TITLE: Food and water insecurity in specialised fishing communities: evidence from the Philippines

ABSTRACT

Food insecurity remains a problem for Southeast Asian communities that specialise in fishing. Food insecurity is closely linked to other social conditions, and the linkages between these conditions and their underlying drivers are less well explored in fishing contexts than they are in agricultural contexts. In this paper I draw on fieldwork from a community that specialises in fishing in the Western Philippines to examine the linkages between food and water insecurity. Food insecurity is common, and characterised by a lack of funds to buy food, particularly during periods of bad weather. Water insecurity is also characterised by the need to pay for the delivery of drinking water from one of several remote sources. I argue that both food and water insecurity in communities that specialise in fishing are driven by broader forms of poverty. Understanding the relations between food and water insecurity and the wider drivers of poverty should generate better understandings of how food and water insecurity is generated and reproduced in specialised fishing community contexts.

KEYWORDS:

1. INTRODUCTION

The relationship between fisheries and food security is becoming a field of rapidly growing academic and policy interest. From an environmental perspective, some have emphasised the dangers to food security from overfishing, and the potential food security gains from increasing the availability of fish through well-managed fisheries and protected areas (Pauly et al., 2005; Mora et al., 2009; Foale et al., 2013). The food security benefits of fish are also being heavily promoted from a human health and nutritional perspective (Béné et al., 2015; Golden et al., 2016). It is increasingly recognised in the marine policy community that food
security is not just about increasing the availability of fish, but instead is a highly complex condition, influenced by multiple factors including trade and market dynamics, nutrition, gender, and other social relations (Loring et al., 2013; Fiorella et al., 2014; McClanahan et al., 2015; Béné et al., 2016; Golden et al., 2017). In this paper the focus is on the linkages between household food insecurity and the related problem of water insecurity, and how both are collectively driven by poverty. The ways in which food insecurity is linked to other problems such as water insecurity, and the broader drivers of these conditions, are less well explored in specialised fishing community contexts than they are for related issues in agricultural contexts. Drawing on extensive fieldwork from the coastal Philippines, the focus in this paper is on understanding how poverty contributes to the linked experiences of food and water insecurity.

Linkages between food insecurity and other problems are well-recognised, for example the linkages between food insecurity and HIV/AIDS (Himmelgreen et al., 2009). Social scientists have more recently begun to explore the linkages between food and water insecurity, with some calling for a broader study of ‘resource insecurity’ that examines how humans meet their ‘basic needs’ for food and water (Wutich and Brewis, 2014). While less studied than the more well-known concept of food security, water security refers to

the ability to access and benefit from affordable, adequate, reliable, and safe water for wellbeing and a healthy life. Water insecurity is a condition when at least one of these variables (affordability, reliability, adequacy, and safety) is significantly reduced or unattainable so as to threaten or jeopardize wellbeing, which includes, but is not

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1 A common definition of food security is ‘availability and adequate access at all times to sufficient, safe, nutritious food to maintain a healthy and active life’ (World Food Programme, 2015). In this and other similar definitions, food security is not simply understood in terms of ‘availability’ of food, but also ‘access’ and ‘use’ (and sometimes ‘stability’).
limited, to physical and mental health and the capacity to undertake necessary productive, social, and cultural activities (Jepson et al., 2017: 3).

The highly diverse and rapidly growing literature on water insecurity has examined water security in the context of a variety of concepts and themes, including: human needs and development; ecological sustainability; geopolitics and international relations; and vulnerability and adaptation (Jepson et al., 2017: 3; see also Hadley and Wutich, 2009; Cook and Bakker, 2012; Lankford et al., 2013).

Yet in the marine policy community, discussion of water insecurity is scant relative to similar research on food insecurity. While this may be because the linkages between food insecurity and fisheries are more direct and obvious (fish as a source of food itself and as a product that can be sold to purchase other foods), in this paper I aim to show how water insecurity is also worthy of study because of the ways through which it is closely linked to food insecurity in specialised fishing community contexts, and how it highlights the common drivers of both.

Food and water insecurity have often been observed to co-occur in many cases (Wutich and Brewis, 2014), and this is also likely to be the case in specialised fishing community contexts beyond those described in this paper. Small islands, for example, represent an example where households may frequently specialise in fishing, and experience both food and water insecurity (Macintyre, 1983; Lane et al., 2013; Hadwen et al., 2015). At an empirical level, therefore, the aim of the paper is to assess and describe some of the ways in which food and water insecurity relate to each other in specialised fishing community contexts.

