Fijian women's involvement in coastal fisheries: A socioeconomic study of fisherwomen from Matuku, Moala and Totoya islands (Lau Seascape)

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Abstract

Fisherwomen contribute over 50% towards small-scale fisheries, yet are one of the least understood and documented groups participating in these fisheries. We investigated and quantified the fishing activities of rural fisherwomen from southern Lau in Fiji. A total of 224 women were interviewed from 18 villages across three islands to determine which fisheries will be targeted, challenges faced by fishers, opportunities for promoting sustainable techniques, and to advocate for better food security and fisheries management. Women primarily fished for food, largely using handlines in soft bottom, mangrove and coral reef habitats, and least often in open ocean and freshwater. Lethrinids and serranids together made up 81% of the total regular catch, across all islands and habitats. Challenges included physical injury during fishing, bad weather conditions, lack of fishing resources and further training in effective and efficient fishing techniques. Women are either not represented, underrepresented, passive or uninvolved in decision-making relating to marine resource use and management. Investigating seafood consumption rates and investing in youth and children programmes that nurture ecoconscious minds and behaviour are interesting opportunities to promote sustainability. Advocacy must form within the community's deep sense of ownership of marine resources, leaders must be fully prepared for change, and stakeholders should explore ways to integrate traditional ideas with modern conservation for better food security and to revive ecologically important cultural norms.

Introduction

Women are major contributors to coastal fisheries, yet even today their roles are poorly understood, underappreciated and sparsely documented. An assessment by the WorldFish Centre estimated that women represent between 5% and 73% of the total capture fisheries workforce (including full-time and part-time participation in both fishing and post-harvest activities) from nine major fish producing countries (Weeratunge et al. 2010). This calculates to an average participation rate of almost 50% for all fisheries-related activities (World Bank et al. 2010). However, there is still a paucity of information here regarding women's roles in supporting fishing operations, fisher-families and communities (Frangoudes and O'Doherty 2006). Across many regions of the world, the greatest participation of women has been in the inshore and small-scale fisheries sector (Ogden 2017) for which efforts have been made to document this. In the Pacific, an estimated 70–80% of the catch from inshore fisheries (reefs, estuaries and freshwater) is used for subsistence purposes (Gillett and Lightfoot 2001) and largely caught by women for the provision of food security for their families and communities. Harper et al. (2013) states that when estimates of catch are combined from the available data in the Pacific, women contribute 56% to total estimated small-scale fishery catches. Compared with men, women dominate the subsistence fishing sector by fishing more regularly within a week, catching a wider variety of fish and invertebrates, fishing in various habitats (e.g. marine, brackish water and freshwater), and spend more time in post-harvest activities such as salting, drying, cooking and preserving (Chapman 1987; Matthews 1993; Lambeth et al. 1998; Vunisea 1995, 2016).

There are many examples in the Pacific of the significant involvement of women in subsistence fisheries. In Samoa, 18% of all village fishers are women who harvest 23% of the total weight of seafood (Passfield et al. 2001), which provides close to 20% of the per capita seafood consumption of 71 kg/year in Samoa. In South Tarawa (Kiribati), women are the largest harvesters of the bivalve *Anadara* sp., with an annual harvest of 1,400 tonnes, one of the largest fisheries on the island (Lambeth et al. 2002). In Papua New Guinea, Chapman (1987) and Avalos (1995) reported that more than 25% of the annual catch in weight of marine resources is caught by women. Rawlinson (1995) interviewed various fishers from 123 rural settlements and villages on Viti Levu, Fiji, and found that women contributed to more than half the fishing effort observed during the creel survey (818 of 1,522 hours). As a proportion of their total numbers, Fijian women (45.3%) were the most active fishing group followed Fijian men (38.1%) and Indian men (23.6%). However, women are less directly involved in offshore fisheries, with most women contributing in post-harvest, processing, marketing, sales and administrative roles.

