Moving within and beyond illegal crustacean fishery: why do Indonesian fishermen not comply with the crustacean catch ban rule?

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Abstract

Illegal wild capture fisheries undermine crustacean (e.g., crabs, lobsters, and swimming crabs) stock and their habitats. In a search for a new approach to the fisheries issues, this paper aims to explain why the illegal fishing for crustacean species still exists in Indonesia. It focuses on analyzing a set of practices in crustacean production and consumption. Banyuwangi (Indonesia) was the case study area of the conducted fieldwork. The method applied semi-structured interviews and participant observation. The design of research enabled the researcher to study daily fishing, purchasing, and processing. These practices determined the exploitation of crustacean species in the sea. This paper shows that the current fishing, purchasing, and processing of crabs, swimming crabs, and lobsters played a vital role in constructing the habit of illegal fishing. When the catch prohibition rules heavily focused on the wild capture fisheries in the sea, the local intermediaries and processors innovated their purchasing and processing to obtain crustacean species incessantly. Such an innovation was in response to the crustacean scarcity problems. (1) In swimming crab mini-plants, processors diversified their processed swimming crab products. The crab product diversification allowed them to process swimming crabs in all sizes. (2) The local intermediaries gave fishermen binding loans. Fishermen paid back the loans by supplying the crustacean species to the loan givers. (3) The existence of processing and purchasing stimulated fishermen to harvest every last crustacean species. Even though such crustacean fishing was illegal, it contributed to the livelihoods of fishermen, local intermediaries, and processors. This paper makes a research contribution to the use of social practice theory in fisheries issues. It gives a novel research approach to the habit of illegal fishing problems.

Keywords Crustacean species · Crustacean catch ban regulation · Illegal fishing

Introduction

The seafood market globalization connects fishermen to the seafood customers they have never met before (Bailey et al. 2015). It contributes to creating job employment for coastal communities worldwide (Duggan and Kochen 2016). In Indonesia, fishermen export crabs, swimming crabs, and lobsters to the American seafood customers and the Vietnamese lobster farms indirectly through the local intermediaries and swimming crab mini-plants (Bokkes 2013; Priyambodo et al. 2015, 2017). Nonetheless, the emergence of the global seafood market drives fishermen to overexploit crustacean

species (Pusceddu et al. 2014). The overexploitation threatens crustacean populations and marine habitats in the oceans (Fromentin et al. 2014; Hamid and Wardiatno 2015; Madduppa et al. 2016).

Given such environmental issues, the Indonesian Ministry of Fisheries and Marine Affairs has imposed a crustacean catch ban rule (Ministerial Regulation No.56 2016). This rule comes to exist, primarily because fishermen supply juvenile spiny lobsters to the Vietnamese lobster farms incessantly. According to the Indonesian government, such juvenile lobster trading practices result in national economic losses of about 90 million USD (Mongabay 2019). The Indonesian government expects that this ban allows juvenile lobsters to grow up into the adult lobsters in the wild, meaning that it may increase the revenues of local fishermen (Kompas 2019).¹

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¹ Mongabay (2019) and Kompas (2019) are one of online newspapers in Indonesia that follow the issue of juvenile lobster export controversy.

The catch ban regulation alone applies not only for lobsters but also for crabs and swimming crabs (Ministerial Regulation No. 56, 2016). The ban aims to protect the biodiversity of those crustacean species in the sea by prohibiting fishing activities for egg-bearing and juvenile crustacean species. Nonetheless, fishing, purchasing, and processing in Indonesia still violate the existing prohibition rule (Farhan et al. 2018). Fishermen continue harvesting the crustacean species indiscriminately regardless of juvenile and egg-bearing crustaceans (Petrossian et al. 2015; Hungria et al. 2017). Simultaneously, the local intermediaries and processors purchase the illegally caught crustacean species for the Vietnamese lobster farms and the American seafood market (Fahmi et al. 2015; Petrosian, 2019).

Even though such social practices potentially construct the habit of illegal crustacean fishing, the analysis of these practices is, remarkably, few. Social science communities, in general, focus on studying the perceptions and attitudes of fishermen when it comes to illegal fishing and non-compliance issues (Bokkes 2013; Gjerde et al. 2013; Karper and Lopes 2014; Bailey et al. 2015; Garza-Gil et al. 2015; Mcclanahan and Abunge 2016; Cepić and Nunan 2017; Khan et al. 2018). These studies generally disseminate the information into three “waves.” The first is that transparent negotiation with fishermen about the scale of costs and benefits should increase the rule compliance in fisheries. Subsequently, inclusive participation in designing fisheries management encourages fishermen to follow the fisheries regulations. The last argues that the environmental issue awareness becomes the moral motive of fishermen to end their destructive fishing.

