

Self-governance and challenge to improve the management in small scale fisheries in Peru

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Abstract

Small-scale fisheries in Peru accounts for about 80% of the fish and seafood consume in the country. Despite its important contribution to food security and the economies of coastal population, its formal governance system has not been effective to prevent or recover fisheries from tragedy-of-the-common-like situations, widening the gap to achieve the sustainability of small-scale fisheries. This situation has overwhelmed the sector's capacities to achieve effective management.

In this context, the study focuses on understanding the self-governance efforts and the challenges faced by fishers' groups in five localities along the Peruvian coast: Manglares de Tumbes (Tumbes), Ancon (Lima), Laguna Grande (Ica), Ilo (Moquegua) and Morro Sama (Tacna). The data collection was carried out through semi-structured interviews and surveys based on Ostrom' social-ecological analytical framework.

Our findings show that self-governance efforts to emerge to improve fishers' life quality. Most of them have become de facto claimants or proprietors (*de facto* management and exclusion rights), and, in that process, several challenges have been overcome, but some still persist today such as: not having a legal basis for their efforts, inability to detect infractions of their members and foreigners, generate marketing and management skills.

This study unveils key aspects to improve the governance of small-scale coastal fisheries in Peru. For instance, the implementation of rights-based management couple with organizational capacities, investment in control and surveillance and support for overcome the inefficiencies of value chains of seafood in Peru.

Key words

Small-scale fisheries, self-governance efforts, challenges, Peruvian coastal localities

INTRODUCTION

Small-scale fisheries represent more than 25% of the world's capture fisheries and represent a valuable source of animal protein for billions of people worldwide (FAO, 2014), contributing 80% of the fish and shellfish consumed in Peru. Small-scale fisheries often supports the economies of coastal communities (FAO, 2014) and is a very important source of employment that contributes to the reduction of poverty. In Latin America, there are around 2 million fishermen (FAO, 2016) and in Peru, that figure reached almost 67 thousand people engaged in small-scale fisheries (Mendoza et al. 2018), which annually extracts between 400 thousand and 500 thousand tons per year, between fish and shellfish (Clemente, 2009).

Now, Peru has a centralized model of fisheries management, which produces a dichotomy between the users of the resource and the area where decisions made. Furthermore, the open access regime for small-scale fisheries is been the main cause for fishermen to maintain the olympic race towards the resource with the interest of maximizing their individual benefits. Which is forcing them to increase fishing effort, leading to concealment of catches, massive extraction and producing the failure of any attempt to have a correct system of fishing exploitation (Townsend, 1995) and that place small-scale fisheries in a situation of overexploitation through the competitive process itself (Cortés, 2009).

The present study aims to understand the design of the self-management systems of the communities evaluated and the reasons why they have managed to maintain themselves over time; Likewise, identify the challenges to overcome to achieve better governance in coastal fisheries in Peru.

Study area

Manglares de Tumbes:

Manglares de Tumbes: located at the northern tip of Peru in the department of Tumbes. Of the entire recognized mangrove ecosystem, only 2972 Ha have the denomination of Los Manglares de Tumbes National Sanctuary. In Peru, natural protected areas are recognized in categories of direct use and indirect use, with the Sanctuary being one of the categories of greatest protection, in which the resources found in it can't be used. However, prior to the designation as a protected area, there was already the presence of users of the resources that the mangrove provided, so that their extraction rights, were respected; reaching agreements between the head of the area and the communities that work there.

In December 2017, the Mangrove Ecosystem Consortium of the Northwest of Peru signs with the SERNANP the contract for the administration of the area, thus being the first community of small-scale fishermen that have the administration of a protected area.

Ancón: located in the department of Lima. In this community there is only one organization of seafood extractors. It has three main areas of resource extraction, the

lower areas (Pasamayo) and above (Ventanilla) and the Islands Grupo de Pescadores de Ancón, which belongs to the Guaneras Island, Islet and Point System National Reserve. Is in that area where the best results of the Ancon shellfish resources are shown, since they are the only spaces of access and almost exclusive use of the organization, those that benefit freely from self-management efforts and that others do not access and take advantage of conservation efforts. For the areas of Pasamayo, the divers entered from Chancay and the ventilation area entered the divers of Callao, who do not respect the limits of the catch.

Laguna Grande: located in the National Reserve of Paracas, in the department of Ica. Access to this community is difficult because there is no paved road to get there and you must follow a trail that is not well marked. The trip to get from the Pisco's Principal Square to Laguna Grande is around an hour and a half. In the locality two defined zones can be identified, Rancherío and El Muelle.

