

“We Navigate the Pan-American Highway”: Women’s Contributions to the Communal Management of Ocean Resources in Northern Peru

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Abstract

The study of fishing communities has mostly focused its analytical gaze on the activities of men; however, ethnographic research carried out in Northern Peru shows that women are critical components of the fishing enterprise even if they rarely engage in fishing directly. This paper shows the different ways in which women influence the local fishing economy and how their indirect involvement impacts the management of ocean resources by traditional fishermen of Mancora, located in the department of Piura. Women in this village capitalize on social capital to manage a complex net of information and alliances on land that is critical to the success of their family’s fishing operations. In this paper, I posit that it is the contributions of women that provide the resilience needed to maintain an artisanal fishing tradition facing environmental and social disruptions.

Key Words: Common Pool Resources, Traditional Fishing, Women and Fisheries, Resilience

Introduction

No. I never go out to sea, women don’t board the boats, some of them don’t even get on them when they parade the Saint during his festival, but we are also fishermen, here we are a community of fishermen ...[Men] head out to sea for days and we [women] stay here to keep things going and wait for their return. And, well, so that they arrive also and have a place to sell at a decent price.

(Wife of artisanal fisherman)

In traditional fishing villages of northern coastal Peru, women’s contributions to fishing enterprises are often unappreciated by fishermen who do not explicitly recognize women as part of local fishing activities. However, ethnographic research shows that women do see themselves as critical to the fishing economy and in fact engage in a variety of economic and social activities designed to maintain fishing livelihoods even if they rarely engage in fishing directly. This paper shows the different ways in which women participate and influence local fishing activities and how their indirect involvement impacts the management of ocean resources by traditional fishermen called the **pescadores artesanales** of Mancora, a village located in the department of Piura.

Women in this village manage a complex net of information and alliances on land that are critical to the success of their family’s fishing operations. Moreover, their involvement revolves around unique environmental conditions, since villages and fishing operations take place at the intersection of the cold Humboldt Current and warm tropical waters system. The result of fluctuating temperatures is that the composition of the species harvested throughout the year changes drastically, and thus I argue that women carefully negotiate social networks and use this social capital to deal with environmental uncertainty.

In this paper, I posit that it is the contributions of women that provide the resilience needed to maintain an artisanal fishing tradition that is constantly threatened by political disenfranchisement, market fluctuations, industrial overfishing, and environmental change. I hope to persuade fisheries scholars to consider the role of women more seriously in their research, as the study of fishing communities has mostly continued to focus its analytical gaze on the activities of men.

The Human Dimensions of Fisheries

Traditional fishing communities have long been featured prominently in the common property theory literature. In these works, anthropologists and other social scientists have determined that traditional livelihoods are often better suited to the management of common-pool resources than modern industrial ones (Acheson 1981; Basurto 2005; Becker and Ostrom 1995, Constance 2001, Cordell 1989). Furthermore, these studies have uncovered and evaluated the kinds of social arrangements behind a society's ability to manage communal resources as a way to avoid what is known as the "tragedy of the commons." Key among their findings is the need for users to develop robust institutions that allow for effective regulations and monitoring systems for the resource in question (Acheson 2006, Bromely et al. 1992; Colburn et al 2006; McCay and Acheson 1987; Ostrom 1999; Pinkerton 1989; Shlager and Ostrom 1993).

In addition, these findings have been honed further into a series of characteristics, or principles, that have been identified as critical to the long-term management of common pool resources (Becker and Ostrom 1995). Broadly speaking, these principles outline the importance of: 1) clearly defined boundaries; 2) proportional equivalence between costs and benefits; 3) collective choice arrangements; 4) monitoring; 5) graduated sanctions; 6) conflict resolution mechanisms; 7) minimal recognition of rights to organize; and 8) nested enterprises (ibid). The result is a vast body of literature that has contributed greatly to our understanding of the institutional arrangements that characterize viable fishing communities. However, these investigations have tended to favor political ecology and economic frameworks that overlook the roles of identity and gender as critical components of traditional livelihoods and the management of common pool resources (Ostrom 2005).

The failure to incorporate identity and gender as key variables is curious, since many ground-breaking studies do cite a strong sense of identity as a common theme in fishing communities (Acheson 1981, Acheson and Knight 2000, Nadel-Klein 2003) as well as acknowledge the role of women (Ashwani and Weiant 2003; Nadel-Klein and Davis 1988 & 1997) even if these issues are rarely analyzed in depth. Part of the problem is that conventional analysis has been anchored around events and people directly involved in fishing operations, such as activities taking place on boats, docks, or organizations like fishing cooperatives (e.g. Acheson 1981; Colburn et al 2006; Pinkerton 1989). Households and community dynamics are not incorporated unless they directly link to these brawny male fishing activities. What results is a gap in understanding "behind the scenes" behaviors that may occur outside typical fishing realms that are often informal in nature and may be influencing certain resource management decisions. Furthermore, these hidden factors may be of particular relevance since they pertain to the social capital found in these communities, which is also a critical factor in the maintenance of communal resources that has been identified as an understudied area by scholars such as Elinor Ostrom (2005). For these reasons, one of the main goals of this paper is to elucidate the significance that women's involvement may have in building and maintaining the social capital of fishing communities.

