



# Intertwined realities — hybrid institutions in the Peruvian fisheries and aquaculture sectors

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## Abstract

Following pro-market policies, the Peruvian state has aimed to regulate profitable fisheries and aquaculture activities in order to increase their production. However, informal and illegal activities not only persist but are also interlinked with formal practices and frameworks, creating intertwined realities in fostering processes of institutional hybridization. This article analyses the (re)production of informal and illegal activities by explaining the formation of hybrid institutional entanglements in the Peruvian anchoveta (*Engraulis ringens*) fishery in Pisco and the Peruvian bay scallop (*Argopecten purpuratus*) aquaculture industry in Sechura. It argues that state policies to promote industrial fisheries and entrepreneurial aquaculture for the global market coupled with limited interest in supporting small-scale fisheries and aquaculture activities have resulted in processes of institutional hybridization. Within these processes, social actors resist and accommodate formal regulatory frameworks to suit their respective needs, while intertwining formal and informal practices and institutional arrangements, based on their political leverage or ability to produce hybrid institutional entanglements in a context where regulation is limited and state authority is negotiated. Under these forms of hybrid governance, the article shows that interactions between state and non-state actors do not lead to collaborations for solving problems but to the persistence of sustainability problems.

**Keywords** Fisheries · Aquaculture · Peru · Hybrid institutions · Regulation · Sustainability

## Introduction

Enhancing the institutional regulation of marine resources in favor of sustainable fisheries and aquaculture practices is a fundamental objective for national and international governance bodies (FAO 2015). In this regard, countries rich in marine resources, such as Peru, have been prompted to adopt existing legal frameworks and develop new ones to regulate fisheries and aquaculture production, and establish protected areas to prevent resource depredation (Garteizgogeoasca

et al. 2020). However, political factors and economic development models have shaped the way these policies have been designed and enforced in each country.

Following pro-market policies and blue economy discourses, the Peruvian state has aimed to regulate the fisheries and aquaculture sectors in order to increase their production for global markets (Cavaleri 2022). Indeed, the state has promoted the industrial anchoveta fishery (Peruvian anchoveta; *Engraulis ringens*) and granted Peruvian bay scallop (*Argopecten purpuratus*) aquaculture concessions for enterprises amid increased demand for fishmeal and scallop on the global market. To this end, legal frameworks have been enacted with a view to formalizing industrial and small-scale fisheries (SSF)—a category that encompasses small scale and artisanal fisheries—as well as aquaculture activities (Garteizgogeoasca 2020; González 2010; Paredes 2013; Sociedad Peruana de Derecho Ambiental 2022). However, informal and illegal activities not only persist but also interlink with formal practices and frameworks, fostering processes of institutional hybridization.

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In these intertwined realities, artisanal fishing communities struggle to sustain their traditional fishing practices and their rights vis-a-vis the expansion of industrial fishing, while attempting to enter the profitable anchoveta market through informal and illegal channels. Both formal and illegal processing plants exploit formal and informal anchoveta fisheries, primarily to fuel the global market for fishmeal as a feed input for aquaculture. In addition, informal and formal state-supported scallop farmers extract scallop spat from reserved areas to rear them in formal and illegal zones.

This article aims to understand the persistence and reproduction of informal and illegal activities and explain the formation of hybrid institutional entanglements in the Peruvian anchoveta fishery and the Peruvian bay scallop aquaculture industry. It argues that state policies that favored industrial fisheries and entrepreneurial aquaculture for the global market but exhibited limited support of SSF and aquaculture activities have generated processes of institutional hybridization. In these processes, social actors resist and accommodate formal regulatory frameworks to suit their respective needs, while intertwining formal and informal practices, based on their political leverage or ability to produce hybrid institutional entanglements. Under these hybrid governance schemes, state regulation is limited while state authority is negotiated.

In developing the argument, the article examines three issues. First, it critically analyzes how state narratives portray fishing and aquaculture as good options for promoting sustainable economic development, feeding the Peruvian population, and sustaining local livelihoods, while actual policies favor large-scale fisheries and scallop farms for exportation. Second, it explores the agency of social actors such as local producers in contesting state regulatory frameworks and institutionalizing informal and illegal practices. Third, it exemplifies the anchoveta and scallop value chains to discuss hybrid institutional entanglements.

This article is divided in five sections. After the introduction, we develop our theoretical framework based on the concept of institutional hybridization. In the third section, we present our cases studies to show how state pro-market policies are shaping small-scale anchoveta and scallop fisheries. In the results and discussion section, we analyze social actors' agency and the formation of institutional hybrid entanglements in explaining the process of institutional hybridization. In this section, we also discuss the impacts of such processes on SSF. In the conclusions, we summarize our findings and contributions.

## Theoretical framework

State and society create governance schemes by positioning the state as an arena of political relationships in which political actors strive for the upper hand in a somewhat unstable

balance of power (Bear 2015; Jessop 2016; Migdal 2001; Li and Tania 2005). Studies have examined the different ways that these political relationships unfold (Krupa and Nugent 2015; Risse 2011). Some have analyzed the way state and non-state actors may interact and collaborate (Kooiman and Bavink 2013; Vince and Haward 2017; Yasmin et.al. 2022). Other studies have focused on the interplay between political and cultural practices in the process of constructing (or deconstructing) state governance (Corbridge et al. 2005; Gupta 2012; Li and Tania 2005; Schuppert 2011).

In addition, relationships between state and society are developed not only through formal institutional channels but also institutionalized informal practices: that is, practices that are not regulated by the state authority. As Chatterjee (2007) has noted, different groups relate to each other and exercise power through formal and informal means. The ways such groups perform can be regarded as political strategies and/or culturally embedded political practices. Institutional hybridization processes unfold in an interplay between state regulatory initiatives and social actors' practices and responses to such initiatives (Cleaver 2015). State regulatory power is therefore exercised in a contentious manner, depending on the power balance between different groups of actors (Lund 2006, 2008; Damonte 2018).

Therefore, studying social actors' agency is key to understanding state governance. Many scholars have investigated how local people's agency shapes governance schemes (Chatterjee 2007; Joseph and Nugent 1994; Raeymaekers 2009; Yang 2005). This study seeks to add to this literature by showing how social actors' responses to state development model and regulatory initiatives foster the constitution of hybrid institutional entanglements (Damonte 2021).

Hybrid entanglements occur when governments seek to regulate local practices and social actors consciously follow both formal and informal frameworks in processes of institutional hybridization, in which the practices of both shape institutions that are neither completely formal nor completely informal. Hybrid institutional entanglements are dynamic, and thus, it is fundamental to understand them in a continuum that runs from near-formal to informal or illegal institutionalized practices (Damonte 2021; Sindzingre 2006). Moreover, the state may formalize practices or ban them in the context of changes to public policies. These changes may not significantly affect the reproduction of rules in place when the state is incapable of or has no real interest in implementing formal law, but they could certainly move such institutions to the formal, informal, or illegal side of the continuum.

As Li and Tania (2005) observed, local practices permeate the state by creating local realms for hybridization. These realms go beyond state bureaucracy and bureaucratic domains since state systems are also influenced by informal practices reproduced in society (Damonte 2018;

Gupta 2012). Moreover, the type of relationship established between specific social groups and state authority, such as processes of state capture and resistance, adaptation, or subjection to the state, shapes the ways in which different forms of institutional entanglements arise.