As women are major contributors to these fisheries they should be included in the decision- and policy-making

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process to establish appropriate alleviation to poverty, and promote sustainable food security. However, much of the available data regarding women in fisheries is descriptive, lacking both an analytical framework and documented methodology, thus making it difficult to translate into meaningful quantitative data (Harper et al. 2013). Many studies have identified the great lack of quantification of the contribution of women to fisheries, to be one of the most common and critical causes hindering the further development of fisherwomen and an obstacle to gender mainstreaming (Alonso-Poblacion and Siar 2018).

In Fiji, studies on fisherwomen have included:

- their participation in inshore fisheries, post-harvest, marketing and distribution (Lal and Slatter 1982; Matthews 1993; Tuara 1995; Vunisea 1995; Lambeth et al. 1998);
- their dominance in the inshore fisheries (Kronen and Vunisea 2007; Tawake et al. 2007);
- traditional environmental knowledge, Fijian lifestyles and livelihoods in relation to marine resource management (Veitayaki 2002; Nainoca 2010);
- customary ownership of rights to fishing grounds (Fong 1994; Waqairatu 1994; Veitayaki 1995);
- women's struggles in marketing (Vunisea 1995);
- the employment of women in fisheries sectors and their economic status (Narsey 2011);
- the involvement of the Fiji Department of Fisheries with women engaged in fisheries (Vunisea 2016);
- poor working conditions and low salaries of women working in PAFCO (the Pacific Fishing Company) (Emberson-Bain 1994; Bidesi 2008);
- women's fishing activities continuing to be support subsistence and economic livelihoods (Veitayaki 2005; Demmke 2006; Fay-Sauni et al. 2008; Verebalavu 2009); and
- fish consumption (Vuki 1991).

However, there has yet to be further studies from the outer islands that provide a deeper understanding of the activities of fisherwomen, particularly those residing in rural coastal Fiji. One particular province of interest is the Lau Islands. Lau is Fiji's largest maritime province (30% of Fiji's exclusive economic zone), comprising 60 islands and islets. Recent marine biodiversity surveys conducted by Conservation International among the various islands in the Lau Group revealed exceptional corridors of biodiversity, including fish, corals and marine mammals. Despite this, a literature search (using Google Scholar) for studies focused on Lau revealed the top three areas to be geology (57%), anthropological-related disciplines (18%) and marine biology (16%). Additional studies from this region have included fish yields and composition from reef fishing sites (Jennings and Polunin 1995) including Moala, Totoya and Vanuavatu, marine resource inventory surveys in Moala (Department of Fisheries 2012), and various comprehensive surveys pertaining to archaeology, reptiles, entomology, marine vertebrates and invertebrates, botany and mammal surveys (Tuiwawa and Aalbersberg 2013) from southern Lau, including the Moala Islands. To understand and quantify the fishing contributions of women from Lau, fisherwomen from the Moala Islands, particularly the islands of Matuku, Moala and Totoya, were interviewed individually and in focus groups to determine: 1) how these women utilised their fisheries resources, 2) the challenges they faced, 3) opportunities to promote sustainable fishing techniques, and 4) appropriate approaches to ensure food security and better fisheries management.

Figure 1. The survey site of the Moala Islands or Yasayasa Moala, consisting of Moala, Totoya and Matuku. Source: http://guides.leeward.hawaii.edu/pacs108/fiji

Methodology

Sample size and collection

A team of Conservation International staff interviewed 224 women from eight villages on Moala, three villages on Totoya and seven villages on Matuku (Fig. 1) between February and April 2018. The

survey was designed by the Wildlife Conservation Society (WCS) and other supporting agencies.

The methodology for collecting the data for the fisheries survey was divided into two parts. The first was a focus group survey, which involved a group interview with fisherwomen in the village (Fig. 2) to determine the collective views of women on various issues relating to their fishing activities. One focus group survey was carried out per village. Questions included village demographics, resource management and decision-making, rules and restrictions, resource and activity mapping, challenges, opportunities and fisheries sales (for a total of 46 questions). The focus group surveys took approximately 40 minutes per session. In total, 18 focus group interviews were carried out.