While there exist excellent ethnographies on women's involvement in fishing activities, they tend to depict situations where women are heavily involved in fishing due to a shift in economic needs or out-migration by men (e.g. Allison, Jacobs, and Poter 1991; Cole 1991, Nadel-Klein and Davis 1988; Stilles 1972; Thiessen, Davis and Jentoft 1992). The result is that there continues to be a dearth of gendered analysis in the fisheries literature. In cases where the complementary role of women is depicted (e.g. Ashwani and Weiant 2003; Nadel-Klein and Davis 1997), gender is never fully incorporated as a significant component of a successful common pool management regime (Nadel-Klien and Davis 1997; Ostrom 2005).

There are numerous reasons for overlooking women's contributions, and feminist scholars have articulated the lack of gendered analysis in political ecology before (see Rocheleau, Thomas-Slayter and Wangari 2006), but the issue may be exacerbated by other factors as well. For instance, evaluating how different sectors of a community participate in management regimes is often masked by methodologies that mostly base research questions at the household unit level, and as Agrawal and Gupta (2005) point out, women's roles in the broader system are often neglected.

Another factor is that women's activities tend to happen in informal realms that can be ignored by research approaches that focus on processes and behaviors occurring only in formal settings (e.g. official meetings, written policies). Nevertheless, behaviors that take place in informal realms must be considered, as informal processes are often more efficient than formal solutions implemented by scientific methodologies and governmental policies (Acheson 1981; Acheson and Knight 2000).

Artisanal Fishing in Peru

Artisanal fishermen harvest over 80 percent of the fresh fish consumed in Peru (Sueiro 2006). Due to the importance of this economic activity, a series of impressive governmental initiatives have been implemented throughout the Peruvian coast in villages that harbor artisanal fleets. These initiatives, mostly carried out by IMARPE (the Peruvian Sea Institute or **Instituto del Mar Peruano**) and FONDEPES (the National Fund for Fishing Development or **Fondo Nacional de Desarrollo Pesquero**), have focused their efforts on implementing ecological monitoring programs, strengthening local organizations like fishermen guilds, improving working conditions on vessels and docks, making health care more accessible through the implementation of medical and life insurance programs, creating and funding training workshops, and developing credit programs designed exclusively for artisanal fishing enterprises. Although successful in many respects, these programs do not reach all artisanal communities equally and many programs suffer from poor participation. Part of the problem stems from the manner in which artisanal fishing is defined in Peru, a definition that is too broad and encompasses a very diverse group of users (Ocampo-Raeder 2011).

The Peruvian government broadly defines artisanal fishing as fishing activities that occur with any vessel that does not exceed 30 tons of storage capacity and where the method of extraction relies heavily on manual labor (Hidalgo 2002). This designation also includes fishing activities that do not use vessels, as in the case of scuba divers or beach fishing. Among the rights granted under this category, artisanal fishing operations have exclusive use of the first five miles of littoral and access to the governmental programs mentioned previously. However, in practice this definition does not accurately represent a very heterogeneous group of users. Currently there is great diversity in the types of gear used and the types of resources exploited, as well as in the size and kind of vessels in operation. To illustrate this point, one must consider situations where a family enterprise might consist of a half-ton non-refrigerated vessel versus a family operation that might consist of several 30-ton vessels with electrically refrigerated storage units. In the latter case, the yields of extraction start approximating an industrial fleet and although family owned, they tend to rely on hired labor, are able to negotiate prices more effectively, have substantial collateral for accessing credits, and have resources to invest in lobbying governmental and local fishing organizations.

In addition, the main objective of key government institutions like FONDEPES is to increase fishing production and small-scale fishing enterprises located in isolated villages that tend to be left out of major decision-making processes. Moreover FONDEPES, which is part of the Ministry of Production, is secondary to industrial fishing interests in a country where industrial fishing is one of the most important, lucrative, and long-established economic activities. The effect is that small-scale artisanal fishing interests that favor community development and fishermen well-being as the desired outcomes of a fishing livelihood come in conflict with interests from industrial operations that favor production.

Artisanal fishermen of Peru also face a series of other challenges that go beyond political and institutional disenfranchisement. Among the most widely cited during fieldwork are environmental and resource uncertainty due to changing climate patterns, industrial overfishing, competition with other sea-based industries such as tourism and oil exploration, isolation from markets, scarce access to credit, and a lack of control over the commercialization of resources harvested. Indeed, the life of a fisherman can be characterized as uncertain and precarious, with unpredictable fluctuations between good harvests and poor harvests. An elderly man summarized this sentiment as follows: "It's not an easy life, you have to struggle and struggle, and keep going and hope for the best because when it is bad, it is bad, maybe even tragic I would say."