At a conceptual level, linkages between food insecurity and other problems – such as water insecurity – are commonly conceived to be components of a broader social state, or as manifestations of an underlying driver. Scholars writing with very different theoretical orientations – from those studying vulnerability and multiple stressors (Adger, 2006; Bennett
et al., 2015), to political ecology studies emphasising the drivers of poverty at multiple scales (Bohle et al., 1994), to biomedical studies of ‘structural violence’ (Farmer, 2004) and ‘syndemics’ (Himmelgreen et al., 2009; Singer et al., 2017) – have all emphasised how food insecurity is heavily influenced by more fundamental forces. In their development of the notion of ‘resource insecurity’, Wutich and Brewis (2014) follow Sen (1981) to emphasise the role of a lack of entitlements in generating food and water insecurity. However, in comments on this review, other authors have noted the potential for future studies to instead examine the role of markets and poverty in generating food and water insecurity (Logan, 2014; Stevenson and Hadley, 2014).

In this paper I will show how food and water insecurity in communities that specialise in fishing are both generated by poverty (poverty understood in a very narrow sense as constituted by a low level of financial assets and income). I show that both food and water security depend strongly on income, and those periods when it is most difficult to obtain money are when food and water insecurity occurs. I focus on the role of income in food and water insecurity because of the particular importance of markets for specialised fishing communities. As Firth noted in his study of Malay peasant fishing communities from 1944, unlike many mixed farmer-fishers, full-time fishers need to be able to sell their fish:

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 (Firth, 1966 [1944]: 27).

Similarly, in a review of the history of Philippine capture fisheries, Spoehr pointed out that ‘[c]ontemporary Southeast Asian communities specialised in fishing are primarily dependent
on town, city or regional markets... Communities specialised in fishing are not economically self-sufficient and depend on markets external to the community’ (Spoehr, 1984: 26-27; see also Siar, 2003). While these insights regarding the importance of markets for communities that specialise in fishing have been present in the anthropological literature for many years, much research and policy on food security for fishing communities (particularly from a conservation perspective) still tends to downplay the role of trade and markets, focusing instead on the availability of marine resources (Foale et al., 2013; Fabinyi et al., 2017). In the discussion, I expand on the ways in which studies of food and water insecurity could be usefully complemented by political economy work on a ‘relational’ view of poverty (Mosse, 2010) that focuses on the broader relations that sustain poverty, and consequently food and water insecurity.

2. MATERIALS AND METHODS

The island of Ambulong is part of the municipality of San Jose, which is located in the province of Occidental Mindoro (Figure 1) and has a population of 143,430. While Mindoro is a significant centre for agricultural production, San Jose is also an important centre for commercial fishing, with 121 commercial fishing vessels registered there. Major types of commercial fishing vessels based in San Jose include bagnet vessels that target small pelagic fish (e.g. scad, *Decapterus* spp), hook and line vessels (carrying multiple small boats) that target mixed reef fish, large net fishing vessels that target all fish (*lintigan*), and vessels that carry spearfishers, who dive using hoses and air compressors.

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2 In the Philippines, commercial fishing vessels are defined as those >3 gross tons, and are only allowed to fish in waters 15km from the shoreline.
Ambulong is a small island of 1033 ha, lying approximately 15km from San Jose town, with a population of 3525 (508 households). Residents are composed of migrants from different parts of the Philippines who arrived and settled the island in the early twentieth century. Fishing is the dominant livelihood; there are very limited viable alternative livelihoods on the island. Seaweed farming is practiced by some households as an additional, supplemental source of income, some rice and vegetables are farmed in the interior of the island, and bamboo is harvested and sold. There are also some remittances from younger residents who increasingly look for work in San Jose town (e.g. commercial fishing vessels), elsewhere on the mainland of Mindoro (e.g. agricultural labouring on tobacco and onion farms), or in Manila. However, the limited availability of suitable farmland on this small island means that most residents are full-time small-scale fishers, meaning that Ambulong is an ideal location to study food and water insecurity in communities that specialise in fishing. As with many
communities of the Philippines that specialise in fishing, fishers resident in Ambulong practice a wide range of fishing activities to catch a diversity of species in different seasons. At the lowest level of capitalisation are fishers who use boats with no engine and simple gears (e.g. hook and line) to catch very small numbers (e.g. <10kg/day) of assorted reef fish. However, the most common type of fishing involves boats with engines with crew of two to four people who use bottom-set gillnets to target fish such as sardines (*Sardinella*), fusiliers (*Caesio* spp), and rabbitfish (*Siganidae*). Others use driftnets to target larger fish such as garfish (*Belone belone*). Most of these types of fish only fetch a price of between P20-P50/kg when sold in San Jose town. Spearfishing and gleaning are also common, and fishers will occasionally catch small quantities of higher-value species such as octopus, lobster, squid, and groupers. These products are also traded locally to San Jose town. Some younger men (approx. 20) are employed on the large-scale commercial hook and line vessels that operate out of San Jose town or from neighbouring Palawan province. Fishing activities are flexible, and vary throughout the year depending on season, weather, household financial circumstances, and personal preferences.