As Roitman (2004) pointed out in his research on “informal” (or “black”) economies, the institutionalization of formal–informal–illegal economic practices reflect not so much the failure of regulation as the pluralization of regulatory authorities. Several studies on Peru have shown that while the state regulates the formal practices, it is informal institutionalized practices that structure the informal aspects (Barrio de Mendoza and Rodriguez 2016; Damonte 2018; Damonte and Schorr 2022; Durand 2013, 2007). Interestingly, Roitman argues that in these cases it is not that the state is unable to extend its authority to embrace all regulatory aspects, but that it is not actually concerned about such pluralization, as long as it still manages to extract rent from business.

In Peru, the main sector of central government responsible for defining the regulatory frameworks for fisheries and aquaculture activities is the production sector, followed by the environmental sector which establishes reserved areas for conservation. The narratives and policies of these sectors are sometimes contradictory and their respective capacities to enforce their regulations vary greatly. Likewise, the relationship between central and regional regulatory power is asymmetric; while central government sectors draft the regulatory frameworks and hold the budget for enforcement, regional government has very limited political and regulatory power. As we have observed on the field, different sectors and levels of government are in constant tension, although the central Ministry of Production is clearly dominant. However, the state as an entity is not separate from society, and as a result there are always social actors trying to influencing state governance.

This article aims to show how formal, informal, and illegal rules and practices shape the formal–informal value chain corresponding to the Peruvian anchoveta (*Engraulis ringens*) fishery in Pisco, Ica and the Peruvian bay scallop (*A. purpuratus*) aquaculture industry in Sechura Bay, Piura, as examples of hybrid institutional entanglements that give rise to hybrid forms of governance in the Peruvian fishing and aquaculture sector in general.

## Methods

In methodological terms, this article hinges on the analytical comparison of two Peruvian case studies: the artisanal Peruvian anchoveta fishery based mainly in Pisco, Ica; and the Peruvian bay scallop aquaculture industry in Sechura, Piura (Fig. 1). We selected these cases based on three criteria:

small-scale fishing activities are increasing in Peru; this increase in production is linked to growing international markets, and the state seeks to govern their production through regulatory initiatives (De la Puente et al. 2020). In addition, we have selected Pisco and Sechura because they are main production sites for anchoveta and scallops, respectively.

For the comparative analysis, we used a qualitative hybrid methodology. We conducted an integral literature review (Snyder 2019) and systematized quantitative and qualitative secondary information obtained from the Ministry of Production (PRODUCE) and the media. To collect the primary data, we carried out several fieldwork visits to Pisco and Sechura between 2013 and 2021. Following a grounded theory perspective (Bryant and Charmaz 2007), data recovery was made on two stages. First, carried on an exploratory fieldwork devoted to identify research topics “from below” where we could observe that institutional hybridity emerged as common practice in both cases. On a second stage, data gathering activities were targeted to deepen our understanding of these dynamic along both value chains. We also used information from (expert) interviews and surveys conducted during previous research of LC Kluger related to the general sustainability of the scallop value chain (e.g., Kluger et al. 2019a), the effects of the Coastal El Niño 2017 on the fisheries and scallop sectors in the Peruvian North (Kluger et al. 2019a) and the mobility of resource users (Kluger et al. 2020).

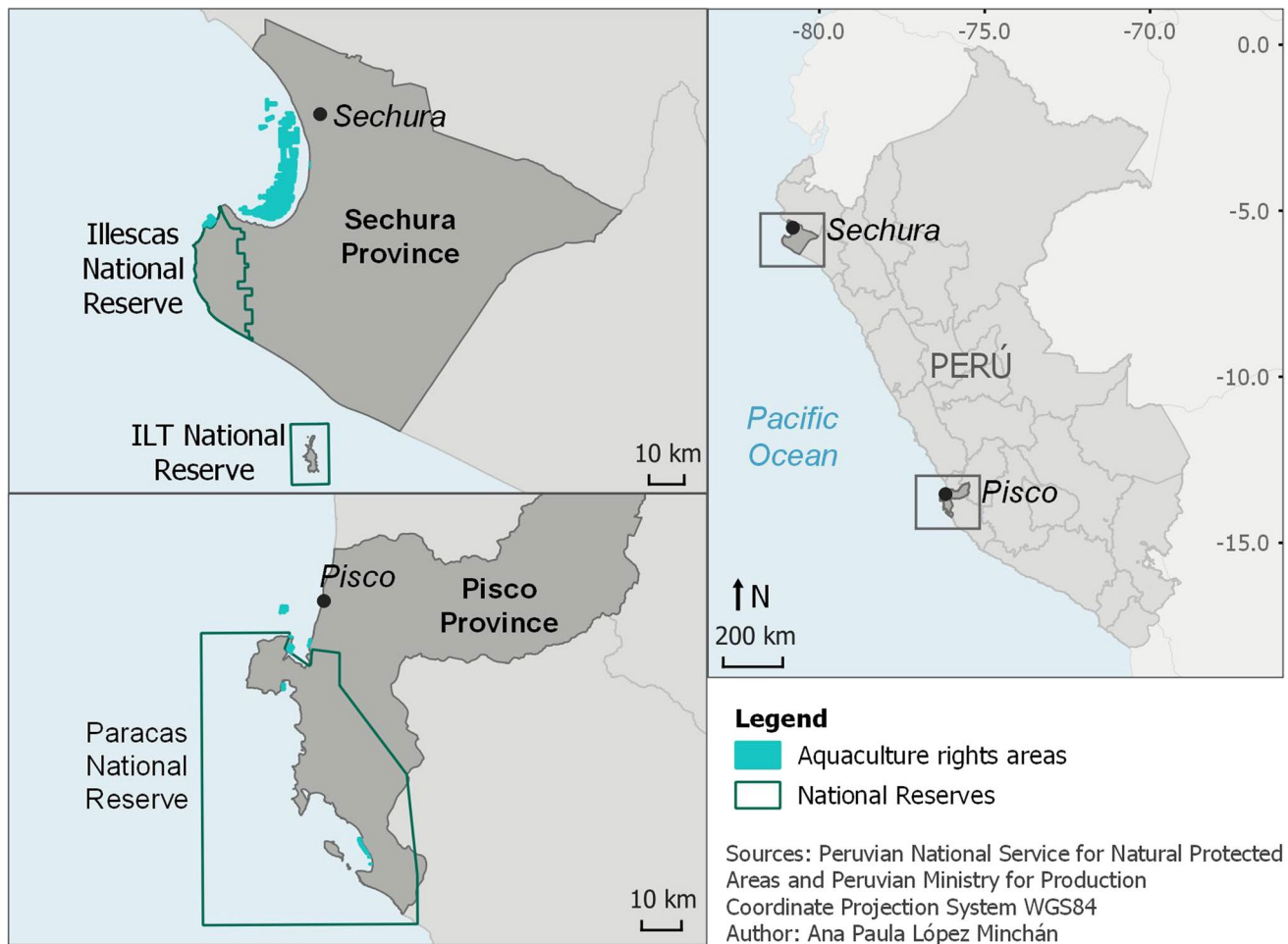
During our field visits, we conducted a range of informal conversations and semi-structured interviews with fishers, fishers’ leaders, scallop farmers, and workers (divers), representatives of different value chain actors for both case studies, and state authorities. In addition, we utilized semi-structured telephone interviews with fishers in 2021 due to the mobility restrictions caused by the COVID-19 pandemic (cf. Kluger et al., forthcoming). On these conversations we discussed fishing activities and target markets of each product. Also, we discussed different local social responses to state norms. We carried out field observations of fishing, processing and selling practices in anchoveta fishery and scallop aquaculture.