The uncertainty of an artisanal fishing livelihood is common and it is frequent to hear life stories that include losing family members or all their equipment at sea. In many cases this occurs not once but several times throughout a person's life. Yet fishing communities show a remarkable resilience and continue to fish even if there seem to be better options. A woman expressed this attitude by stating, "Even if the fish leave we will continue being fishing folk."

That artisanal fishermen continue to choose this way of life in spite of economic hardships and political disenfranchisement highlights the need to evaluate these resource management systems beyond economic and political frameworks. It is precisely because of this reason that I propose that a strong sense of identity and community are important driving forces in maintaining artisanal fishing communities in Peru, particularly in the region of northern Piura, where the ecological and social characteristics of these fishing villages require collaboration and cooperation between all users, even women who do not engage in fishing directly.

The Fishing Folk of Mancora

The fishing village of Mancora is located (4° 06' S and 81° 03' W) in the northern coastal region of Piura, in the Talara province. Although the village is locally referred to as a fishing village (**caleta de pescadores**), in the rest of the country Mancora is a well-known beach resort. Ecologically speaking, Mancora's sea is distinctive because it is located at the intersection of the cold Humboldt current (14 to 19 C°) and the warm tropical currents (21 to 27 C°) that come from Ecuador. Fishing activities are thus adapted to the annual seasonal changes in water temperatures as well as to longer-interval climactic phenomena such as el Niño.

Mancora is one of approximately six fishing villages that fish under these conditions, the others being Cabo Blanco, El Ñuro, Los Organos, Cancas, and Acapulco (see Map 1). These fishing communities are close to each other and are connected to land by the Pan-American Highway. Cabo Blanco, the southernmost village, is about 3 hours away by road from the northernmost village of Acapulco. Along the coast, the villages are found within a water temperature gradient, and although everyone fishes a seasonal mix of cold water and warm water (tropical) fish species, Cabo Blanco mostly focuses on harvesting cold-water fish because it is at the edge of the cold-water Humboldt ; Acapulco tends to harvest more tropical species than the other villages, as it is closest to year-round warm waters.

Each community has its own dock and specializes in a certain type of fishing, which means each uses different boats and gear to access distinct areas of the sea. Despite occasional conflict, this arrangement results in ample collaboration between the communities, especially during times of the year when fish species compositions modify in response to changes in water temperature (Ocampo-Raeder 2011). Members of these communities use each other's docks and women generally travel by land on public transport to neighboring fishing villages to bring food, news, and supplies to the men, thus facilitating the exchange of information and reaching out to friends and family for different kinds of support.

Currently the Mancora fleet specializes in fishing with **cortina** mesh in vessels that contain between three to seven tons of non-refrigerated storage capacity (ice is used). Of the approximately 137 vessels registered, 107 are **cortina** vessels, six are longline vessels (pelagic and demersal), four are **bolicheras**, and 30 are small balsa wood rafts. In addition, there are 30 divers (who work with and without compressors) that fish and collect cephalopods, bivalves, and crustaceans along the edges of the beach. In total, there are about 450 active fishermen in Mancora at this time, of which about 310 are dues-paying members of the local artisanal fishing guild know as the **Asociación de Gremio de Pescadores Artesanales del Distrito de Mancora** (Guild Association of Artisanal Fishermen of the Mancora District). As of 2011, there were no registered women in the guild. Mancora's population is estimated at around 10,500 people and I estimate that about 2,500 are fishing folk, most of whom live in one of the three fishermen neighborhoods locally known as **barrios de pescadores**.

Ethnographic research in Mancora has taken place mainly during the months of May, June and July and began with an exploratory period in 2008 followed by two full field seasons in 2009, 2011, and 2015. During this time, I interviewed a total of 170 adult individuals (92 men and 78 women) living in Mancora, paying special attention to the life histories of seven families of the area. In addition to formal interviews, I also conducted focus groups and engaged in substantial participant observation in activities taking place in the docks and fishermen neighborhoods, and collected information regarding species captured throughout the year and in recent history. Table 1 summarizes the methodologies used in detail.

My research shows that fishing activities in Mancora are structured around two main seasons and two transitional periods. The warm water season (December to early April) is characterized by the harvest of tropical water species such as tuna fish (*Thunnus* sp.), swordfish (*Xiphias gladius*), hammerhead shark (*Sphyrna zygaena*), and dolphinfish (*Coryphaena hippurus*). This season also marks the most lucrative time of the year, since these species tend to garner higher prices in Lima markets. The warm season is followed by a month of transition where waters turn cold and fishing is especially difficult because the ecosystem transitions and new species arrive.

The cold-water season (mid-May until October) is dominated by species such as eels (*Ophichthus remiger.*), Eastern Pacific bonito (*Sarda chiliensis*), striped mullet (*Mugil cephalus*), Pacific moonfish (*Selene peruviana*), and Humboldt squids (*Dosidicus gigas*). At the end of the cold period another transitional month begins where waters slowly warm as tropical currents from the north take over. Mancora's fishermen harvest about 133 different species including a series of cephalopods, bivalves, and lobsters collected by divers.