This paper draws on data from a mixed-methods approach that took place over three fieldtrips to Ambulong in August 2014, March 2016, and June 2017. I worked with the largest community in Ambulong, which is administratively divided into two *sitios* and three *puroks*, but which forms one geographical community of 348 households, with a population of 2465, along the eastern coast of the island, and which is locally referred to (and hereafter in this paper) as ‘Ambulong’. In 2014 and 2016, fieldwork centred around semi-structured interviews with residents in Ambulong (n=30), one focus group with elderly residents that focused on historical settlement and livelihood change, and three semi-structured interviews with key informants in San Jose town (government officials from the Bureau of Fisheries and Aquatic Resources and the fishport, and a commercial fishing captain). These semi-structured
interviews and the focus group discussion were supplemented with numerous unstructured interviews and observations of livelihood activities in Ambulong. The topics for these interviews in 2014 and 2016 in Ambulong focused on life histories of individuals and households, community patterns of marine resource use and trade and livelihood change over time, and contemporary possession of assets, livelihood strategies, and social differentiation within Ambulong. Income class was not explicitly considered as a discrete variable in these interviews; instead, poverty was described through descriptions of experiences, household assets, and fish catches. Households were selected based on the snowball method to encompass a range of different livelihood activities (e.g. different fishing methods).

In 2017, fieldwork was specifically focused on obtaining data about food and water insecurity in Ambulong. Seventy semi-structured interviews were undertaken, with questions focusing on food and water insecurity, food and water consumption patterns, and adaptations to food and water insecurity. Female household heads were targeted as household members with a high knowledge of household food and water insecurity. A female research assistant from the local community assisted with these interviews. Interviewees were selected through purposive sampling to include households of different types of fishing gears. As part of these interviews, formal assessments of food and water insecurity were also undertaken. The Household Food Insecurity Access Scale (HFIAS) (Coates et al., 2007) includes a range of questions about the subjective experience of food insecurity over the past four weeks, and is widely used among development practitioners and scholars as one measure of food insecurity. For each of the nine questions about experiences of food insecurity, the women gave a score of 0-3 to indicate the frequency of occurrence. The Household Water Insecurity Access Scale (HWIAS), more recently developed by Tsai et al., (2016), is based on the HFIAS, and asks a series of questions about the subjective experience of water insecurity over the past four weeks (see Jepson et al., 2017 for a list of other metrics of household water
Both the HFIAS and HWIAS were translated into Tagalog, and questions were adapted to local conditions.

Four key informant interviews were also conducted with local leaders and health workers in the community, focusing on community engagement with non-governmental organisations (NGOs) and government policies and projects for food and water insecurity. Observations were also undertaken of food and water procurement and preparation, and livelihood activities such as fishing and seaweed farming. Numerous unstructured interviews on these topics with male fishers (ranging from short conversations to extended discussions of an hour or more) were also undertaken.

Developing methods for the measurement of both food (Barrett et al., 2010) and water insecurity has been a goal of researchers and practitioners in these fields for years. Both the HFIAS and the HWIAS have multiple limitations. They rely on participant recall over the past few weeks, and they are subjective: some women may see having to use water from a spring as a problem, for example, while others do not. Others may have been ashamed to discuss their experiences with food and water insecurity with an outsider. Because both measures are a static snapshot of the past four weeks, they can also provide highly variable results according to season. These measures are therefore not intended as a comprehensive assessment of food or water insecurity. Instead, they provide one measure of food and water insecurity that contextualises, supplements, or ‘triangulates’ (Flick, 2014) the main data collection on these topics generated by qualitative semi-structured and unstructured interviewing, and by observations. The focus is therefore less on the quantitative assessments of food and water insecurity as it is on the qualitative details.

All interviews were conducted in Tagalog, which is the national *lingua franca* and spoken by community members. Informed consent was obtained from all participants. Detailed
fieldnotes were taken each day during fieldwork, and these fieldnotes were subsequently manually qualitatively analysed for key themes that emerged (Bernard, 2006). Statistics on fisheries were also obtained from relevant government offices. The paper also draws on insights from long-term ethnographic research in other parts of the coastal Philippines, mostly in neighbouring Palawan province (e.g. Author, 2012).