## Context: case studies

In this section, we present the Peruvian anchoveta fishery and the Peruvian bay scallop aquaculture industry, and its policies and narratives.

### Case study 1: the Peruvian anchoveta

The Peruvian anchoveta (*Engraulis ringens*) is a small, short-lived, fast-growing pelagic species distributed along



**Fig. 1** Sechura and Pisco provinces and National Reserve Areas. ILT = Island of Lobos de Tierra

the western coast of South America. Off the coast of Peru, two populations are widely recognized: the north-central stock ( $5^{\circ}$ – $16^{\circ}$ S); and the southern stock ( $16^{\circ}01'S$  to  $24^{\circ}$ S) Ñiquen et al., 2000), which exceeds Peruvian jurisdiction by expanding into Chilean waters. For this reason, the present work will focus on the north-central stock and its governance. The Peruvian anchoveta fishery emerged in the early 1950s following an increase in global demand for fishmeal and the collapse of the Californian anchoveta fishery, and soon developed into what Doucet and Einarsson (1966) called the “anchoveta wonder”: one of the biggest fisheries in the world in terms of landings. Following a decrease in anchoveta stocks from the 1970s due to the El Niño phenomenon and overexploitation, populations started to recover in the early 1990s, giving the industry new opportunities for development (Arias Shreiber 2012). The anchoveta fishery forms the basis of various local and global value chains, especially via the processing of fresh fish into fishmeal and oil that are used worldwide as a

key input for fish and livestock feed (Avadí et al. 2014). With average production values of up to 5.5 million tons for the period 2005–2014 (total average production over the same period was 6.4 million tons), Peru’s anchoveta fishery ranks as the second biggest in the world (FAO 2020). Accordingly, the anchoveta fishing industry (i.e., the harvesting stage) contributes between 0.7 and 1.5% to Peru’s GDP (for the period 2008–2017; PRODUCE 2019), making it Peru’s second most important economic activity after mining.

Today, the northern-central stock of Peruvian anchoveta is targeted by two fleets: one whose catch is marketed for processing into fishmeal and fish oil (i.e., for “indirect human consumption,” IHC), and one whose production is intended solely for use as human food (i.e., for “direct human consumption,” DHC). Known colloquially as “*vikingos*,” the industrial IHC fleet consists of wooden-hulled purse seine vessels with a hold capacity larger than  $32.6\text{m}^3$ , and accounts for up to 83% of total landings (value

for 2018, PRODUCE 2019, p.33<sup>1</sup>). Though other species are caught too, their share in total IHC landings is negligible, in that an overwhelming 99.9% are attributable to Peruvian anchoveta (in 2018, PRODUCE 2019, p.33). The fishmeal is produced locally and 74% is exported to China, followed some way behind by the likes of Japan (7.3%), Vietnam (4.5%), Germany (3%), and Taiwan (2.9%) (2019 figures, p.106–107). In turn, the DHC fleet comprises small and medium-sized wooden boats that are classified based on hull size as artisanal (operated mainly manually) or small-scale (operated not-manually; i.e., mechanized) with a maximum hold capacity of 32.6 m<sup>3</sup> (DS 012-2001-PE<sup>2</sup>). However, legally, most fishing for DHC is classified as artisanal, in a broad definition that encompasses small- and medium-scale fisheries.

DHC landings are marketed in canned (49.22% of total DHC landings), preserved (29.30%), frozen (21.25%), and fresh (0.21%) forms (values for 2019, p.33). The difference in target markets between the DHC and IHC fleets is a function of Peru's General Fishing Law (1992) and its regulations (2001), as well as the legal definitions of “small-scale” and “artisanal” fishing they contain, whereby artisanal catch is to be targeted “preferably” for direct human consumption (Art 58, DS 12-2001-PE). Thus, the state has enacted legal restrictions<sup>3</sup> that seek to circumscribe artisanal fishing to DHC.

While the IHC fleet is operated by a few large Peruvian and foreign-owned firms, the DHC fleet is made up of an estimated 70,000 fishers (IMARPE 2018). The fishing communities from which the artisanal DHC fleet draws its crew are located along the Peruvian coast, generally in port-city neighborhoods or small coastal settlements known as *caletas de pescadores* (“fishers’ coves”). Pisco and Chimbote are the centers of the DHC anchoveta fishing industry (see Fig. 1). Members of the artisanal fishing families in these communities typically make a living from different activities related to fishing, although they sometimes supplement their earnings from other activities (especially during legally mandated fishery closures, closure of landing sites, or times of fish scarcity). Artisanal fishing is traditionally a multi-species, multi-gear activity, but some fishers may opt to specialize in a single species based on market prices, seasons, and availability. In recent decades, some artisanal fishers and

fishing communities, such as those in Pisco, have specialized in anchoveta—even for IHC despite the legal restrictions—because of market opportunities and high prices.

In the last few decades, state regulations have targeted the anchoveta IHC and DHC fleets. The General Fishing Law (GFL; DL No. 25977, 1992), which is the main regulatory body for the Peruvian fishing sector, defines “hydro-biological resources contained in the jurisdictional waters of Peru [as] the patrimony of the nation” and holds the state responsible for “regulating the integrated management and rational exploitation of these resources” (Art.2.). In the case of anchoveta, the industrial IHC fleet is regulated through total allowable catches (TACs) which, since 1992, have been set by the Ministry for Production (PRODUCE; under advisement from the Peruvian Marine Institute, IMARPE) for each fishing season. In turn, as of 2008 these TACs are broken down into individual vessel quotas (IVQs, D.L. No. 1084<sup>4</sup>) that assign a share to each vessel registered as part of the IHC fleet. The DHC fleet, by contrast, operated under an open-access regime until 2017, when a TAC specific to anchoveta intended for DHC was implemented (D.S. No. 005-2017-PRODUCE<sup>5</sup>). In addition, in 2009, the state created a Registry of Authorized Artisanal Fishing Vessels for the DHC fleet, to which only replacement vessels are permitted entry (RM No. 100-2009-PRODUCE 2009). These regulations are intended to regulate the anchoveta catch and restrict the DHC fleet.

Thus, state policy clearly benefits large firms and IHC exports at the expense of artisanal fishing and DHC. The segmentation of the market and the fleet protects the more profitable IHC market for large firms by banning small and medium-sized vessels from accessing resources, while registration of artisanal fishing registration aims to limit DHC anchoveta fishing.

## Case study 2: the Peruvian Bay scallop

Not only is Peru a major fishing nation, but it has lately gained momentum as aquaculture producer as well. The Peruvian bay scallop (*Argopecten purpuratus*) is the most commercially important bivalve species along the Pacific coast of South America. It is found on sandy bottoms of coastal bays at depth ranges of 5–30 m (Wolff et al., 2007) between Paita, Peru (5 °S) and Valparaíso, Chile (33 °S) (Peña 2001). At present, the sector produces between 16,800 and 93,000 tons annually (over the period 2011–2018; PRODUCE, 2019, p. 54). Along

<sup>1</sup> PRODUCE 2019, Anuario estadístico pesquero y acuícola. Available at: <http://ogeiee.produce.gov.pe/index.php/shortcode/oe-documents-publicaciones/publicaciones-anuales/item/901-anuario-estadistico-pesquero-y-acuicola-2018> accessed 2020-10-21

<sup>2</sup> DECRETO SUPREMO No. 012-2001-PE. Available at [https://cdn.www.gob.pe/uploads/document/file/418473/Decreto\\_Supremo\\_N%C2%BA\\_012-2001-PE.pdf](https://cdn.www.gob.pe/uploads/document/file/418473/Decreto_Supremo_N%C2%BA_012-2001-PE.pdf) accessed 2020-10-21

<sup>3</sup> The anchoveta regulations restrict the proportion of bad conditions fish that an artisanal can have: just up to 10% of discards, that would end up in fishmeal production. D.S 005-2017-PRODUCE.