During years that the el Niño phenomenon is observed, the cold-warm barrier is "broken" and warm currents dominate the area; however, since the warm waters push beyond the natural barrier found in the nearby Cabo Blanco (where the Humboldt Current ends and turns west), many species migrate further south. In some cases, tropical species are observed near Lima, and harvests tend to be unpredictable. At this time, prices go down for species that are generally lucrative and losses are common, as occurred in 1983 and 1998. Fishermen report that the composition and abundance of species has changed in the last 10 years and attribute these changes to 1) the impacts of industrial fishing (national and international companies) that are now able to intercept entire schools of fish before they reach their fishing grounds, 2) over-fishing by non-affiliated vessels that trespass into their territory, and 3) climate change.

In addition to these challenges, the fishermen of Mancora also face a series of social and economic problems, such as low participation in guild activities, little support from government institutions that have a limited presence in the area, little control over the commercialization of their product since pricing tends to be established by outside buyers, limited access to products needed for fishing expeditions, and restricted access to credit opportunities, since houses within fishermen neighborhoods are not formally titled and cannot be used as collateral (Guerrero Chinchay 2010, Ocampo-Raeder 2012).

Nevertheless, fishing operations continue, people report a high satisfaction from their chosen occupation, and harvests have not varied drastically since the 1990s when IMARPE began documenting fishing yields by dock. I suggest that one of the main reasons fishing perseveres is that although formal institutions like the fishermen's guild and government presence may be weak, informal institutions anchored in fishermen neighborhoods are quite robust because fishing families cooperate and interact extensively with each other. In fact, the guild has suggested that to strengthen their institution, they should address the needs of fishing neighborhoods directly and perhaps incorporate women into discussions, instead of waiting exclusively for government support (Guerrero Chinchay 2010). Nevertheless, the role of women remains obscured when fishing conversations ensue and a common response to interview questions that asked how their wives contributed to fishing operations was, "Well, my wife contributes a little." However, if the wife was nearby, she almost always interjected. In the previous example, she snapped back: "Well, my name is on the lease, and in any case, I might not fish but I am the one that helps you think!"

Women's Contributions to Fishing Activities

Informal arrangements have long been recognized in the literature as important in the management of common pool resources (e.g. Acheson 1981; Acheson and Knight 2000). In this case, in addition to informal arrangements managed by men, women also contribute by managing social networks, negotiating information (social, economic, and environmental), providing logistical support by land, and complementing fishing livelihoods with various economic opportunities. I hypothesize that it is the contributions of women that provides the resilience needed to maintain an artisanal fishing tradition that is constantly threatened, a process that is aided by the fact that fishing folk in Mancora live close to each other and share a sharply defined identity.

Research revealed that women were much more active in fishing activities than interviews with men suggest. Of the 123 adults interviewed, 88 percent of men responded that women had "little or no contribution to fishing activities," while 92 percent of women expressed that they contributed "significantly." In general, men categorized women's contributions as "domestic responsibilities" with little acknowledgement that in many cases these activities were taking place in response to fishing activities. For instance, a wife may take home a couple of large fish from a day's catch to fillet and sell to local restaurants, a process that triples the price of the fish. However, men merely see this as a clever way women act to expand the family budget, even if money obtained from filleting was used to replace gear, buy food for the next expedition, or pay a debt.

Although family members did respect each other as hard workers, men did consider that their job was much more strenuous than women's, since life at sea is considered both difficult and dangerous. On the other hand, women saw their role as inherently diverse, often stating that they did "a little bit of everything" and did so because they believed it was important to support their husband's vocation.

Furthermore, they were animated about their position as fishing folk and articulated their activities within a context of community and support to fishing activities. One woman stated the following when asked why she considered herself to be a part of the fishing community even if she never went out to sea:

For us the sea doesn't end in the sand. The men navigate the sea and we the Pan-American Highway. We don't fish but we are supporting them at all hours, not only our husbands but also other families, here in the neighborhood and sometimes kin elsewhere ... We are all fishermen here and we have to help each other however we can.

Broadly speaking, women's contributions can be categorized into five main categories: logistical support, wage labor, small-scale entrepreneurial activities, brokerage of information, and management of social networks

Logistical Support

At the most basic level, women are involved in a series of logistical tasks that directly aid the fishing operations of their male family members. All women interviewed were in charge of preparing meals for fishing expeditions, and although men do cook for themselves when at sea, women prepare the initial meal and also bring a "welcoming" meal to the docks once they return. In families that fish with balsa rafts or small boats using longline, which depart and return on the same day, women wake up before dawn to prepare breakfast and the day's meals. In addition, women will also travel by land, using public transportation, to neighboring docks in Cabo Blanco, el Ñuro, Los Organos, Cancas, and Acapulco to drop off meals and supplies when their vessels are fishing in that area.