Spaargaren (2011) counter-argued such perception and attitude approach. According to him, having positive perceptions and attitudes towards governmental regulation did not necessarily mean people more likely to abide by it. In retrospect, this paper uses social practice theory as an alternative research approach to the issues of illegal crustacean fisheries in Indonesia. This practice theory focuses on practices as the unit of analysis instead of perceptions and attitudes (Jaeger-Erben and Offenberger 2014). With this theory, this paper explains the underlying reasons why fishermen do not comply with the catch prohibition rule. Besides, one may know how current fishing, purchasing, and processing in crustacean production and consumption construct the habit of the illegal crustacean fisheries.

This paper draws from the case study of the conducted fieldwork in Banyuwangi, Indonesia. Banyuwangi is one of the best known in lobster and swimming crab fisheries in Indonesia. According to the Statistic Data Center of Banyuwangi Regency (2011), fisheries in Banyuwangi yielded 15,000 tons of lobsters and 10,000 tons of swimming crabs annually. Banyuwangi supplies lobsters, crabs, and swimming crabs to domestic and international seafood trades.

This paper provides some sections for readers' guideline. The “**Theoretical framework**” section describes a theoretical framework explaining social practice theory (SPT) followed by the “**Methods**” section describing the information gathering. Subsequently, the “**Findings**” and “**Discussions**” sections provide an analysis of the results. Finally, the “**Conclusion**” section sums up the main findings and the role of the social practice theory to understand the issues of illegal crustacean wild capture fisheries in Indonesia.

Theoretical framework

Social practice theory

This paper applies social practice theory as a research lens to investigate illegal wild capture crustacean fisheries issues in Indonesia. This theory seeks to understand “why” and “how” illegal crustacean fisheries in the sea come to exist continuously. It uses practices as a unit of analysis. Spaargaren et al. (2016) suggested the definition of social practices by combining elements of Giddens, Schatzki, and Shove into the following working definitions:

“Social practices are shared, routinized, ordinary ways of doings and sayings, enacted by knowledgeable and capable human agents who – while interacting with the material elements that co-constitute the practice – know what to do next in a non-discursive, practical manner.”

Shove and Walker (2014) state that a practice requires three elements to make it reproduced and routinized on a day-to-day basis: meaning, material, competence. Meaning is a sense of purpose, which a practice offers to its practitioner when carrying out the practice. Material is “things” and their “use,” the physical objects in practice. Competence is the know-how, skills, ability, and knowledge that allow the practitioner to reproduce and routinize the practice in well-order (Fig. 1).

A way of fishing, purchasing, and processing crabs, lobsters, and swimming crabs are a practice. The practitioner fathoms the value of those practices, to which he (she) obtains “meaning” from doing the practices. To perform fishing, purchasing, and processing, the practitioner needs material (e.g., fishing gears for fishermen and knives for the swimming crab processors). They learn and practice a set of skills and knowledge in using of material daily. Performing their fishing, purchasing, and purchasing practices leads those practices to be culturally embedded—the practitioners are carrying out the practice unconsciously. The unconscious aspect of the practice implies that the practitioners routinize the fishing, purchasing, and processing crustacean regularly, to the extent the practices become “a taken for granted” action.

Fig. 1 Theoretical framework based on social practice theory adopted from Spaargaren et al. (2016)

The fishing, purchasing, and processing are interdependent. In such interdependency, these practices share meaning, material, and competence with each other. That is to say, without the existence of one of the practices, other practices may not exist. Fishing in the sea cannot take place without the presence of purchasing and processing on land. The opposite is also true. The purchasing and processing require crustacean species obtained from fishing activities. In general, the set of practices has an overarching goal to exploit crustacean species in the sea. When fishing, purchasing, and processing altogether exploit the crustacean non-selectively, such practices normalize illegal fishing. These practices construct non-compliant behaviors among fishermen, local intermediaries, and processors, the actors involved in crustacean production and consumption.

Methods

The case study of regulatory intervention vs. existing practices in crustacean supply chain

The researcher focuses on a set of practices such as fishing, purchasing, and processing within crustacean production and consumption. This research helps to understand why the current regulatory intervention has failed to cease illegal fishing. Besides, it gives a clear picture of whether purchasing and processing stimulate illegal fishing. The conducted case study of the fieldwork took place in Banyuwangi.

The fieldwork took place in Badean, Muncar, and Red Islands (see Fig. 2 above). The case study areas are the districts of

Banyuwangi. In these districts, local fishermen caught crustacean species for their livings. Local fishermen and intermediaries from different villages in Banyuwangi sold their crustacean species to local processors and intermediaries in Muncar.

People, ethnicities, and a kinship

The researcher obtained the information regarding the diverse ethnicities in the conducted fieldwork of the case study areas (see Table 1). People often established fishing communities based on similar ethnicities and languages. Javanese fishermen formed their fishing communities with other Javanese fishermen in the village. The same was true for Maduranese fishermen. In general, their fishing communities consisted of relatives or extended family members who worked in crustacean fisheries. Through the fishing communities, fishermen shared fishing experiences and daily challenges related to capturing crustacean species in the sea.