<sup>4</sup> DL No. 1084, available at [http://www2.congreso.gob.pe/sicr/cendocbib/con4\\_uibd.nsf/E8DBF74350DFD0905257B4400587313/\\$FILE/2\\_DECRETO\\_LEGISLATIVO\\_1084.pdf](http://www2.congreso.gob.pe/sicr/cendocbib/con4_uibd.nsf/E8DBF74350DFD0905257B4400587313/$FILE/2_DECRETO_LEGISLATIVO_1084.pdf), accessed 22 October 2020

<sup>5</sup> Regulations for Anchoveta [*Engraulis ringens*] for Direct Human Consumption, DS No. 01-2010-PRODUCE

the Peruvian coast, the main aquaculture areas are found in the regions of Piura (Sechura), Ancash (Chimbote), and Pisco (Bahia Independencia), though Sechura has been a driving force in the expansion of production over the last 15 years (Kluger et al. 2019b). In 2013, this bay accounted for 80% of national and 50% of Latin American scallop production. Peruvian bay scallop is almost exclusively exported, with 67% sold to Europe, and 23% marketed within the Americas (mainly the USA) (in 2019, p. 145).

Currently, scallops are grown in bottom culture (i.e., sea ranching) by small-scale organizations (*Organizaciones social de pescadores artesanales*, OSPAs) in designated aquaculture areas (concessions<sup>6</sup>) in the aforementioned coastal regions. With 15,812 hectares officially assigned to concession areas for scallop production, the activity is also the biggest aquaculture industry in Peru in terms of area (PRODUCE 2019, p. 171). Sea ranching involves the placing of scallop spat (juvenile individuals of 2–4 cm in shell height)—whether collected in the natural environment or produced in the laboratory (hatcheries)—on the sea bottom, where they are harvested once they reach permitted commercial sizes (a minimum of 6.5 cm in height<sup>7</sup>). At the same time, larger-scale firms farm scallops in what is called suspended cultures, in net structures hanging on long lines. This is a more labor- and capital-intensive but more readily controllable way of farming scallops.

It is important to understand that the scallop aquaculture industry grew out of scallop diving. Scallop fishing in Peru has a history that dates back to the nineteenth century. Gonzalez (2008) engaged with legislation from the 1920s that regulated scallop fishing effort through the exclusion of this activity from Peru's guano-producing islands (which affected scallop fishers based in Callao). At that time, dredging was the only permissible fishing method for the mollusk. Starting from the 1950s, a diving fishery evolved, exploiting scallops as one of many benthic resources along the Peruvian coast. Until 2001, when the first Peruvian aquaculture law was passed (Law No. 27460, 2001; with DS No. 030-2001-PE), the main regulatory mandate stemmed from the fishing legislation (and to a lesser extent from conservation-oriented legislation designed to regulate coastal-marine activities in newly established marine protected areas and reserves). This first law aimed to promote and develop aquaculture activity, framing it as a means for small-scale fishers (organized into OSPAs) as well as indigenous and peasant

communities to sustain and enrich livelihoods. In 2015, a second aquaculture law (DL No. 1195, 2015; with DS No. 003-2016-PRODUCE; DS No. 002-2020-PRODUCE; DS No. 012-2019-PE) was passed, requiring participants in the activity to evolve into small-scale or larger-scale firms.

While the first aquaculture law explicitly granted access rights to manage the species of interest (the Peruvian bay scallop) within designated aquaculture areas (concessions) rather than through an exclusive area-based notion, the second law conferred access to a particular territory, providing exclusive rights to use the sea bottom and the water column above it. The latter aspect is important as it legally excludes other coastal marine activities from the ocean space granted through a concession, which repeatedly precipitates conflicts with fisheries.

## Results and discussion

### Contested governance frameworks: state policies and local responses

The anchoveta and aquaculture industries are presented as good options for promoting economic development, providing livelihoods, and feeding the Peruvian population. Yet from the beginning state policies have promoted the industrialization of these activities to meet global market demand to the detriment of local market needs and food security concerns (Doucet and Einarsson 1966). Moreover, the state's role in promoting industrialization changed in the 1990s following neoliberal perspectives (Arias-Schreiber 2012). Since that decade, general state policies have increasingly promoted private rights and the involvement of foreign firms and investment to foster industrialization.<sup>8</sup> Though this rights-based management approach has been celebrated by many fisheries scientists as a successful one (e.g., Arias-Schreiber 2012), it has also been criticized by others for failing to address the social impacts of introducing private rights to fisheries management (Sota 2018).

Moreover, it has been argued that the divisive nature of the regulations—prioritizing industrial fishing operations while restricting small-scale fishers to harvesting food for human consumption—exacerbates social injustice and malnutrition in a country that urgently needed to address such issues (Fréon et al. 2014). As Cavaleri (2022) shows state policies, following blue economy paradigms, have jeopardized the livelihood of small-scale fishers in Peru and elsewhere in Latin America.

<sup>6</sup> “Access to aquaculture activities require authorizations or concessions, with previous approval of its Environmental Management Instrument” (Art. 30.1, Law 1195) [http://www.sanipes.gob.pe/archivos/biblioteca/N\\_8\\_DL\\_1195\\_Ley\\_General\\_de\\_Acuicultura.pdf](http://www.sanipes.gob.pe/archivos/biblioteca/N_8_DL_1195_Ley_General_de_Acuicultura.pdf)

<sup>7</sup> <https://pescayconsumoresponsable.produce.gob.pe/tallas-minimas.html>

<sup>8</sup> For example, the 1992 General Fishing Law; the Industrial TAC Law; and the 2017 law for anchoveta TAC and permits

However, state policies and regulations do not exclusively define the institutional framework that governs fisheries and aquaculture practices. Formal regulations coexist and entangle with local practices and institutions that—from a state perspective—are informal or illegal.

In explaining the existence of informal and illegal institutionalized practices, local producers and leaders have developed political arguments to contest certain state policies and regulations. First, they contend that fishing freely in the ocean is a customary right of SSF communities—an argument that is echoed in the communities themselves (Garcia 2000; Raycraft 2016; Shultz 2015). As one fisher in Pisco put it, “The artisanal fishers came first (to the state) and all the theories and all the stories prove it. There is a deep history of artisanal fishing and sometimes they [state representatives] don’t understand that” (artisanal anchoveta fisher, 08/10/21). From the start of fisheries regulation in Peru (the 1970s), SSF communities (including those focused on anchoveta) were allowed to fish under open-access regimes, and each community developed its own institutionalized informal practices to govern fishing activities. It was the 1988 fisheries law that first engaged with artisanal fishing, maintaining open-access while stipulating that SSF target its catch to DHC. In 2000, the state began closing the artisanal fleet’s access to anchoveta through supplementary norms regulating catch size and restricting the commercialization of anchoveta. In 2009–2010, the state required fishers to obtain a special permit to fish anchoveta, and then closed the registry. And in 2017, a general TAC was established for DHC anchoveta fishing. Following the legal framework for IDH, the state allocated the fishing quota to permit holders and sought to formalize vessels.