This was then followed by individual interviews with fisherwomen (for a total of 89 questions, not including subsections) after determining the approximate number of women fishers in the village. The individual survey was completed to determine in-depth information from each fisherwoman. We aimed for a minimum coverage of 50% of fisherwoman per village, although where there were restrictions in time, we focused on a fair representation of randomly selected fisherwomen present. Each individual interview took about 40 minutes (Fig. 3). The fisherwomen population coverage from each village ranged from 32% to 100%, with an average of 78% (Table 1).

Table 1. The number of women surveyed per island or village.

Island/Village	Number of women surveyed (fisherwomen population coverage)
Moala	
Keteira	21 (85%)
Nasoki	17 (94%)
Vunuku	9 (100%)
Cakova	17 (85%)
Vadra	12 (32%)*
Nuku	9 (75%)
Maloku	18 (45%)*
Naroi	15 (50%)
Totoya	
Udu	10 (100%)
Ketei	14 (100%)
Tovu	9 (100%)
Matuku	
Yaroi	10 (83%)
Qalikarua	16 (90%)
Makadru	11 (100%)
Raviravi	3 (100%)
Lomaji	9 (100%)
Natokalau	12 (100%)
Levukaidaku	12 (60%)
TOTAL	224 (78% average coverage)

* The total number of fisherwomen in these villages was large owing to women who also only occasionally fished, gleaned or captured crustaceans. In general, we focused largely on women who were regular fishers and chose representatives of remaining occasional fishers.

Figure 2. Focus group survey with fisherwomen from Maloku Village, Moala Island. (image: Conservation International, Fiji)

Figure 3. Individual interview with a fisherwoman from Levukaidaku Village, Matuku Island. (image: Conservation International, Fiji)

Analysis

All data collected were recorded into a spreadsheet. Common and scientific names of fish and invertebrates were rechecked against the World Marine Species (WORMS) database for correct and updated classification. Additional fish and invertebrate classification guides were also used (Matsuoka 2010; Pakoa 2013; SPC 2014; Moore and Colas 2016; Lee et al. 2018). To avoid confusion, units of abundance given by women, as either pieces or kilograms, were not changed to a standardised unit and remained the same to ensure a more accurate depiction of yield. However, where women indicated how many pieces of seafood made up a kilogram, this was used. Seaweed (*Caulerpa racemosa*), however, was actually weighed and equated to 500 g per

handful. This was used to standardise seaweed weights. Data analysis and graphical representation were completed using Microsoft Excel.

Results and discussion

In terms of utilisation, women primarily fished for food security, and soft bottom, mangrove and coral reef areas were the most frequented habitats for fishing activities. Open ocean and freshwater sites were the least frequented. During fishing trips, up to 50% of the time was spent collecting the right type of bait in the necessary amounts before the actual fishing began. Interestingly, this meant that women visited more than one habitat in a normal day of collecting bait and fishing. The most common fishing device used was a hand line, followed by hand collection and fishing with gill nets. Despite the limited and simple devices used, women use varying techniques, depending on water depth, species and the type of fishing site. The most common time to fish is early morning to mid-morning, and is particularly dependent on the tide. The greatest number of hours per fishing trip is spent in open ocean sites, with the least being in freshwater sites. Across all islands, the greatest yield in fish comes from coral reef habitats, followed by soft bottom sites and mangroves, and the least quantity comes from freshwater sites. In terms of invertebrates, the greatest yield comes from soft bottom habitats, followed by coral reefs and mangroves.

In regards to the composition of fish caught for food, two groups of fish dominated: lethrinids (emperor fish) at 56% and serranids (groupers) at 25%, together making up 81% of the total catch across all islands and habitats (Table 2).

This finding is in agreement with previous studies of various coastal fisheries in Fiji. Lethrinids continue to be the most common group of fish caught in Fijian waters. According to a survey by the University of the South Pacific, fish landings from 46 villages across 10 provinces in Fiji showed lethrinids as the most abundant fish group (USP 2009). Rawlinson (1995) also found lethrinids to be the most abundant catch amongst rural fishers in Viti Levu, particularly among handliners. A study on the size and composition of yield from six traditional fishing grounds (*qoliqoli)* in Fiji (including Moala Island) also found lethrinids and serranids as the most dominant in yields across all six reef fisheries (Jennings and Polunin 1995). The Department of Fisheries (2012) also found lethrinids and serrranids to be the two most often-caught species in Moala Island.