3. RESULTS

As almost all households rely on small-scale fishing as their primary income source, there is only limited social differentiation in Ambulong. One-hundred and eighty-eight out of 508 households (37%) on the island overall are beneficiaries of the government’s conditional cash transfer program, which is designed to provide social assistance and break ‘poverty cycles’ (Philippine Government, 2017). Because this program is only designed for very poor households, the high proportion of beneficiaries is an indication of the very high level of poverty on the island. However, ownership of fishing assets is one form of differentiation among households. Those who own a boat accrue a greater share of the profits than crewmembers, and they can rent their boat out while they work on other income-generating activities. For example, a net fishing trip typically involves three to four crew: at the end of the trip profits are divided among each fisher, and the boat owner also gets a share. Other boat owners rent their boat out at PHP350 a day. Other more well-off households include those who had household members sending remittances from their work in San Jose town or elsewhere, while some households owned land and collected rent. In contrast, poorer households are those without significant financial assets, whose income is effectively determined by how much fish they catch on a day-to-day basis. Their livelihoods are less secure because they depend on the schedules and needs of other boat owners to work on their boats, and they obtain less income than boat owners because their profit shares from each

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3 During the last period of fieldwork in May-June 2017, USD1 = PHP49.
fishing trip are lower. According to the national statistical agency, ‘During the first semester of 2015, a family of five needed at least PhP 6,365 on the average every month to meet the family’s basic food needs [i.e. the ‘food threshold’] and at least PhP 9,140 on the average every month to meet both basic food and non-food needs [i.e. the ‘poverty threshold’]. While income data was not formally collected, households such as those without significant fishing assets reported earning well under PHP10,000 gross income per month. Such households find it difficult to effectively save money and consequently, they are impacted most severely when bad weather interrupts daily fishing activities.

3.1 Food consumption and insecurity

The diet in Ambulong is similar to that of many other parts of the coastal Philippines, and is based around the consumption of rice and a dish, or viand (ulam). There is some rice grown in the interior of Ambulong, but this covers only a small amount of the consumption needs of Ambulong residents. Therefore, rice is almost always bought, costing between PHP35-50/kg and transported from San Jose town. Rice consumption forms a significant component of weekly household budgets, and rice is eaten at every meal. Some small swidden vegetable plots in the interior of Ambulong exist, but these do not supply enough vegetables for annual consumption. Vegetables are therefore also commonly bought by residents.

The most commonly eaten viand is fish, which is generally procured from a household’s own catch. Higher-value species of fish are invariably transported to San Jose and sold, while a portion of the lower-value species are consumed. This means that the fish that are regularly consumed are those that are regularly caught in Ambulong (Table 1). As sardines are the most commonly caught fish, they are eaten almost every day by many residents. When fish are bought by residents, the price for most fish sold in Ambulong is between PHP20-50.
Meats such as chicken (PHP120), pork (PHP130) and beef (PHP180-200) are rarely eaten because of their price.

Table 1: Commonly caught and consumed fish in Ambulong

<table>
<thead>
<tr>
<th>Common English name</th>
<th>Local name</th>
<th>Scientific name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sardines</td>
<td>Tamban</td>
<td>Sardinella</td>
</tr>
<tr>
<td>Emperors</td>
<td>Kanuping</td>
<td>Lethrinidae</td>
</tr>
<tr>
<td>Garfish</td>
<td>Katsawan</td>
<td>Belone</td>
</tr>
<tr>
<td>Mackerel/tuna</td>
<td>Tulingan</td>
<td>Scombridae</td>
</tr>
<tr>
<td>Parrotfish</td>
<td>Mulmol</td>
<td>Scaridae</td>
</tr>
<tr>
<td>Rabbitfish</td>
<td>Samaral, Danggit</td>
<td>Siganidae</td>
</tr>
<tr>
<td>Flying fish</td>
<td>Flying fish</td>
<td>Exocoetidae</td>
</tr>
</tbody>
</table>

Experiences of food insecurity are common among households in Ambulong. For the HFIAS, out of a total possible score of 27, where 27 represents the highest degree of food insecurity, and 0 the lowest, the mean response was 7.9 (n=70, s=6.4). There are many ways in which respondents described food insecurity via their coping mechanisms. (Table 2).
Households will frequently reduce their food consumption, for example, eating once or twice a day: people will skip breakfast, or combine breakfast and lunch into a late morning meal and then eat nothing until dinner. On occasions, women described how they or their spouse would only eat once a day. Across many households the stated priority was for children to have sufficient food; the male household head and sometimes the female household head sometimes went without food or minimised their food consumption specifically in order for the children to have enough to eat. Dinner is the meal that all respondents will aim to consume because of the uncomfortable feeling associated with being hungry while going to sleep: ‘even if we skip breakfast and lunch, we make sure to eat something before going to sleep’ one woman noted. Food choices are very limited, as the following quotes from women indicate:

‘We have no choice, whatever is there we just eat it.’