Another contribution is purchasing supplies, not only for normal household consumption but also for fishing expeditions. Mancora has a very small market that tends to be pricey given the area's tourism, so purchasing goods locally is expensive. For this reason, women travel to neighboring cities such as Talara (81 kilometers, 1.5 hours away) and Tumbes (102 kilometers, 3 hours away) to buy goods. They will generally travel in groups of three to four women and take a **colectivo** (privately owned van that services the highway) to buy supplies in bulk (Image 1). They generally save about 18 to 20 percent in the price of goods. These trips are carefully coordinated and often combine a variety of tasks from doctor's visits to processing paperwork at banks or government offices.

Women are also involved in preparing and maintaining fishing gear, in particular baiting, since it is labor intensive. Baiting for longline is a process that entails adding bait to the hooks before they go out to sea and then removing the remaining pieces off hooks once they return. The process generally needs the participation of several people. In interviews, most men stated that only men baited their lines, yet among every group of people baiting there are always women helping with the task (Image 2).

Wage Labor

During the high tourist season (December-April) women may work temporarily for hotels, restaurants, or private homes as housekeepers and cooks. However, most women reported a deep dislike for this type of job since they are considered "unskilled" by the tourism sector and get paid less than outsiders. Nevertheless, they will seek out these opportunities when in need.

Another source for wages stems from working directly at the dock washing fish. These women, known as **lavadoras de pescado** (fish washers), generally affiliate themselves with certain buyers and will be called in to wash and pack fish that is being transported out of Mancora. However, since buyers tend to be outsiders who usually hire their own people, women from Mancora do not have a reliable source of employment there and only engage sporadically when opportunities arise at the dock or nearby in a large privately-owned eel packing plant.

Small-scale Entrepreneurial Activities

Perhaps the most noteworthy contribution women make to local fishing livelihoods is through their entrepreneurial activities. Most women interviewed (92 percent) were engaged in selling goods, but what is interesting is that most of the sales occurred within fishermen neighborhoods (the only exception was crafts made for tourists). In practice, neighborhoods function as semi-autonomous economic regions where women sell each other a wide array of products that includes homemade goods as well as items purchased during trips to Talara and Tumbes or via mail order catalogues. All items are sold at a slight profit, yet prices still remain lower than at local stores. The following table (Table 3) lists products and types of small-scale businesses encountered from a sample of 31 families interviewed.

The degree of entrepreneurship in these neighborhoods is impressive and one can scarcely walk a street without encountering several home-based stores called **bodeguitas** or impromptu home-restaurants called **pensiones** offering set daily menus. For example, in 2011 on Santa Rosa, one of the main streets, there were 31 bodeguitas and 6 pensiones in a four-block stretch of the street that contained about 78 houses. I found that there are two main tendencies for these businesses. The stores begin small by selling only candies, individual cigarettes, and soft drinks and slowly grow until they have an assortment of groceries. The home-restaurants start with a dish that the wife may know how to cook well. This dish is initially offered only on Sundays, holidays, or when fishermen return from expeditions and seek something special to eat (in other words, anything but fish). As she hones her meals and develops a clientele, she slowly expands to a daily menu. If successful, she may expand into a more formal restaurant set-up known as a **picanteria**. Generally, a business is launched slowly as women sell items they are good at producing, and it gradually grows as they save money and can invest in stock. However, there are also cases where a business venture is launched after a particularly good fishing season when a family is able to set some money aside, but in general men will not contribute until they start sensing that their wives' business has potential.

Their clientele tends to be neighbors and kin, and an advantage frequently reported is that these businesses are more likely to give credit than conventional establishments. Moreover, the system is fueled by active reciprocity because everyone is constantly buying each other's items. There is also an expectation of purchasing items from people known to be undergoing hardships or extraordinary events (e.g. birth of a child, surgery, christening, loss of gear or vessel, support of fishermen widows). A woman expressed her willingness to help a neighbor as follows:

Look, I do not have much, that is true, but I have more than her right now, and it is good to help out if I can even with just a little bit. If I do not do it later she may have to come and ask anyway and that feels awful. And tomorrow who knows if I or my children may need something. Don't you think? Because the sea gives much but can also take away much.

The monetary contributions of women through these entrepreneurial activities are substantially lower than those from fishing activities. I estimate that on a yearly basis, a woman's financial contribution amounts to between 13 to 30 percent of household earnings. One exception to this trend was a woman who contributed to 52 percent of the total earnings for her household. This was partly because she is a savvy businesswoman but also because her husband's vessel had suffered from a mediocre fishing season that year. However, in general women's contributions were steadier than men's, and were often the sole financial contribution when unexpected events occurred or during months of fishing scarcity.

Brokerage of Information

Women's ability to brokerage information on land that directly pertains to activities taking place at sea is perhaps the most unexpected contribution I encountered in the field. During fieldwork, I witnessed women negotiating environmental, economic, and social information that they used to influence decisions men made concerning fishing. Regarding environmental information, I initially expected that their ecological knowledge would be limited, given their lack of direct contact with resources harvested. Indeed, women had a very difficult time identifying marine species when presented with pictures. However, they did have a keen understanding of overall climactic and marine conditions as well as seasonal fluctuations. They obtain this information directly from their husbands because they communicate with them via cell phone while they are at sea. However, they also listen around town for clues about the weather, currents, water temperature, and marine-life behavior encountered, which they communicate to their husbands who may seek out the source for more details later.