The fishermen of the area of El Muelle live mostly in Pisco; unlike the fishermen of Rancherío, who can stay more than 30 days in the area in their "ranchos" which is what they call their constructions of cane and wood. In Rancherío there are two associations that are formally conformed and 3 associations are located in the Muelle sector. These do not have a constant stay in Laguna Grande, finishing work they go to the DPA of San Andrés, in Pisco, to sell their products on Monday, Wednesday and Friday, so their work trips can become from two to three days. Of the three associations that work in the dock sector, formed by almost a thousand members, two of them are more dedicated to the cultivation of scallop as a main activity, with fishing being a secondary activity and sometimes not even carried out. Only one of the associations, of which 65 of its 220 members, performs activities to extract resources in an orderly and organized manner.

Ilo: located in the department of Moquegua. The Sindicato Único de Pescadores Artesanales de Buzos Civiles del Puerto de Ilo (SUPABCP) founded in March 1988, which up to now includes some 800 formal partners (among divers, crew and ship owners) with a total of 130 vessels. Currently, access to be a member of the Union is not limited, provided it has been proven that they have a work seniority of at least two (2) years; the entry of new vessels has a greater restriction, since only those members of the union who have belonged at least two years to it can register their new vessels.

Morro Sama: located in the northern area of the department of Tacna. In the port of Morro Sama, the association that is in constant activity to date is the Asociación de Pescadores Artesanales Buzos Civiles Puerto Grau Morro Sama, which has a total of 30 vessels registered and about 130 formally active partners. The access to register in the association is not restricted for any fisherman or boat that wants to enter.



Figure 1: Location of Mangroves of Tumbes (Tumbes), Ancon (Lima), Laguna Grande (Ica), Ilo (Moquegua) and Morro Sama (Tacna) in Peru.

DATA COLLECTION METHOD

The fieldwork has carried out from July to November 2018.

Interviews and surveys were used for characterize each self-management system based on the framework of the Socio-Ecological System of Ostrom (Basurto et al. 2009, 2013). The interviews were made to the representatives of each community to know the design of the experience (McGinnis and Ostrom, 2014). Likewise, the surveys directed towards members of the random associations to know the perceptions of the experience.

The leaders interviewed were two from each community: In Manglares de Tumbes, 45 surveys carried out (18.9% of the total number of members); in Ancón, 30 interviews (46.2%); in Laguna Grande, 25 interviews (22.7%); in Ilo there were 30 interviewees (5%) and in Morro Sama, 15 interviews (11.5%).

RESULTS

Design of the self-management system of the Consorcio Ecosistema Manglares del Noroeste del Perú, Tumbes

Table 1: main resources extracted. In yellow, the regulations established by PRODUCE (Ministry of Production), in orange, the regulations agreed jointly with SERNANP.

RESOURCE	SCIENTIFIC NAME	ESTABLISHED REGULATIONS			
Mangrove crab	<i>Ucides occidentalis</i>	Minimum size	Ecdysis ban	Reproductive ban	Catch limits
Black shell	<i>Anadara tuberculosa</i>	Minimum size	Reproductive ban	Catch limits	
Huequera shell	<i>Anadara similis</i>	Minimum size			

MANAGEMENT MEASURES

Catch limits	200 units of black shells per day	12 strings or 96 units of mangrove crab per day
Catch restrictions of crab	It is not allowed to extract female crabs	It is not allowed to remove crabs in ban or with the body still soft
Consortium management	The board of directors is made up of six positions, which are occupied by a member of each organization, thus ensuring the involvement of all interests.	
Decision making process	The board or directors is the one who makes the agreements; each leader first consults their bases, thus bringing the proposal previously discussed in the bases to the directors' meeting.	
Fishing permit	To access, you must have the fisherman's license and fishing permit granted by the Tumbes DIREPRO; Without that document, you cannot enter work.	
Admission of new members	The entry of new members is restricted for being a National Sanctuary, the use of resources should not been given and they are only given to those who have previously been in the area or their descendants who, by necessity, enter to work.	
Payment of fees	Depends on each association, this fee may vary and serves to cover the day of work lost by the leader or committee that has to perform some coordination.	

CONTROL AND SURVEILLANCE MEASURES

Control	The guardians of the Sanctuary carry out the control. The extractors who observe strangers entering the area give notice to the guardians.
Sanctions	Depending on the degree of infraction and recidivism, fines or restrictions on access to the area may be applied for a specific period.

Design of the self-management system of the town of Ancón, Lima.

Table 2: main resources extracted. In yellow, the regulations established by the PRODUCE, in green, the regulations established by the association.