In the case of scallop aquaculture, much of the industry’s early years took place on the basis of SSF regulation, since small-scale fishers were the first to engage in the activity. Recent laws have changed the former open-access regime to ones of private production by privatizing water columns. In Sechura, the privatization and expansion of scallop production has affected traditional fishers by excluding them from formal production and privatized ocean areas but also by legally expelling them from areas traditionally used as fishing grounds. The areas around Lobos de Tierra (an island some 8–10 h by boat south of Sechura Bay) are a constant source of conflict and dispute: Most scallop spat is still obtained from natural banks around Lobos de Tierra (Mendo et al. 2016), even though the practice has been prohibited by law since 2006 (i.e., through RM No. 293-2006-PRODUCE, which interdicts the extraction of scallops of any size<sup>9</sup>). This is because the regulations are very rarely enforced. In addition, since 2009 the island’s traditional source of scallop

spat has been designated part of the Guano Island, Islets and Capes Reserve System (*Sistema de Islas, Islotes y Puntas Guaneras*, RNSIIG), a national reserve comprised of 22 guano-producing islands along the entire Peruvian coastline. And while “traditional use and sustainable exploitation of natural resources” is permitted, (Peruvian) natural reserves have a clear mandate for biodiversity conservation<sup>10</sup>, theoretically further to restricting scallop extraction around Lobos de Tierra. Excluded anchoveta and scallop fishers contest these regulations, which they see as an infringement of their (perceived) constitutional right to access a common resource.

Second, fishers think that state regulation clearly benefits industrial anchoveta fishing operations and aquaculture export firms over local producers and markets, restricting their right of access not only to national resources but also to more profitable markets. What is more, they claim unequal treatment by the state. Ever since DHC regulation was initiated, artisanal fishers became the object of constant sanctions over rules infractions, including the confiscation of unauthorized catch and vessels, imposition of fines, and penal processes against fishers. In these contexts, artisanal fishers argue that state institutions have been captured by business interests whose aim is to displace them from their fishing zones, resources, and markets: “It seems like they want to make us disappear, because the rules that hit us with everything are harmful. They [industrial fishers] have acquired all the rights; we being the poor artisanal fishers that we are, [...] we cannot acquire rights” (artisanal anchoveta fisher, 73 years old, 08/10/21). This is a claim made of state policies in countries other than Peru as well (Fabinyi 2012; Fabinyi et al. 2015; Oracion 2013).

In the case of the anchoveta industry, artisanal fishers assert that the requirement for exclusive anchoveta permits and quotas as well as regulations on the sale are aimed at restricting their right to fish this species. On the other hand, state quotas and permits make sense for the industrial IHC fleet, since the vast majority of the anchoveta catch is concentrated among a few large companies. In aquaculture, state policies promote private self-regulation rather than comprehensive state regulation: small-scale holders produce for large export firms that adhere to principles of corporate environmental responsibility, following international sanitary requirements and market standards (Kluger et al. 2022). In this regard, the state has transferred its regulatory responsibility over the formerly open ocean into private hands, guided more by profitability than sustainability: industrial anchoveta fisheries have an exclusive right to fish for highly profitable IHC exports while private scallop concessions aim to furnish the increasing demands of global

<sup>9</sup> <http://extwprlegs1.fao.org/docs/pdf/per67134.pdf>

<sup>10</sup> <https://www.gob.pe/institucion/sernanp/colecciones/2525-reservas-nacionales>

markets. Thus, state policy is clearly prioritizing production for export (making sure a certain cut of the profit ends up with the state) over local and national markets (and thus the food security of the Peruvian population).

Third, many artisanal fishers think that the state policy-makers do not have enough knowledge about artisanal fishers' activities or the species they target to correctly regulate their fishing activities (Espinosa 2019; Palacios 2015, 2016, 2019; Sabella, 1980). As one fisher put it: "The permit should be for all species, artisanal fishers should fish all species; here, there should be no 'you must fish this'" (artisanal anchoveta fisher, 62 years old, 08/10/2021). This relates to the perceived ignorance of the state with respect to the multi-species nature (and history) of small-scale fishing: that in reality, fishers catch whatever they can find. Thus, the basis of the fishers' complaint is that the state removed a right they had in the past, and made it difficult for them to develop one of the most common strategies to cope with risks: diversification of catches (Solís and del Corral 2020; Robinson et al. 2020). Conversely, state officials couch their justifications in terms of sustainability discourses, arguing that regulation is needed to avoid overexploitation; in turn, they contend that need for restrictions is misinterpreted as the need to formalize artisanal and small-scale fishers. Artisanal fishers, however, believe that the official argument is misleading; they feel they are unjustly blamed for the damage exerted by much larger industrial fishing operations with their far larger trawl nets. As an artisanal anchoveta fisher said: "Industrial [anchoveta] fishing has an annual quota of 6-7 million tons. If we add up the statistics, at all levels of the Peruvian coast, including artisanal fishing we reach 250 thousand tons, and we do nothing [about the industrial fishery]. But when they talk about artisanal fishing, they always treat us as predators" (artisanal anchoveta fisher, 65 years old, 08/10/2021). Artisanal anchoveta fishers further argue that the specimens they catch are decreasing in size due to the amounts caught by industrial operators, but there are no specific regulations to tackle this—and they often receive the blame (largely because they are not regulated) for this process (Boëns et al. 2021). This trend is, at the same time, a huge problem for artisanal anchoveta fishers, since the DHC market only receives anchoveta of a minimum length of 14 cm, while the IHC markets accepts anchoveta from 12 centimeters and over (specimens of less than 12 cm are considered juvenile and their catch is legally banned).

In the aquaculture sector, state regulations do not recognize fishers (farmers) who work at a concession as a "guest" of the concession holder. As a result, any scallops they produce are automatically assigned to the concession holder. Under the previous (first) aquaculture law, small-scale scallop production, which largely meant sea ranching, was restricted to artisanal fisher organizations (OSPAs, as explained above), and this sometimes led to big

scallop-producing firms acquiring concessions through the use of a "dummy" fisher organization—that is, they use an OSPA as their "face" while running, and profiting from, scallop production themselves.

The issue of state regulations is often accompanied by a claim, common to fishing communities, for more autonomy and self-government (Bombiella 2016; Carothers and Chambers 2012; Nakandakari et al. 2017). In Peru, artisanal fisher communities accept state authority despite their criticism of state policies, but they believe that they have the right to criticize some state policies they regard as unjust and, as a result, to contravene certain rules. In the anchoveta fishery, many artisanal fishers have habitually resorted to fishing and selling anchoveta for IHC. Though artisanal fishers are expected to produce for the DHC market, if their catch does not adhere to certain quality and sanitary standards (which are much higher/stricter than those for the IDC market), 10% of it can be legally sold to the IHD market for fishmeal/oil legally. But in reality, the percentage is much higher when the catch illegally channeled to IHD is taken into account. This practice is so common that there is an accompanying artisanal route to producing fishmeal, as we observed in Pisco: fishers sell part of their catch to intermediaries who let the anchoveta catch dry in the sun in certain places (*pampas de secado*, or "drying fields"). As Fréon et al. (2014) contended, an increasingly large share of the small-scale fleet's anchoveta catch (officially intended for DHC) has been targeted for fishmeal production. This explains why official anchoveta production values are smaller than actual exports (Grillo et al. 2018).