Economic information gathered was much more detailed and women vigorously inquire about the going prices for certain species. This kind of information is collected in the neighborhoods, but also while traveling to other cities or docks. In other villages, they take advantage of their social network to access this information and often approach a buyer on a dock by introducing themselves as a relative from someone in that village. They are also keen about finding out market prices in Lima but unless they know someone in the capital this information is generally more available to men who have access to radio communications. Economic information helps their family make decisions in terms of whom to sell to (there are slight variations among buyers) and how to deal with a catch. For example, if prices are low, a family may opt for selecting a few individual fish to sell to local restaurants to make-up for a low price at the docks. This last strategy must be done clandestinely, as a catch is often promised to a buyer before they depart, because buyers often pay fishermen in advance so that they can buy supplies.

Finally, women pay a lot of attention to the social landscape they live in and social information collected is used strategically to help out their kin, neighboring families, and Mancora's fishing folk community at large. In fact, the social information gathered gives women their influence in the fishing process, because, as will be described next, they strategically use knowledge for ends that they consider advantageous.

Management of Social Networks

The most important contribution women have to Mancora's fishing operations is their ability to gather and sort social information that is then transformed into social capital. Women are constantly paying attention and collecting information on people's overall economic situation and well-being. This kind of engagement gives them a way to influence the manner in which alliances and working partnerships are made within the village. For example, if a family suffers an unexpected hardship and they are either kin or good neighbors, a wife may suggest to her husband that he invite them as a new crewmember for a given period of time.

Women are able to influence their husbands by simply choosing when to relay a message or share a particular piece of information. In one instance, I witnessed four men come to a house looking for a fisherman who was scheduled to return from sea. In every case, they were forced to speak to his wife and request that she tell her husband that they were hoping to join her husband's crew in the next expedition. However, upon the husband's arrival, she chose to tell him extensively about a neighboring family whose child was sick again and needed extra income. She spun what seemed like an innocent piece of gossip into a story that culminated with her husband suggesting on his "own" that a solution would be to include someone from that family for a couple of fishing trips. She did not tell him about the other visitors until late that night and only in passing. When I asked her why she waited, she simply said, "Blah! They weren't people of importance. I do not even know the surname of the last two."

Alliances are strengthened in a variety of ways that go beyond helping one another in times of need. Some of the more obvious alliances are forged through marriage or family friendships known as **compadrazgos**. However, there are several festivities in town that also help strengthen bonds between groups of fishing folk. One such festivity is a carnival where families are divided into red or blue groups and compete with each other in a series of musical competitions as well as town-wide activities and parades. Each family actively recruits people for their own color and then works together to out perform rivals. Another important festival is **La Fiesta de San Pedro**, (San Pedro being the patron saint of fishermen), that is celebrated through two weeks of activities, parties and processions (Image 3). In this case, the saint is carried through streets to pay homage to the individual saints, virgins, or Christs located throughout the neighborhoods, and culminates with a trip by sea around Mancora's coastline and a large concert. Although the formal activities (concerts and competitions) are organized by the fishermen's guild, women work in groups to prepare for the activities taking place in their immediate area of the neighborhood and there is quite a level of cooperation as well as competition that takes place during the process.

What emerges from women's activities is that they are constantly considering ways to build and maintain alliances that are beneficial not only to their own family fishing operation but also to their immediate community. In general, women depict themselves as being of critical importance to planning and organizing fishing activities before they take place, revealing a process that emphasizes community well-being as a way to foster cooperation between users that share a common resource and livelihood.

Furthermore, when asked what the benefits of maintaining these alliances are, informants reported a series of benefits that directly related to fishing activities. The most frequently cited were: 1) access to better crewmembers or vessels to work in, 2) promises to actively exchange information regarding illegal fishing activities taking place in the region, 3) admission (temporarily or permanently) to fishing territories that are held by others, 4) introductions to buyers that offer better prices, 5) promises to support initiatives set forth by the guild and neighborhoods, and 6) early rights to information concerning the location and behavior of marine resources.

Female-Created Resilience

In addition to aiding in the planning and organizing of fishing activities, women's involvement may also represent a valuable source of resilience during stressful times of the year or unusual circumstances. During fieldwork, informants were asked to complete a calendar of activities for two years (2009 and 2011) to determine how people's behaviors shift as well as to identify economic trends and key environmental events that changed throughout the year. Results from these calendars show that women intensified social and economic activities during times of the year when fishing tends to be low. They also tend to find creative ways to save money during times of abundance.