The kinship was formed not only because of similar ethnicity and language but also a good working relationship. In this respect, the local intermediaries often visited the fishermen at their houses, which they discussed crustacean scarcity problems directly with fishermen. The local intermediaries often adjusted the price of crustacean species based on the total catch in the hope to help fishermen for their livings. Fishermen perceived this price adjustment as a fair price system. It encouraged them to sell the crustacean species to the local intermediaries loyally. In many accounts of fishermen and local intermediaries, they mentioned that such a good business relationship between fishermen and local intermediaries created a social bonding. That said, the local intermediaries bought crustacean species for not

Fig. 2 The distance between Muncar and Probolinggo, and the distance of each case study areas. *Note: The entire orange borderline on the map covers the whole area of Banyuwangi regency. The red circle indicates Muncar and Probolinggo, to which the distance between the two locations

is about 137.05 km. A, B, and C are Muncar, Badean, and Red Islands, respectively, in which the total distance of the three case study areas is 97.88 km (source: Google Map)

only sustaining their businesses but also helped the family of the fishermen.

The role of local actors to implement the catch prohibition rule

The catch ban regulation imposed in 2015 changes the rule of the game in fisheries in Indonesia. It restricts the use of

destructive fishing gears (e.g., trawl-fishing gears and fishing with dynamite). The regulatory intervention aims to change the way of fishing in crabs, lobsters, and swimming crabs to be (more) sustainable. The rule does not allow the fishermen to capture egg-bearing and juvenile crustacean species in the sea.

The local fisheries department officers, at the district level, have performed various efforts to change the non-compliant behavior among crustacean fishermen:

Table 1 People and their ethnicities

No.	Villages	Ethnicities	Crustacean target	Social practices
1.	Muncar	Maduranese and Javanese	Crabs, swimming crabs and lobsters	Fishing, processing and purchasing
2.	Badean	Javanese	Crabs, swimming crabs, and lobsters	Fishing and Purchasing
3.	Red Islands	Javanese	Juvenile lobsters	Fishing and Purchasing
4.	Probolinggo	Maduranese	Swimming crabs	Fishing and Processing

Educational campaign and fisheries community association (*Kelompok Masyarakat Pengawas Perikanan*)

The local fisheries department officers at the district level promoted the catch prohibition rule to fishermen during the educational campaign. The educational campaign took place once in every 3 months. Often, the educational campaign was held at the Headman Office in each village (Tables 2 and 3).

To make the educational campaign a success, the local fisheries department officers built a partnership with local fishermen. They established the fisheries community association (*Kelompok Pengawas Masyarakat Perikanan*). The association aimed to facilitate coordination and cooperation between the local fisheries department and fishermen. It allowed the local fisheries department officers to obtain information regarding the number of current fishermen and fishing efforts in every village in Banyuwangi. Similar to other organizations, the fisheries community association consisted of leaders and members. The number of members varied in each village, from 15 to 50 fishermen. The number increased or decreased over time, depending on the availability of job alternatives apart from fishing.

The primary role of the fisheries community association was to carry out peer-monitoring. In principle, they reported some problems in the sea, such as the dynamite fishing and trawl-fishing gear usage, to the local fisheries officers. The local fisheries officers mediated the social conflict issues resulting from the destructive fishing gear operations. They often came up with the advice to change the destructive fishing gears to gillnets.

The establishment of the fisheries community association gave the local fisheries department officers some advantages in disseminating information to fishermen. In this matter, fisheries managers held a workshop about sustainable fishing in the village. The representatives of fishermen members and leaders attended the workshop. Fisheries manager explained the objective of the catch prohibition rule for crustacean species at the meeting. Additionally, they promoted gillnets as

“eco-friendly” fishing gears. The workshop allowed the participants to have some questions, to which the fisheries manager answered.

They discussed the benefits of gillnets and the environmental consequences of trawl-fishing gears in the workshop. The fisheries manager informed the participants that the trawl-fishing gear operation destroyed the coral reefs, the marine ecosystem where swimming crabs and lobsters inhabited. The fisheries managers mentioned that the trawl-fishing gear operation deteriorated the crustacean stock, which in turn, reduced earned incomes of fishermen. To address the issue of the trawl-fishing gear use, the fisheries managers recommended using gillnets, with the mesh of 4.5 to 5 in. to catch crustacean species selectively. Ever since, most fishermen, especially in the case study areas, did not operate the trawl-fishing gears anymore. The research observation confirmed that all fishermen only operated the gillnets for fishing crustacean stock in the sea. In all villages, fishermen prohibited the use of trawl-fishing gears to restore crustacean stock in the sea.