Faced with these problems, the state has resorted to aggressive attempts to enforce its regulations. In 2018, the government issued a law that regulates the interdiction of illegal fishing activities (DL No. 1393), criminalizing the construction or alteration of artisanal fishing vessels without authorization for construction, the harvesting of fishing resources using a vessel without a fishing permit, among other practices. This law authorized the Public Ministry, Peru's National Police Force and the General Directorate of Harbormasters and Coast Guard to destroy fishing vessels and fishing gear that did not comply with current norms, to seize and destroy fishing catch harvested illegally, and to arrest fishers for crimes against the environment. In the aquaculture sector, the state has repeatedly removed (i.e., destroyed) informal farming infrastructure, especially in established conservation areas. In Sechura Bay, one example of the reoccurring removal of informal scallop farming operations can be found in the coastal village of Constante: In the early 2000s, fishers' groups, wishing to take part in the "scallop boom" that was unfolding in the area, had established their own aquaculture sites outside the village (*cf.* Kluger et al. 2019a, for an account of the historical development). During the "organization" process that

was initiated by the state a few years later (aimed at formalizing existing and new groups and spatially structuring the activity within the bay), however, their operations were relocated to the bay's "buffer zone": a 1–2 mile stretch of coastal water declared unsuitable for scallop aquaculture due to being potentially affected by wastewater discharges). Consequently, the authorities destroyed all aquaculture sites located within the buffer zone—including those belonging to the fisher groups from Constante. Even years after the incident, the fishers of Constante were still strongly contesting the state's narrative of the scallop boom helping the region of Sechura to flourish—a process from which they felt very much excluded. Villagers argued that only outsiders (such as migrant fishers from Pisco and other Peruvian regions) benefitted from the boom in an area that was rightfully theirs.

The repressive measures prompted protest among artisanal anchoveta fishers in places such as Pisco, where organized fisher groups have mobilized and blocked the Panamericana Sur highway. Indeed, they have demonstrated on several occasions with the aim of securing the derogation of DL No. 1393, but the law is still in place and interdictions have not ended<sup>11</sup>. In addition, state regulations are resisted in more everyday ways, such as taking advantage legal loopholes and poor state regulatory capacity. For example, anchoveta fishers are only sanctioned with fines for producing fishmeal from artisanal catches when they hold a fishing permit. Hence, some fishers do not show their permit (even if they have one) when they are monitored and accused by state authorities of illegally attempting to produce fishmeal. Likewise, scallop fishers continue to harvest scallop spat for formal, informal, or illegal aquaculture plots with limited state surveillance: formally, scallop spat extraction is linked to SSF and permitted in open-access areas along the entire Peruvian coast—but not in the natural reserve at the island of Lobos de Tierra. Regardless these practices, scallop population seems to be rather stable at ILT without taking into account the Niño events (Tafur et al. 2000).

Interestingly enough, fishers are not against state authority. Fishers' leaders approach the state peacefully to express their concerns and look for solutions. They periodically visit PRODUCE offices to talk with state representatives, e.g., seeking to formalize their informal and currently illegal activities such as anchoveta fishing for IHC or scallop spat harvesting. For instance, anchoveta fishers are proposing the formalization and registration of their vessels, and scallop farmers are calling for the recognition of their rights to use scallop spat banks as an open-access resource. In this way,

they believe their practices can be recognized as rightful and legal.

As noted earlier, the agency of social actors is key to understanding state governance (Chatterjee 2007; Joseph and Nugent 1994; Raeymaekers 2009; Yang 2005). In the last decade, the Peruvian state has enacted several laws with the aim of governing the production of anchoveta and scallops. Through discourses, demonstrations, and everyday practices, fishers have actively contested state regulations that they believe restrict their right to fish and access more profitable markets. They have been able to get the state authorities to listen and to some extent negotiate with them. In addition, the state's weak enforcement capacity, due to a lack of resources and political interest in the artisanal sector, has resulted in the incomplete implementation of formal regulatory institutions. As a result, the ways in which artisanal anchoveta fishing and scallop farming are governed are informed by formal institutions as well as informal and outlawed local institutionalized local practices.

Next, we will show how these institutional entanglements unfold in the anchoveta fishing and scallop aquaculture industries.

### Hybrid entanglements in the anchoveta and scallop value chains

Commonly, informal institutions are grounded in locally accepted practices that are not formally recognized by the state (De Herdt 2015; Cleaver 2015). Sometimes, local state norms not only not recognize but ban such practices that then become illegal despite local social acceptance (Sindzingre 2006; Damonte 2022). This is the case of several practices in artisanal fisheries, such as using certain traditional fishing gear that eventually become illegal when the state adopts a conservation perspective (and bans fishing gear considered environmentally harmful). However, there are also informal and illegal practices and rules that are opportunistic, especially with regard to market opportunities (de Sardan 2021). In these cases, fishers or merchants seek to take advantage of legal loopholes or limited state capacity or interest in enforcing formal regulations on illegal fishmeal processing and export.

According to Castillo and Mendo (1987) reports of mislabeled anchoveta catch (landed under the guise of a different species) and illegal landing of undersized fish (of below 12 cm, through deals between boat owners and plant managers) date back to the 1970s. At that time, there were reported cases of fishmeal plants processing species other than anchoveta (i.e., sardines) into fishmeal, or mislabeling as canning plants while continuing to process anchoveta into fishmeal. Moreover, in the case of aquaculture case, the reserved areas around the Lobos de Tierra remain the main source of

<sup>11</sup> <https://avanzapesquero.lamula.pe/2018/09/20/pescadores-informales-tomaron-las-calles-en-contra-de-dl-n1393-de-produce/avanzapesquero/> ) (<https://www.huachos.com/detalle/pescadores-artesanales-protestan-por-un-ley-que-les-dejaría-sin-llevar-el-pan-a-su-casa-noticia-7284>)

scallop spat for aquaculture within Sechura Bay in a situation in which authorities barely control the sourcing of spat.

This shows that informal and illegal institutionalized practices are not new, and they do not tend to disappear. On the one hand, the very state definition of informality or illegality is sometimes contested. As we have seen, many fishers believe that they have the right to reproduce their traditional practices and that state regulations—such as anchoveta fishing restrictions or the creation of marine reserves in traditional fishing spots—are against their interests, so they question the legitimacy of the corresponding laws and rules. As Sota (2018) asserted, “producing illegal fishmeal forms part of a rightful claim because artisanal anchoveta fishers have the right to subsist.” On the other hand, the Peruvian state has limited capacity and interest in actually regulating the artisanal fishing sector. As with other extractive sectors, such as mining, the state concentrates most of its efforts on promoting large-scale, formal extraction for global markets to assure tax revenues for the state (Damonte 2016, 2021); in this context, its main policy concerning SSF entails avoiding activities and conflicts that could interfere with large-scale business. The maintenance of informal and illegal institutionalized practices might be functional to this objective: central government officials can blame artisanal fishers for environmental problems because they “just don’t follow the rules” (as has been expressed by artisanal anchoveta fishers, such as those quoted here) while tolerating some informal and illegal practices so as to avoid social confrontations. Thus, state policies and actions may furnish the reproduction of informal and illegal institutions.

Importantly, informal and illegal institutions are not made up of isolated practices; rather, they articulate with formal institutions in shaping hybrid forms of governance. A close review of the anchoveta and scallop value chains shows the hybrid institutional entanglements that connect the formal, informal, and illegal spheres.