‘Having food is more important than variety, we just eat whatever we can get.’
If people do not have access to a viand, they will adapt: people will make rice porridge to make it more filling (*lugaw*), reduce the amount of viand they consume (e.g. spreading 0.5kg of fish for the whole family over a whole day), or add mixtures of sugar, coffee, oil, and soy sauce as ‘viands’. However, it is very difficult when rice is unavailable, as one respondent noted: ‘the most important thing is rice – as long as we have rice we are OK’. This is because rice is perceived to be filling, and it provides the foundation for what is locally understood to be a ‘proper’ meal. When households cannot afford to buy rice, people will sometimes instead consume root crops (e.g. cassava, sweet potato) that are grown locally in swidden plots and sold more cheaply than rice (PHP20/kg), or breadfruit. Others will go into debt, borrowing money from kin, friends, or neighbours. Because of the importance of rice for food security, and the fact that rice needs to be bought, food security is therefore largely equated with income in the views of many residents.

Fish are also extremely important for food security in Ambulong. Not only are they the main type of viand, because fishing is the primary livelihood activity on the island, they (more significantly) provide the income that is used to buy rice, other viands, such as vegetables, and sauces, coffee, sugar and salt. After the fish for household consumption is deducted from the catch (a few kgs, depending on the size of the family), the rest is sold. However, the capacity of fishing to sustainably generate food security for households in Ambulong appears to be at risk. Among the fishers and female household heads interviewed, many gave examples of reduced catches. One net fisher gave the example that during the 2000s, he could easily catch up to 200kg during peak season, but now would catch 100-150kg. Another stated that during the 1990s, he could catch well over 300kg; now, he would bring in a maximum of 75kg. Similarly, a hook and line fisher noted that in the 1990s, he used to be able to catch up to 25kg, whereas now he regularly caught between 2-10kg. According to long-term residents, population growth since the 1970s greatly increased the number of fishers in the local area.
At different times, destructive and illegal fishing methods have been widely practiced in the area, including the use of sodium cyanide, dynamite, and commercial-scale fishing (*lintigan*) in local municipal waters. Official statistics from the municipal office of the Department of Agriculture state that daily fish catch rates for motorized boats in Ambulong are now from 5-10kg (lean season) and 10-30kg (peak season). Declining fisheries and limited alternative livelihood options for local residents therefore mean that food security is negatively affected at a community level.

However, local health workers also reported some progress on food security issues. An international NGO began working in Ambulong in 2008, with a focus on improving the quality of life of children. Many children who were most at risk of food insecurity were sponsored. Additionally, a feeding program implemented by the provincial government since 2011 targeted those children with malnutrition, employing local health workers to prepare meals for specific children. According to local government data, malnutrition among children aged 0-71 months in Ambulong has declined, from 38% in 2011, down to 24% in 2013, and 11% in 2017. While food insecurity therefore remains present in Ambulong, targeted government interventions appear to have had some impact.

### 3.2 Water use and insecurity

For water for washing, people will use water from one of ten wells that exist in the community. These are all open, public, dug wells that are located within 50-100m from the shoreline. Most residents live within just a couple of minutes’ walk from one of these wells, and so will fetch water as needed several times a day. While this water is brackish and unsuitable for drinking, it is not generally perceived to be a problem for washing clothes and dishes, as well as personal hygiene. Some more well-off households have a personal pump inside their homes, connected to the well water.
There has never been a source of water for drinking and cooking in Ambulong, and so residents need to obtain this water from one of three external sources. The first source is from a spring on the western side of Ambulong Island, which takes approximately half an hour to get to by boat. The second source is a spring on Ilin Island, directly opposite the community, which takes a similar amount of time to get to (both are two to three km away). Some residents obtain water from a third source, purified water from San Jose town.

There are several problems associated with water insecurity with these sources (Table 3). For the HWIAS, out of a total possible score of 24, where 24 represents the highest degree of water insecurity and 0 the lowest, the mean response was 6.9 (n=70, s=7.2). For the springs, water is fetched using large containers of between 20-30L. Those residents who own a boat can go directly themselves to fetch water. The cost of such a trip will be approximately PHP55, for a litre of fuel to be used. More often, however, residents will pay someone to deliver water. Water deliverers will collect water containers from many residents at a time and fetch water, using either a boat with an engine or a raft made from bamboo. These are usually young men in the community, who make multiple trips a day. Waiting time at both springs varies significantly, but can sometimes be up to two hours. A container costs between PHP12-17 (depending on the size) to be filled with water and delivered. Depending on the size of the household, households will fill between one to two containers at a time, two to four times per week. This means the weekly cost of water delivery is between PHP60-120 per week for most households.