For example, during the high tourism season (e.g. December-April and during independence week around the 28th of July), women will find temporary jobs, sell arts and crafts, or fillet selected fish for touristic restaurants. Income generated can be saved or reinvested in products they plan to sell later. One especially entrepreneurial woman crocheted dozens of beach dresses in a couple of weeks and used the money to purchase fishing supplies she sold to kin for the rest of the season. Another women justified a recent purchase of pots and pans in the following manner: “Like they say, you need to save bread for May. I generally already have something ready to sell or do for those dates. I do not make much but anything is good when the sea is dry.”

During normal years, the two lowest points for fishing are associated with shifts in water temperature in the month of May when water turns cold and November when waters warm up. The month of May is particularly precarious for fishing families since it represents a time when fish are scarce and those found are not very lucrative. In addition, families switch into using different kinds of gear that often requires some level of mending. Women report that they are “busier” during this time of the year and reported getting together with other women to organize small business ventures or devise ways to save on household expenses to help them through the month. In fact, some men complained that when fishing is low they spend more time at home yet still have to work because their wives are often gone doing things.

Another interesting finding is that women intensified extracurricular activities during key events of the year, such as when school begins, during holidays, and during personal events (weddings, baptisms, fist communions, etc.). However, in general, men did not report altering their fishing schedule to accommodate upcoming family or community events (the only exception was during the Fiesta de San Pedro when most vessels make a special run right before the parties begin to have income for the celebration). In fact, fishing strategies are quite predictable among the Mancora fleet, and although they may vary slightly by a couple of weeks, they usually fish in the same general area and seek out a particular suite of species at any given time during a normal year. This means that when fish are not found, they have a hard time compensating for the loss, since they cannot easily explore other regions that are being used by their neighbors.

Finally, women reported that they were forced to help out more in 2009 since fishing was peculiar during the months of May, June, and July because catches were dominated by an unusual abundance of Humboldt squids (*Dosidicus gigas*). Humboldt squids are the only species that are not sold for fresh consumption since they are processed into flour and tend to fetch low prices. Women stated that they found themselves traveling more to neighboring docks as their husbands looked for more fertile fishing grounds, seeking out more economic opportunities, and relying more on kin and friends for help.

This type of analysis suggests that instead of intensifying fishing during times of dearth, the fishermen of Mancora seem to be able to maintain a similar level of activity because they can rely on the complementary activities of their female kin. These observations present an interesting set of hypotheses that will be further tested as this project continues and more long-term ecological data is collected that can be linked to social behaviors taking place both at sea among men and on land with women.

Conclusions

Ethnographic research indicates that women play an essential role in Mancora’s fishing activities in spite of never engaging in fishing directly. Their involvement is an important factor in the management of common pool resources as they work to foster cohesion, build social capital, and create complementary income to subsidize fishing when resources are scarce. Results presented highlight the need to develop research programs that evaluate fishing communities more holistically; in particular, activities that take place on land in situations where users live close together, as occurs in fishing neighborhoods in Mancora. This approach can help uncover the contributions of certain users, like women, that may be obscured because they do not engage in the resource management process in a conspicuous or direct manner. Finally, insights from such investigations can be important in determining areas where a society has “built in” social arrangements that help provide resilience, especially in systems where environmental uncertainty affects a common pool resource.

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Map 1: Fishing Villages Referenced in this Study located at the Northern Coast of the Piura Region in Peru.