Estimated yields and fishing efforts reported here, coupled with information from previous marine resource surveys (at least from Moala) may indicate that lethrinid fisheries are nearing overexploitation and serranids may already be currently overexploited. Steps must be taken to avoid a collapse in these fisheries. Fish yields from Matuku Island alone (where actual weights were provided) totalled 1,580 kg harvested by 73 women, and averaging 3.3–4.3 kg of fish per fishing trip per fishing habitat. This calculates to an average catch per unit effort of 0.8–1 kg per hour per fishing trip. If women fish an average of two times per week for an estimated 48 weeks per year, a conservative estimate of fishing yield from women in Matuku Island alone would be 23 tonnes annually. Using a current population figure of 525, the fish consumption rate on Matuku Island is conservatively estimated to be 43.8 kg per capita annually, this however is not including fish catches from men. Past annual consumption rates of local fish have been estimated at about 15 kg per capita in urban areas (Zann 1984), to 50 kg per capita in agricultural areas on the fertile main islands (Zann 1984; Anon. 1990; Vuki 1991). These figures

Table 2. Combined fish and non-fish composition of catch across Moala, Totoya and Matuku islands, and from five habitat types (freshwater, mangroves and mudflats, soft bottom, coral reef and open ocean). Note, non-fish families included gastropods, bivalves, crabs, sea cucumbers, octopuses and seaweeds.

Finfish families caught for consumption	%	Non-fish families collected for consumption	%
Lethrinidae	55.7	Tegulidae	23.4
Serranidae	25.0	Strombidae	20.7
Gerreidae	4.2	Cardiidae	16.5
Scaridae	3.7	Gecarcinidae	8.8
Lutjanidae	3.3	Caulerpaceae	5.4
Terapontidae	2.8	Portunidae	5.2
Scombridae	2.3	Sesarmidae	4.8
Mullidae	1.4	Arcidae	4.4
Siganidae	1.0	Holothuridae	3.4
Hemiramphidae	0.6	Turbinidae	2.8
		Toxopneustidae	1.8
		Neritidae	1.4
		Caulerpacaea	1.0
		Tremoctopodidae	0.3

are also important for estimating rates of harvest to ensure that the rates of fishing and seafood harvesting are sustainable. More data from men's fishing yields would be needed to determine the contribution of women to their overall village fisheries yields. Recently published figures of catch data from various Pacific Island countries show the contribution of women to small-scale fisheries modestly calculated to be over 40,000 tonnes per year. When combining estimates for all countries, women were seen to contribute 56% of the total estimated small-scale fisheries catch. Therefore, women contribute more small-scale catches than men, once again illustrating the crucial role women in the Pacific play towards food security (Harper et al. 2013).

Across the three islands of Motuku, Moala and Totoya, the most common seafood storage technique was cooking, followed by smoking, refrigeration and drying (Fig. 4). In very few cases, women consistently stored food in refrigerators but this requires a constant and reliable supply of electricity.

Up to 66% of seafood for selling (invertebrates and vertebrates) are sourced from coral reefs and soft-bottom habitats. Recommendations to promote and maintain sustainable fishing practices include:

1) closely monitoring gleaning activities;

2) protecting the mangroves, soft-bottom and coral reef fishing habitats;

3) managing lethrinids and serranids;

4) exploring options to better estimate stock, catch rates, fishing effort and yield;

5) monitoring and addressing poaching within traditional fishing grounds (*qoliqoli)* with the help of relevant authorities;

6) monitoring seafood sales, particularly after the establishment of the ice plant at Moala; and

7) cautiously regarding any development that involves the removal of natural resources for money.