Table 3: Types of water insecurity and coping mechanisms

<table>
<thead>
<tr>
<th>Water insecurity</th>
<th>Coping mechanisms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not enough water for drinking and cooking</td>
<td>Ration drinking water</td>
</tr>
</tbody>
</table>
People often use different water sources depending on their needs and at different times of the year. Water from town is the most expensive, at PHP25 for a 30L container, so more well-off households that can afford it use this water. This water is also perceived to be the safest for drinking. However, most residents use water from either of the two springs for drinking, most of the time. At certain times of the year, the water from the springs is perceived to be dirty or less safe for drinking. This occurs both during the dry season (December-May), and at times during the rainy season (June-November). Sometimes leaves and dirt wash into the spring, algae appears, or the water tastes saltier than other times. At these times when the water from the springs is less safe, or if they can afford it, some residents who normally drink from the springs will choose to buy it from town: ‘if we have money we buy it from town, if not then we just get it from the spring’ noted one woman. Another explained how ‘we just use this [mineral water from town] for the children’s drinking water, we [parents] will drink from the spring’. Similarly, one woman noted how ‘if the water isn’t very clean, we just use the spring water for cooking, and we drink the water that we buy from town’. Some will boil the water during times when the water is perceived to be less safe, others will boil it consistently, and others will rarely or never boil it. As safe water becomes more difficult to obtain, therefore, decisions about which water source to use for which activity become more finely-grained, depending on specific household financial circumstances, the different priorities assigned to children and adults, and the different levels of perceived risk in using spring water for cooking as opposed to drinking.
During periods of bad weather, it becomes difficult to collect water, because the weather conditions make it dangerous for small boats and rafts to travel by sea. In these periods some households pay more to buy it directly from town (the bigger passenger boats that travel between Ambulong and San Jose town can often still travel at these times). Others buy water from neighbours who have spare water available, which is priced at the same level as if it were delivered from the springs; others will use water from the local wells and simply boil it; while others will also collect rainwater using buckets and ice boxes. Some women perceive drinking water from the springs to be a cause of diarrhoea, citing examples where they believed cases among children to be caused by drinking water from the springs. As with food, during periods of limited water availability within the household, women reported decreasing water consumption among parents of a household explicitly so that children would have enough to drink. Several men and women described how they would specifically ration their drinking water (e.g. 8 cups a day) to conserve it. In Ambulong, therefore, water insecurity has multiple dimensions: because water needs to be purchased it is sometimes unaffordable, which can sometimes lead to inadequate water intake, while at certain times of the year the weather also makes water unsafe.

As with food, there have also been several external initiatives designed to reduce water insecurity on Ambulong. The external NGO that arranged for the sponsoring of children also had attempted to build a piping system from the spring on Ambulong Island to the eastern side of the island where the community was located. A dispute, however, centred on the financial arrangement with the landowner of the spring. Currently, the owner collects 1-1.50PHP for each container filled at this spring, depending on the size. The NGO and the landowner were unable to agree on management and financial arrangements for the proposed piping system, so the system remained undeveloped.

3.3. Linkages between food and water insecurity
To what extent and in what ways are food and water insecurity linked in Ambulong? Using the scores from the HFIAS and HWIAS, it is possible to do a simple correlation test. Pearson’s r was computed to assess the relationship between the reported scores for the HFIAS and the HWIAS. There was a strong positive correlation between the HFIAS and HWIAS scores, $r=.535$, $n=70$, $p<0.001$. A scatterplot summarises the results (Figure 2). This shows that food and water insecurity (as measured by the HFIAS and HWIAS) are correlated: those who experience food insecurity are also more likely to experience water insecurity.

Figure 2: Relationship between HFIAS and HWIAS ($n=70$).
Disentangling the linkages between food and water insecurity is difficult because of the ways they are both inextricably linked with other components of ‘the assets (natural, physical, human, financial and social capital), the activities, and the access to these’ that comprise a livelihood (Ellis, 2000: 10). The interconnected nature of food insecurity, water insecurity and other stressors is illustrated in female household perceptions of daily stresses (Table 4).

**Table 4: Daily family stresses in Ambulong (n=70).**

<table>
<thead>
<tr>
<th>Stress name</th>
<th>Number of times ranked 1 (n=70)</th>
<th>Number of times mentioned overall (n=70)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial problems</td>
<td>18</td>
<td>37</td>
</tr>
<tr>
<td>Sickness</td>
<td>14</td>
<td>34</td>
</tr>
<tr>
<td>Food</td>
<td>11</td>
<td>23</td>
</tr>
<tr>
<td>Water</td>
<td>6</td>
<td>17</td>
</tr>
<tr>
<td>Expenses for children (tuition fees, allowance, etc.)</td>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>Bad weather</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>Alcohol/vices</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Other</td>
<td>6</td>
<td>14</td>
</tr>
</tbody>
</table>