RESOURCE	SCIENTIFIC NAME	ESTABLISHED REGULATIONS	
Octopus	<i>Octopus mimus</i>	Minimum weight	Catch limits
Snail	<i>Thaisella chocolata</i>	Minimum size	Catch limits
Crab	<i>Romaleon setosum</i>	Minimum size	Catch limits
Jaiva	<i>Cancer porteri</i>	Catch limits	

MANAGEMENT MEASURES

Catch limits	35 bunches (96 units) of snail for one diver and 45 bunches for two divers	Ten (10) kg of octopus per boat	One (1) box of crab by one diver and 4 buckets by two divers	One (1) box of jaiva by one diver and 4 buckets by two divers
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Times of work per day	You can only leave once a day, in the morning or in the evening			
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Workdays	To the area called "arriba" (Ventanilla) can be accessed any day of the week	The area called "abajo" (Pasamayo) can be accessed any day of the week	The Islands Grupo de Pescadores can only access from Tuesday to Friday.	
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Catch restrictions of crab	It is not allowed to extract female crabs with eggs
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Closure of zones	Closure of one or several Islands of the Islet Group of Fishermen, in which the cessation of fishing activity is established for a period
Decision making process	The agreements are discussed and approved in a meeting with the majority of the members.
CONTROL AND SURVEILLANCE MEASURES	
Surveillance	There is a "Commission of Control and Discipline", which is part of the leadership.
Sanction	It can be an economic sanction or workdays are prohibited, depending on the seriousness of the fault.

Design of the self-management system of the town of Laguna Grande, Ica.

Table 3: main resources extracted. In yellow, the regulations established by the PRODUCE, in green, the regulations established by the association.

RESOURCE	SCIENTIFIC NOME	ESTABLISHED REGULATIONS		
Avalone	<i>Concholepas concholepas</i>	Minimum size	Reproductive ban	
Octopus	<i>Octopus mimus</i>	Minimum weight		
Mussel	<i>Aulacomya atra</i>	Minimum size		
Scallops	<i>Argopecten purpuratus</i>	Minimum size	Catch limits	Cleaning the product
Limpet	<i>Fisurella sp.</i>	Minimum size	Natural ban	
Clam	<i>Gari solida</i>	Minimum size		
Snail	<i>Thaisella chocolata</i>	Minimum size		
Sea kelp	<i>Macrocystis pyrifera</i>	Passive colect		

MANAGEMENT MEASURES

Ban	Based on their experience, they have identified that the snail tends to produce eggs between the months of June and July, for which reason they have reached an agreement not to extract snails from a month before.
Decision making process	The agreements are discussed and approved in a meeting with the majority of the members.

Admission of new members New members who want to enter must have a minimum of two years of work experience in the area, this can vary if it is observed that the new partner knows the fishing area.

Commercialization The sale of scallops takes place in a group, the management negotiates the price and the amount of purchase with the merchant, the payment is made for each vessel.

Payment of fees The partners contribute to generate funds for festive activities or as a compensation fund in the event of an accident, illness or death.

CONTROL AND SURVEILLANCE MEASURES

Surveillance The members carry out daily surveillance in the fishing areas, staying a boat all day.

Sanction It can be an economic sanction or work days are prohibited, depending on the seriousness of the fault.

Design of the self-management system of the town Ilo, Moquegua

Table 4: main resources extracted. In yellow, the regulations established by the PRODUCE, in green, the regulations established by the association.

RESOURCE	SCIENTIFIC NOME	ESTABLISHED REGULATIONS			
Abalone	<i>Concholepas concholepas</i>	Minimum size	Reproductive ban		
Red sea urchin	<i>Loxechinus albus</i>	Minimum size			
Octopus	<i>Octopus mimus</i>	Minimum weight			
Mussel	<i>Aulacomya atra</i>	Minimum size	Reproductive ban	Catch limits	Catch limits

MANAGEMENT MEASURES

Work days Mussel just extracted on the day determined at the meeting, usually only once a week.

Minimum mussel size From 5cm.

Mussel ban From October to December, sometimes January

Decision-making process The agreements are discussed and approved in meeting with the majority of the partners.

Hookah divers and crew committee	Group responsible for negotiating the price and distribute the amount of choro requested by the trader.
Catch limit allocation	Once they know the amount requested, make a meeting where members wishing to participate in the extraction of mussel enroll and divide the amount according to the number of boats.
CONTROL AND SURVEILLANCE MEASURES	
Surveillance	Two members of the committee stays at the dock, they're responsible for checking the catch limits and the quality of the mussels.
Production retention	If a vessel exceeds the catch limits, the excess is retained.
Sanctions	Depending the infraction, participation in one or two dates of mussel extraction may be denied.