Studies on anchoveta telecoupling have shown the complex fishery dynamics resulting from local and long-distance ecological and socioeconomic interactions (Carlson et al. 2018). In this case, we focus on the analysis of the institutional arrangements of anchoveta production, processing and consumption in order to show that there is no clear distinction between the illegal and informal realms and to highlight the hybrid and dynamic characteristics of the value chain. As we can see in Fig. 2, several institutional hybrid entanglements characterize the anchoveta value chain. At the level of production, the industrial fleet, small-scale and artisanal formal vessels (with permits), and small-scale and artisanal informal vessels (without permits) all fish anchoveta. The catch of formal industrial vessels is sold directly to formal fishmeal processing plants, but the catch of formal small-scale and artisanal vessels can have been bound for either formal or informal processing plants. In addition, intermediate

buyers can informally sell anchoveta to formal residual fishmeal plants, informal processing plants, or informal *pampas de secado*.

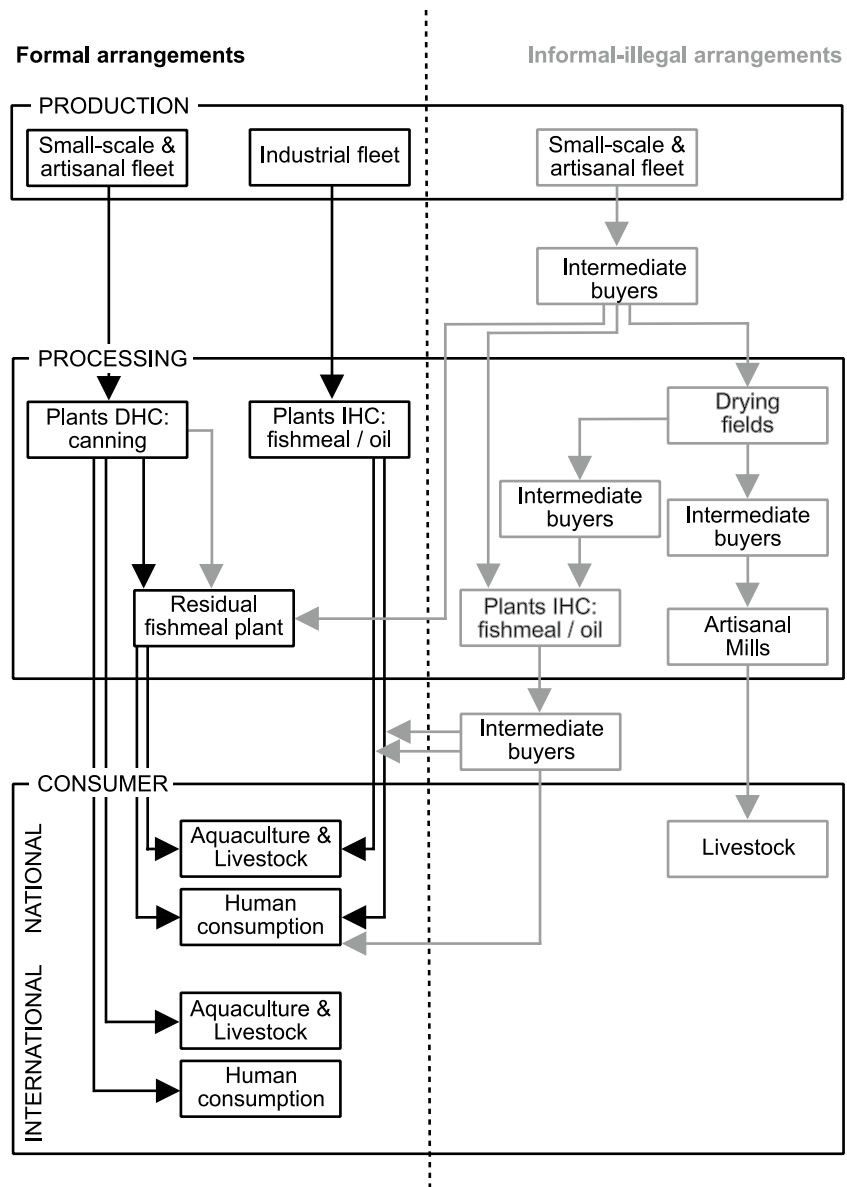
At the processing level, there are formal canning plants, formal and informal fishmeal/oil processing plants, and *pampas de secado*. It should be noted that residual fishmeal (in contrast to fishmeal) plants produce fishmeal out of discards or leftovers from direct human consumption industry. High quality illegally and informally processed anchoveta can be directly or indirectly (through intermediate buyers) sold to formal fishmeal/oil enterprises to be mixed with their fishmeal production. In this way, some informally fished and informally or illegally processed anchoveta for IHC gets formalized in the formal value chain. Low quality processed anchoveta is mostly sold to informal companies that produce livestock feed for national markets, although a certain percentage is mixed with higher quality fishmeal.

Finally, processed anchoveta reaches national and international markets. Formal plants for IHC meet the increasing national and international demand for fishmeal for use in the livestock and aquaculture industries. Most production is exported formally to international consumers, who constitute by far the biggest and more profitable fishmeal market. Formal plants for DHC sell their production mostly to national markets, since canned anchoveta exports are still incipient. Finally, low quality illegally processed anchoveta satisfies national demand, ending up in formal and informal livestock and chicken farms.

Likewise, institutional hybrid entanglements define the scallop value chain (see Fig. 3). When it comes to harvesting spat, the main input for scallop aquaculture, there are three main legal ways to go about it: collecting small individuals from natural banks in open-access (not reserve) areas, capturing spats in collectors (mesh bags installed in the water column within aquaculture areas—an activity for which the government has authorized 10% of each concession area in RD No. 202-2014), or using spat produced within laboratories (hatcheries). In Sechura, state regulation of scallop spat collection depends on what the fisher declares as the source, which is often described simply as “nearby” or in whichever open-access area. Hence, all spat illegally collected from the banks of Lobos de Tierra is passed for formal through the obscuring of its origin when the details are registered with state authorities.

Natural banks for spat extraction may be accessible via an open-access regime (i.e., at natural banks outside aquaculture areas, called *la pampa* in Spanish) or in the natural reserve around the Lobos de Tierra; cf. map in Fig. 1). In this figure, again, we have unified the informal and illegal subsectors in order to show there is no clear distinction between illegal and informal realms and to highlight the hybrid and dynamic characteristics of the value chain. Scallop spat collectors, as noted, were not included in the graphic

**Fig. 2** Formal–informal value chain of the Peruvian anchoveta fishery (*Engraulis ringens*) in Pisco, Peru (cf. map in Fig. 1)