Women were asked to list in order all the ‘daily stresses for their family’. Their responses highlight the significance of food and water insecurity, as well as the ways that they are
intricately connected with other concerns. Both food and water are directly listed (food as the third-ranked stress and water as the fourth), and are closely linked to all the other concerns listed. Women attributed various types of sickness (the second-ranked stress), for example, to problems with the water. When asked if the water from the springs was safe to drink, residents frequently noted how they ‘couldn’t be sure’, and that at certain times of the year it clearly wasn’t. The spring water was cited by women as a cause behind diarrhoea, especially that of children. One woman whose husband had kidney stones ascribed this to the reduced water consumption he had had in the weeks leading up to the sickness, while another woman noted the high number of urinary tract infections in the community, and also ascribed this to insufficient hydration. A lack of food is also commonly perceived to lead to sickness. For example, people described how they had to eat not just because they were hungry, but so they didn’t get weak and sick, which would then lead to greater problems. When sick, household members cannot go out to fetch water, cannot go out fishing, and cannot effectively contribute to the running of the household. This leads to a loss of income, exacerbating food and water insecurity.

Similarly, obtaining both food and water takes significant amounts of time. For those who fetch drinking water from the springs themselves, time is spent travelling to the spring, queuing, fetching the water, and then returning. Those who have their water delivered spend less personal time, but still need to wait for deliveries, which are often late. Fetching water for washing from the wells does not usually take more than a few minutes, but is still longer than those residents who own a personal pump in their own household. This time spent fetching water is time that could otherwise be put towards fishing or other income-generating activities. As one resident complained: ‘You feel like you want to go to work, but you still have to go and fetch water first’. Obtaining food also requires a greater amount of time than previously, because of declining fisheries. A fishing trip that may have taken only several
hours to bring in 10kg or so, for example, now may take most of the day. Greater time spent fishing means less time available to fetch water, and reduced incomes from fishing means less money available to buy both food and water.

As the highest-ranked stress, financial problems underlie the experiences of food and water insecurity in Ambulong. Daily gross income for poorer households, for example, is highly variable, but can be between PHP200-1200 per day depending on the season and catch, after fish are sold at the San Jose market. Fuel costs can be several hundred pesos, depending on how far the boat goes, and there are also costs of transporting the fish to San Jose town (less than PHP100).

Drinking water must be bought either from the springs or from town, and as one respondent described, this is an expense (of PHP60-120 per week) that cannot be avoided: ‘Before you make your budget for the week, you always have to have water. You can’t go without water. We sacrifice other things before water.’ Another pointed out the perceived injustice of the situation: ‘Actually water should be free, but we have to pay for it’4. Food – rice, in particular – forms another significant expense. As households will consume approximately 2.5kg of rice per day, this means that up to PHP125 can be spent on rice daily. While fish, the primary type of viand, are almost entirely derived from peoples’ own fish catch, rice is bought by all households on Ambulong. This means that, especially after operating costs such as fuel and transportation are taken into account, a large proportion of the gross income of households is spent on food and water.

The fact that water and food therefore form a significant component of household budgets means that they can compete with each other. More money that is spent on water means less

4 Such a comment is reminiscent of Susan George’s observation that ‘Food ought to be a basic human right. However, this right cannot be exercised in a system that divides people into two categories: those who can pay (called ‘consumers’) and those who cannot (1985: 4, emphasis in original).
money that is available to buy food, and vice versa. In times of low income – during bad weather when fishers cannot go out to sea – water and/or food consumption can be reduced because of a lack of funds to buy adequate amounts of both. In addition to the examples given in section 3.1, the centrality of income to food and water insecurity is highlighted by the following quotes from women:

‘We want to eat things other than fish, but we can’t afford it.’

‘If we had money we would like to eat groupers, but we eat sardines every day instead!’

‘We want to eat meat but we can’t afford it… We only have just enough food to get through each day.’

Income is central to both food and water security. Rice, the foundation of food security in the view of local residents, needs to be bought. When money is difficult to access because of bad weather that prevents people from going fishing, or for other reasons, the ability to buy rice declines. This is the same for other types of food such as vegetables and meat, and also for water. Those who are more food secure and those who are more water secure are those who can buy food and water more easily. Given the reports of declining catches at a local level in Ambulong (and the widespread definitive occurrence of this at a national level [Anticimara and Go, 2016]), it seems likely that food and water insecurity may become even more challenging in the future.

4. DISCUSSION

This paper has assessed the linkages between food and water insecurity in a community that specialises in fishing in the Philippines. Making strong claims about these linkages is difficult because of the malleability of the concepts of food and water insecurity, the difficulty of
measuring them both, the complexity of the factors that drive them both, and the limited
inferences that can be drawn from a case study of just one community. Yet there is evidence
from this study that is relevant for understanding patterns of food and water insecurity in
other specialised fishing communities, for the development of policy interventions, and for
understanding how poverty is perpetuated and sustained in such contexts.