Design of the self-management system of the town Morro Sama, Tacna.

Table 5: main resources extracted. In yellow, the regulations established by the PRODUCE, in green, the regulations established by the association.

RESOURCE	SCIENTIFIC NOME	ESTABLISHED REGULATIONS	
Abalone	<i>Concholepas concholepas</i>	Minimum size	Reproductive ban
Red sea urchin	<i>Loxechinus albus</i>	Minimum size	
Octopus	<i>Octopus mimus</i>	Minimum weight	
Mussel	<i>Aulacomya atra</i>	Minimum size	Catch limits

MANAGEMENT MEASURES

Work days	Mussel just extracted on the day determined at the meeting, usually only once a week.
Decision-making process	The agreements are discussed and approved in meeting with the majority of the partners.
Hookah divers and crew committee	Group responsible for negotiating the price and distribute the amount of choro requested by the trader.
Catch limit allocation	Once they know the amount requested, make a meeting where members wishing to participate in the extraction of mussel enroll and divide the amount according to the number of boats.

CONTROL AND SURVEILLANCE MEASURES

Surveillance	The president of the hookah divers and crew committee stays at the dock, he's responsible for checking the catch limits.
Production retention	If a vessel exceeds the catch limits, the excess is retained.
Sanctions	Depending the infraction, participation in one or two dates of mussel extraction may be denied.

Reasons to established the agreements

*"We ordered to get a better Price", "We decided to organize to negotiate with traders"
o "organize ourselves to maintain or improve our income".*

These phrases reflect the main reason why the different communities or associations organized themselves and decided to establish the different agreements; whose main purpose is to improve the quality of life of fishermen.

"Before, there were resources in quantity; we had mussels, octopus, snails and crabs a lot, we thought they would last forever and we didn't take care of them; now, we understand that it is important to take care the resources, because every time we find less"

Commentary coming from extractors of black shells and mangrove crab, divers and crew of Ancón. The increase of fishermen, divers and boats over time has led to increased fishing pressure, recognizing that resources are not inexhaustible, generating measures to achieve sustainability.

"We established agreements to take advantage of the market opportunity, due to the fact that in other docks there were no more resources."

Comment from the members of the associations of Ilo and Morro Sama. The natural banks of choro had decreased considerably in the other ports, which enabled the groups of Ilo and Morro Sama to organize together to obtain a better price and thus reduce the fishing pressure on resources.

Benefits of the system

"More order in the activity and more respect between members."

All the interviewees agreed that this has been the greatest benefit and the reason why they maintain the agreements.

"Better quality higher price"

he mangrove extractors of Tumbes and the divers of Ilo and Morro Sama consider this one of the main benefits obtained.

"Although water conditions are not good, we can go fishing and make enough money to live"

The Ancon and Laguna Grande fishermen consider this as one of the main benefits of managing their resources.

Challenges

MANGLARES DE TUMBES	
Conflicts with illegal and foreign extractors	90.0%
Hidden captures (breach of agreements)	76.7%
Ability to detect infractions	60.0%
Improve capabilities	13.3%
ANCON	
Surveillance in closed areas	100.0%
Ability to detect infractions	60.0%
Improve capabilities	45.0%
Hidden captures (breach of agreements)	35.0%
Effective sanctions	12.5%
LAGUNA GRANDE	
Control at night	75.0%
Improve capabilities	73.0%
Conflicts with illegal and foreign extractors	63.6%
Ability to detect infractions	36.4%
ILO	
Conflicts with illegal and foreign extractors	90.0%
Hidden captures (breach of agreements)	76.7%
Ability to detect infractions	60.0%
Generate capabilities to manage resources	16.7%
MORRO SAMA	
Hidden captures (breach of agreements)	100.0%
Improve capabilities	100.0%
Group cohesion	93.3%
Conflicts with illegal and foreign extractors	80.0%
Training for leaders	66.7%
Ability to detect infractions	46.7%

FINAL CONSIDERATIONS

It's important to develop policies that can support the initiatives of the communities, understanding the particularities of each area. Each community has particular characteristics, its members have particular behaviors and the environmental conditions are specific to each area; this means what works in one area may not necessarily work in another.

Also, strengthening the capacities of the communities, improving the control and surveillance of the agreements and supporting to overcome the inefficiencies of the

value chain of seafood in Peru, are key aspects to improve the governance of coastal fisheries in Peru.

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