The direct challenges faced by women during their fishing activities include physical injury, bad weather conditions, lack of fishing resources, and lack of further training in effective and efficient fishing techniques. Unless women also saw fishing as recreational, much of the quality of traditional and current fishing knowledge obtained was generally poor in detail. The continued rural–urban drift also means there is a continual loss of traditional fishing knowledge over time. Environmental threats to fishing habitats observed included coastal erosion, deforestation, nutrient runoff, catching undersized fish, improper waste management, and the continuation of catching banned species (despite an awareness of fishing or harvesting bans in place).

In terms of decision-making relating to marine resource use and management, women are not represented, are underrepresented or choose to remain passive or ultimately uninvolved at all. Men dominate in decisions that are of economic or monetary value within the home and

Figure 4. Women scaling, gutting and cleaning fish caught immediately after their fishing trip near Vunuku, Moala Island. (image: Conservation International, Fiji)

community. Women, however, dominate in decisions relating to food security and family or community well-being. This perception of the value of women's contribution to fisheries is seen on a small-scale within the home, but is also present in a much wider context, across regions, nationally and globally. Where women have been known to contribute to small-scale fisheries through subsistence catches, the documented yields are under-reported, incomplete and inconsistent. However, where there is greater monetary and economic value in a fishing activity, statistics are clear and consistent, formal organisations are established, and legal and regulatory frameworks are set up (Harper et al. 2013; Alonso-Poblacion and Siar 2018). Steele (2014) notes that because women do not receive pay for their work in the home, their roles have often been perceived as unimportant and/or non-productive, and consequently it has not been given a monetary value. This trend seems beyond traditional culture and is rather indicative of a stronger capitalist influence.

There are three main recommendations to address such challenges and threats. One is for men (including spouses) to understand, recognise and acknowledge the significant contribution made by fisherwomen in their communities, thereby creating more opportunities for women's involvement in the decision-making process on the use and management of natural resources. As observed by Steele (2014), the development of programmes for women cannot remain isolated from men, and men must not be excluded from the process of efforts to boost women's involvement in decision-making and women must not work in isolation. It is critical for both parties to acknowledge each other's contribution and value towards reaching their common goal. A second recommendation is to explore the existence and integration of *yaubula* (natural resource) committees within a greater church structure to utilise the efficient organisational and accountability utilities through them. The third recommendation is to ensure that the government and non-governmental organisations provide the relevant support, training and resources to invoke any change that is needed.

The contrast of great dependence on fisheries for food security yet less dependence for a source of living and income creates interesting opportunities to promote sustainable fishing practices and improved fisheries management. The consumption of meals across all islands comprised over 80% seafood of which women provided 50–60% exclusively themselves through subsistence fishing. The major sources of income here are agricultural based predominantly on *yaqona* (kava) farming on Moala, and copra and virgin oil production on Totoya and Matuku islands. Fisherwomen, however, perceived handicrafts as the most important source of income personally because it provided quicker money compared to cash crops. If weekly personal income is consistent, most women make FJD[1] 1–50 per week and spend FJD 1–10 a year on purchasing fishing gear. Opportunities that exist to further promote sustainable practices include investigating seafood consumption rates and drivers or enablers of increased seafood sales; and investing strongly in youth and children via various programmes and activities that nurture eco-conscious minds and behaviour.

Advocacy must first come from within the community. Therefore, a crucial ingredient here is the community's deep sense of ownership over their marine resources, which leads to greater responsibility from community members, and ultimately sustainable practices. Community leaders need to be fully prepared and trained to deal with increasing influence from outside their villages that may threaten their communal spirit, togetherness and unity. Leadership integrity and a clear plan of succession is vital for sustained conservation efforts and participation from the community. Lastly, the Fijian culture is already rich with traditional ideas that promote sustainable practices and eco-conscious behaviour towards the environment. This is an opportune time for the Government of Fiji and non-governmental organisations to explore ways in which ancient and traditional ideas can be integrated with modern practices of conservation to truly achieve better food security, improved fisheries management, and revive ecologically important cultural norms.

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[1] FJD 1.00 = USD 0.47 (January 2019)

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