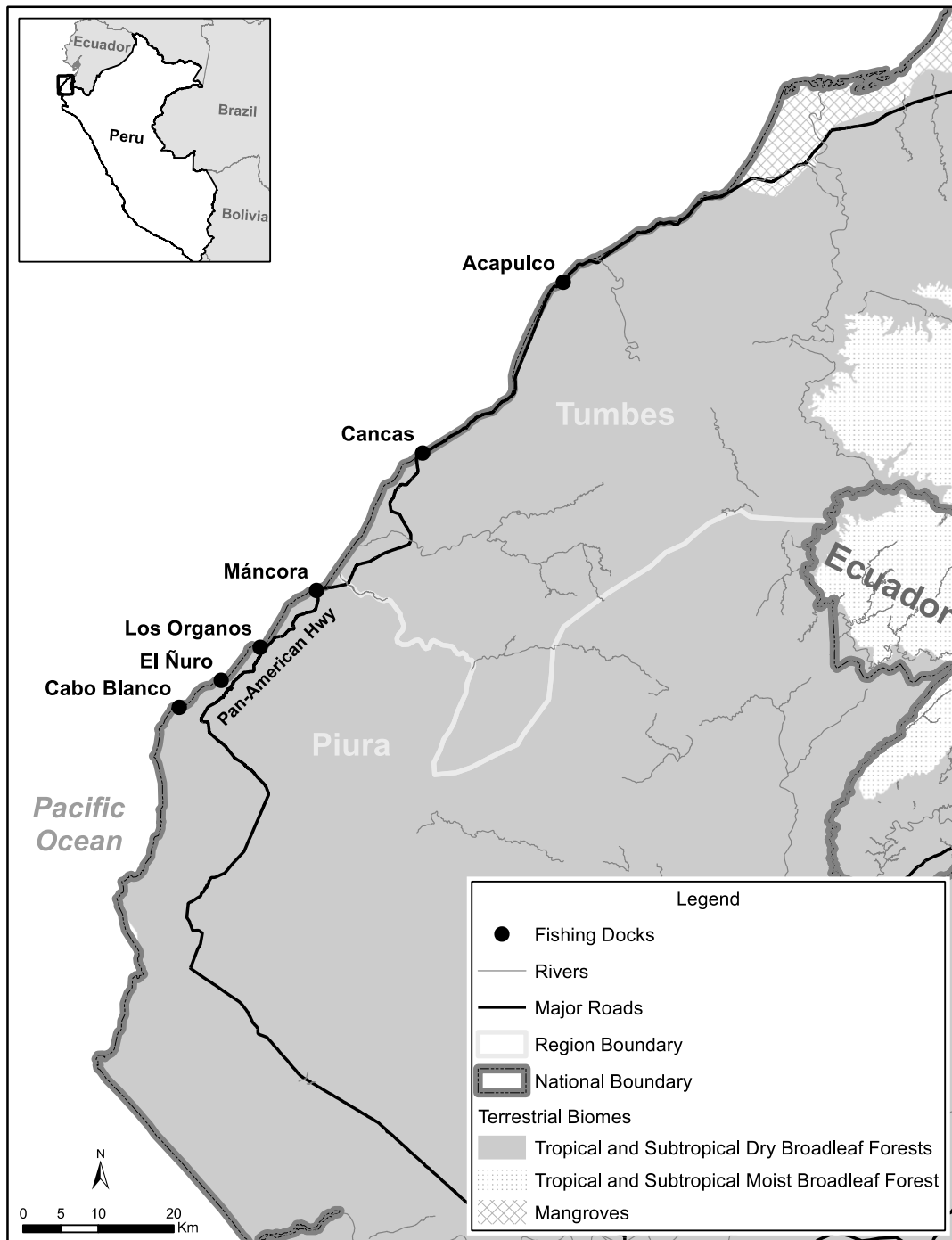


Table 1: Detailed Description of Methodologies Used

Methodology	Description	Number of Participants
Participant Observation	Approximately 8 months total during the months of May-July (2008, 2009, 2011, 2015). Conducted in fishing neighborhood, docks, fishing boats, and commercialization routes.	200+ fishing households affiliated with the Mancora artisanal fishing guild
Structured Interviews	<u>Human ecology themed interviews:</u> 3 questionnaires per person interviewed (demographic, resource management, livelihood) <u>Household life-histories:</u> Interviewed heads of households on their relationship to the fishing economy	N = 170 (92 men, 78 women; representing 75 households) N = 9 (9 men, 12 women; 21 total life-histories)
Semi-Structured Interviews	<u>Informal questions around</u> 11 key themes <u>Focus groups</u> on women’s contributions to fishing activities	N = 403 entries N = 13 focus groups with 39 women
Cognitive Exercises	<u>Ranking and pile sorting activities:</u> on economic, social, and cultural values of themes regarding the sea, fishing livelihoods, and social networks	N = 209 activities
Ecological Data	<u>Analysis of fishing yields</u>	10 years of fishing yields documented by Mancora dock 20+ years from country wide artisanal fishing yields from IMARPE populations

Table 2: Types of Small-Scale Business Ventures and Goods Sold by Women in Fishing Neighborhoods of Mancora (31 families)

Type of Business	No. of Households	Types of Products Sold
Groceries	7	Assorted food items: Canned goods, dried goods (e.g. rice, pasta, sugar, flour, powdered milk), cooking oil, cooking vegetables (e.g. tomatoes, potatoes, onions, garlic, Peruvian hot peppers), and small household goods (e.g. matches, batteries, candles).
Beverages	3 2	Alcoholic: beer, liquor, and home-made beer (chicha de jora) Non-Alcoholic: soft-drinks and home-made sugary drinks made of flavored drink mixes (refescos).
Prepared Food	4 2 2 1	Snacks: fried plantains (chifles), popcorn or corn nuts (canchita), and popped cereal. Prepared Dishes: ceviche, goat stew (seco de cabrito), and chicken stew. Desserts: puddings, gelatins, flan, and frozen treats made from sugary drinks (marcianos). Full Meal: set full course menu (menu).
Specialty Goods	1 2 2 1	Luxury items: wedding and first communion paraphernalia, wedding gifts, wrapping paper, household decorations. Mail-order catalogue: cosmetics and vitamin supplements. Clothing: used, bought in bulk, and new items. Specialty Household Items: Bed linens, pots and pans, kitchen utensils, etc.
Arts and Crafts for Tourists	1	Crochet dresses and hats, necklaces, souvenirs made with local marine materials, etc.
Fishing Supplies	2	Petrol/diesel, oil, batteries, basic replacements for vessels, basic replacements for mending gear.
First Aid Products	1	Bandages, antiseptic, over-the-counter pain relievers, electrolytes for babies.