While the important links between fisheries and food security have become the focus of many
studies (see e.g. Béné et al., 2016), recognition of how water insecurity affects food security
in fishing contexts remains scant. This paper has therefore aimed to provide a first step to
account for some of the ways in which food security and water security relate to each other in
communities that specialise in fishing. I have aimed to show how the costs of food and water
insecurity reinforce each other in a synergistic way (Singer et al., 2017), collectively driven
by poverty. The centrality of markets in specialised fishing communities means that poverty
plays a major role in determining food and water insecurity.

Considering the synergies between food and water insecurity highlights ways in which policy
interventions could potentially target both. For example, interventions to alleviate water
insecurity at the community level (e.g. a piping system from a spring) could indirectly
alleviate household food insecurity through reducing the expenses of residents\(^5\).

Correspondingly, interventions to improve the income of fishing households, such as
improved post-harvest facilities (e.g. dryers), or in the long-term, improved fisheries
management, could also improve water security through improving purchasing power.

However, it remains difficult to envisage simple, straightforward solutions to the problems of
poverty that generate food and water insecurity. Tourism and aquaculture, for example, are
two widely touted ‘alternative livelihood’ activities touted for specialised fishing

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\(^5\) Although see (Gibson and Mace, 2006; Stevenson and Hadley, 2014) about unintended negative consequences
of some interventions to improve water security.
communities across Southeast Asia, yet both livelihood activities also come with potential negative impacts (e.g. marginalisation of coastal residents without secure tenure) and vulnerabilities (e.g. to disease, weather, price, and economic shocks), and their effectiveness can be highly geographically variable (Fabinyi, 2010; Cabral and Aliño, 2011; BFAR, 2016). Government cash transfers currently play a crucial role in supporting poorer households, but their long-term effectiveness in generating wealth is questionable. What may become more common in future years may instead be increased migration from coastal areas, as younger people keen to find more income look to urban centres and away from fishing for work (Fabinyi, 2012; Rigg et al. 2012).

More broadly, then, highlighting the linkages between food and water insecurity also shows the need to go beyond specific technical policy interventions and to address the wider political and economic drivers of poverty in such contexts (Li, 2007). When trying to trace such drivers, helpful here is political economy work on a ‘relational’ view of poverty (Harriss, 2007; Mosse, 2007, 2011; Bernstein, 2010). In contrast to much poverty research that focuses on the measurement of poverty and the impact of technical interventions, a relational view of poverty emphasises the ways that poverty can only be understood in relation to the broader conditions that allow it to flourish, such as particular forms of agrarian change. A relational view of poverty is ‘one that first views persistent poverty as the consequence of historically developed economic and political relations, and second, that emphasises poverty and inequality as an effect of social categorisation and identity’ (Mosse, 2007: 1156). Poverty, from this perspective is viewed as emerging from processes of capitalist accumulation (e.g. dispossession for ‘primitive accumulation’, unequal trade relations)⁶, and reinforced by social institutions such as ethnicity, gender, and so on (e.g.

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⁶ As Harriss notes: ‘The wealth of some is causally linked to the crushing poverty of others’ (2007: 12).
Haller and Merten, 2008). From this perspective, understanding the precise nature of poverty is less valuable on its own than understanding the relationships that reproduce it. While beyond the scope of this study, much can be gleaned from other studies of coastal livelihoods in the Philippines that show how poverty in the coastal zone is generated and reproduced (e.g. Knudsen, 2016). In many cases, fishers in the Philippines have been ‘adversely incorporated’ into capitalist relations, for example through patron-client relations that allow traders to obtain higher shares of the profits of internationally-traded seafood than fishers (Cruz-Trinidad et al., 2014). Examples of ‘coastal grabbing’ related to rapidly escalating coastal land values for tourism development have also placed pressures on marginalised fishing households, who often have no formal land tenure (Fabinyi, 2010; Cabral and Aliño, 2011; Dressler, 2011; Knudsen, 2012). Overfishing remains prevalent throughout the country (Anticamara and Go, 2016). And in response to declining fisheries, the government has been expanding forms of maritime governance such as marine protected areas, often reducing access to fishing grounds for fishers with significant consequential social impacts (Segi, 2014). These large-scale political and economic trends converge and interact with locally-specific sets of social relationships on the ground (e.g. class, ethnicity, old and new migrants), privileging some groups and marginalising others (Knudsen, 2012; Segi, 2014). Future research in contexts of communities that specialise in fishing could productively aim at understanding the relations between food and water insecurity and such broader structures: the specific pathways through which they produce food and water insecurity, and how they condition the prospects for interventions that aim to reduce food and water insecurity.

5. REFERENCES


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