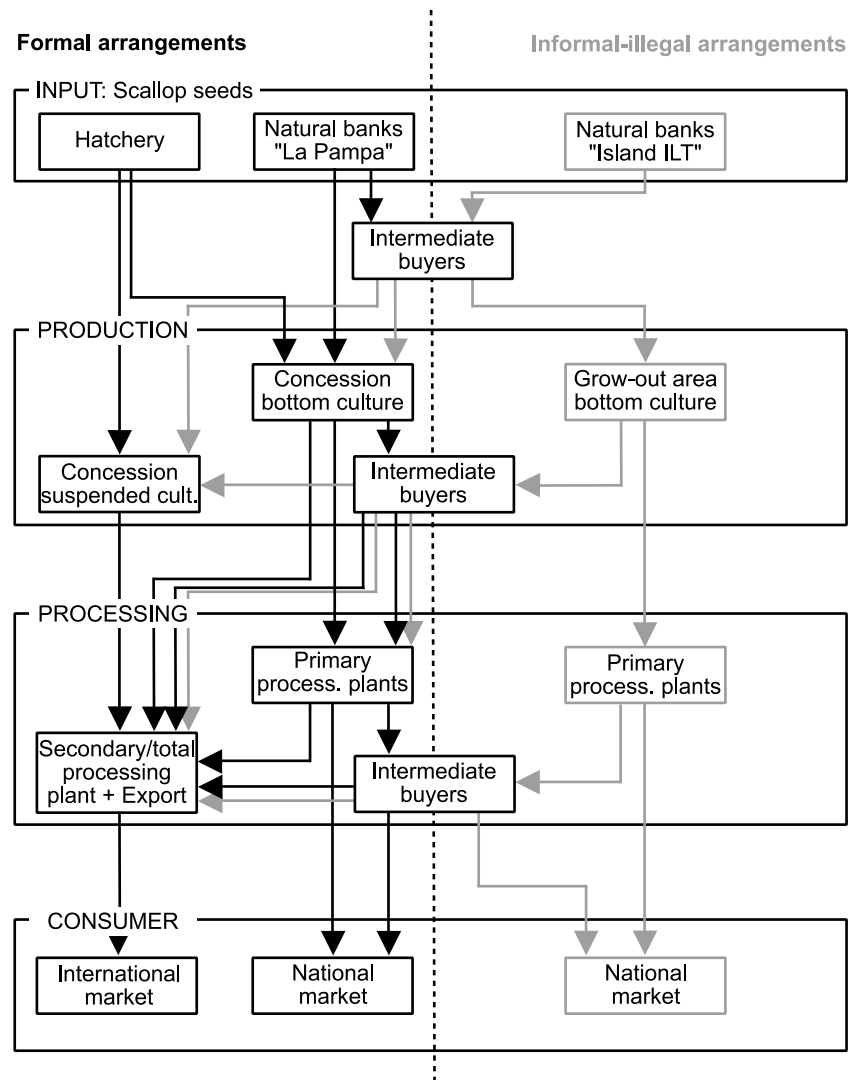
because this is an activity that is necessarily carried out at an aquaculture site: i.e., by the same scallop producing actor.

During scallop production (the grow-out cycle) several formal–informal entanglements are identified. Concessions for scallop aquaculture may be completely formalized and all legal requirements for production obtained, or grow-out areas may be installed completely illegally (e.g., within buffer zones or other areas declared as not suitable for aquaculture). But intermediate versions of these two extremes also exist, such as with concessions not (yet) formalized (because, for example, they may be awaiting final confirmation of paperwork) while scallop aquaculture is already ongoing (i.e., the scallop spat has been brought in, through the practice of adjusting details on grow-out length according to the timing that formalization was completed). Other hybrid realities emerge when the production of “guest”

fishers is counted as that of concession owners’ or when scallops produced in informal or illegal areas are declared as the catch of a different (legally operating) group. This is such a common practice that even large-scale companies that have adopted international environmental responsibility practices (and obtained sustainability certification through the Aquaculture Stewardship Council) and officially produce scallop in suspended cultures (i.e., hanging nets) reportedly use scallop spat caught illegally for their grow-out, or receive larger scallops from small-scale producers by channeling that catch (albeit not necessarily meeting international standards) into their certified lines.

Scallop processing encompasses primary (shucking and cleaning of scallops, sorting according to sizes etc.) and secondary processing (packaging of scallops into marketable formats, sale) plants, the latter of which typically organize

**Fig. 3** Formal–informal value chain of the Peruvian bay scallop (*Argopecten purpuratus*) aquaculture in Sechura Bay, Peru



exports as well. To our knowledge, there are several informal/illegal scallop processing plants in the Piura region, some of which are no more than tables in the backyard of a family home. Landing of informally or illegally produced scallops may also bypass formal records, i.e., by not being landed at the official sites and then brought directly to local markets, hence avoiding any sanitary inspection. Regardless of its origin, most scallop production ends up in formal retail markets around the world.

Finally, our discussion on anchoveta and scallops' production and value chains refer to a common issue on what the literature identified as hybrid forms of governance. As in the studies following an interactive governance's framework (Kooiman and Bavinck 2013), we acknowledge the importance of focusing on the interaction between state and non-state actors to understand the different hybrid forms of governance (Vince and Howard 2017; Yasmin et.al. 2022) and the need of empower and incorporating local producers and stakeholders in knowledge networks to grasp and

eventually solve governance problems (Jentoft and Chuenpagdee 2022). In contributing to this literature, we show that interactions not necessary leads to collaboration or the formation of networks for solving governance problems, but to the institutionalization of formal-informal-illegal entanglements through which power inequalities can be produced and reproduced. Economic growth models, state policies and social conditions shape the nature of interactions, networks, and institutionalized practices that define hybrid governance forms.

## Conclusions

In the last few decades, the Peruvian government has sought to develop the country's fishing sector. To this end, it has followed a development model that favors production for the global markets over local or national consumption. Accordingly, state policy has targeted the extraction of highly

demanded commodities: anchoveta for fishmeal production and scallops. The government has tried to maximize production of the former by further segmenting anchoveta into IHC and DHC markets and allocating private rights to aquaculture farmers and enterprises with links to global markets following blue economy paradigms (Cavaleri 2022). This policy has resulted in increases in production and state revenues. However, the model has marginalized most artisanal fishers who typically produce mainly for local consumption and internal markets as in other parts of the world (Jentoft and Chuenpagdee 2022). Against this backdrop, fishers have found the way to by-pass some regulatory restrictions and seize global market opportunities. Our research shows that while the state development model has led to the creation of public policies, local agency has shaped the way these policies are implemented and observed.

The literature has extensively studied local forms of resistance to state governance (Gledhill 2000; Joseph and Nugent 1994; Scott 1985). In our cases, more than resistance against the state, we observe strategies and interactions that constantly (re)define the relationships between local actors and state agencies. Fishers may confront state regulations through demonstrations, but they mainly by-pass state regulatory power by reproducing informal and illegal practices and institutions. As a result, state regulatory initiatives have not brought about the formalization of harvesting activities but the coexistence of formal, informal, and illegal practices. Moreover, these practices do not belong to separate formal–informal–illegal domains since they are intertwined in hybrid institutional entanglements.

In addition, informal and illegal practices are not remnant, isolated occurrences, or circumscribed to certain fisheries, but embedded in the way the sector functions. A description of the anchoveta and scallop value chains shows how hybrid institutional entanglements unfold from the input to the consumer levels. Social actors such as fishers, intermediaries, firms, and state agencies interact in realms where the boundaries between legality, informality, and illegality are neither fixed nor completely clear: they coexist in an unstable balance in which hybridity is a key element in understanding the governance of the sector.

The studies on interactive governance show the importance of interactions between state and non-state actors in shaping new governance frameworks and possible solutions for sustainability (Jentoft, and Chuenpagdee 2022.). However, governance hybridity may also generate new challenging scenarios for policy innovation and implementation (Clever 2012, 2015; Blundo and Le Meur 2009; de Sardan, 2015). Informal and illegal institutionalized practices are beyond state regulatory structures, but they are not outside the state realm. State policies and interventions certainly have a role in shaping and reproducing institutional hybridity. Thus, this pluralization of regulatory authorities appears

not to be a main state concern as long as anchoveta and scallop production continue to yield revenues. Therefore, state economic model and policies needs to be adjusted to foster small scale fishers' social inclusion and social justice, while strengthened the public regulation institutional arrangements.

## Declarations

**Competing interests** The authors declare no competing interests.

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