the need for better recognition of the complex relationship between fisheries and food security. As Fiorella *et al.* (2014: 856) state, the ‘lines that lead from the fishing net to the plate’ are tangled. Between fish production and fish consumption are a wide range of social, political and economic institutions that determine access to food (Béné 2003; Allison 2011; HLPE 2014). Indeed, the fact that fishers themselves often hold diverse understandings of the concept of food security suggests a need to be more careful in our use of the term. While we have focused on the roles of income and trade in this paper, many socio-cultural variables affect food security in different ways. In addition to the availability of fish, the specific mixture of livelihood activities and the wider economic context present in a particular location, specific food preferences, and the accessibility of staple foods are key variables that will influence the availability, access and consumption of food for fishing households.

In sum, increasing fish availability via MPAs is not necessarily a pathway towards improved food security. Correspondingly, the fish trade should not simply be understood as a threat to the livelihoods of fishing households, but as an inescapably important element of these livelihoods. In many or most cases, markets for fish are not external to the fishery but a fundamental component *of* the fishery. In this context, the dynamics of food security are less about the availability of fish *per se*, and more about the relationship between availability of fish to sell and the generation of income to enable rice purchases. In San Vicente, those households with less income from trade and correspondingly higher levels of poverty were closely associated with food insecurity. Poverty is in turn closely related to and caused by wider social issues well beyond the fishing sector, such as land-based issues, provision of government services, and social relations (Ribot and Peluso 2003; Béné and Friend 2011). This strongly suggests that in addition to managing the availability of food supplies through conservation tools such as MPAs, food (in)security needs to be addressed through interventions that focus on poverty reduction among fishing communities.

Productive scholarly engagement between the marine conservation literature and the social sciences can improve understandings about how conservation interventions such as MPAs may help or hinder food security, and about how other management interventions may be more suited in particular contexts. There are many alternative frameworks and conceptual approaches that attempt to reconcile environmental sustainability with poverty reduction, and which therefore offer more potential to address food insecurity than an uncritical imposition of MPAs. Human-rights (Allison *et al.* 2012); interactive governance (Jentoft and Chuenpagdee 2015); and wellbeing (Coulthard *et al.* 2011; Loring and Harrison 2013) are three increasingly influential approaches that, in different ways, work to achieve both environmental sustainability and poverty reduction. Crucially, all three approaches are based on the need for close engagement with the livelihoods and concerns of fishers themselves. Which approach will be most suitable will vary, suggesting a need for context-sensitive diagnostic approaches (Andrew *et al.* 2007; Eriksson *et al.* 2016).

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