To remind the catch prohibition rule objectives, the local fisheries department officers summarized the key points of the catch prohibition rule. They designed informative banners. It contained a summary of information regarding juvenile and egg-crustacean species. So too was the allowable weight, and the size of crustacean species was one of the primary deliverables on the banners. With the help of the banners, the local fisheries department officers aimed to reach out to more fishermen in the villages. This social campaign aimed to influence fishermen to comply with the rule. The local fisheries department officers placed the banners at the seaport and the house of fisherman’s leaders, where fishermen used to gather before fishing.

Being a member of the fisheries community association allowed them to get “subsidy privilege.” The member obtained the member identity card from their fishermen leaders. When the central government gave fishing subsidies, the identity card enabled them to receive the priority of the subsidies. They obtained the subsidies as new gillnets and boat engines,

Table 2 Size and egg-bearing crustacean rule (source: Ministerial Regulation, No. 56, 2016)

No.	Crustacean species	Sources	Catch prohibition
1.	Crabs (<i>Scylla spp.</i>)	Fishing & rearing farms	<ul style="list-style-type: none"> • Egg-bearing crabs • Carapace size below 15 cm • Weight under 200 gram
2.	(Blue) Swimming crabs (<i>Portunus spp.</i>)	Fishing & rearing farms	<ul style="list-style-type: none"> • Egg-bearing swimming crabs • Carapace size below 10 cm • Weight under 60 grams
3.	Lobsters (<i>Panulirus spp.</i>)	Fishing & rearing farms	<ul style="list-style-type: none"> • Egg-bearing lobsters • Cephalothorax size below 8 cm • Weight under 300 grams

Table 3 Types of fishing gear pre-and-post educational campaign

No.	Villages	Fishing gears in 2015 (before educational campaign)	Fishing gears in 2016 and 2017 (after educational campaign)
1.	Badean Village	Trawl-fishing gears	Gillnets and fishing traps
2.	Cukingan Village	Trawl-fishing gears	Gillnets and fishing traps
3.	Tambakrejo village	Trawl-fishing gears	Gillnets
4.	Muncar village	Trawl-fishing gears	Gillnets
5.	Red Island	Trawl-fishing gears	Gillnets and fishing traps

with a (more) affordable price. Given their functional old boat engines, fishermen sometimes resold the subsidized boat engines to other fishermen (non-members) to earn extra money.

The local department of fisheries and marine affairs responded to the complaints of fishermen in the fisheries community association. They attempted to find the way out, amid lobster and swimming crab scarcity in Badean village, for example. The local department of fisheries and marine affairs wrote an aid proposal to request fish-aggregating devices (“artificial coral reefs”) materials. They assumed that the artificial coral reefs might become a new habitat of crustacean species. Thereby, fishermen were able to harvest crustacean stock in the wild again. During the observation, fishermen worked hand in hand with their fellow fishermen to string up and place the artificial coral reefs in the sea.

Monitoring crustacean intermediaries and swimming crab processors

The local fisheries department officers mentioned that the control and monitoring problem was the lack of local budget and personnel. To address such an issue, they monitored and controlled the purchasing and processing of swimming crabs and lobsters in intermediaries and processors in Muncar instead of fishing activities in the sea.

This surveillance ensured all fishermen to comply with the rule. The logic behind such a surveillance strategy is that if the intermediaries and processors purchased crustacean species selectively, so did the fishermen. The local fisheries officers believed that in this way, they promoted the catch prohibition rule to the seafood provision system.

According to local fisheries officers, they sanctioned all the owners of the juvenile and egg-bearing lobsters when proven during the surveillance. The majority of the fishermen confirmed the statement of the local fisheries officers. They claimed that the local police arrested the rule violators and put them got in prison for 3 to 6 months. Nonetheless, there was no surveillance and sanctions for the illegal buyers of the crustacean species in practice.

It was unclear what types of sanctions for illegal purchase of lobsters and swimming crabs in bulk. These buyers

continued to purchase and process crustacean species in all sizes from fishermen.

Confiscation of illegal lobsters

Many fishermen mentioned that one fisherman in the village had had juvenile lobsters. He spent 3 months in jail for possessing the juvenile crustaceans. The local fisheries department and the local police officers confiscated the poached juvenile lobsters before they were exported to Vietnam for lobster farms. The effort to confiscate and seize the lobster took place at the airport.

Investigating the evidence of the poached juvenile lobsters was arduous. Many illegal fishermen hide their poached juvenile lobsters in mineral water bottles. The police played a vital role in seizing the violators and confiscating the poached juvenile lobsters. During the research, the observation did not find any cases of juvenile lobster confiscation. The intermediaries kept their undersized lobsters in a designated water tank before illegally selling the lobsters to the importers.

The journey of crustacean species from fishermen’s hands to the plate of seafood customers

Although the crustacean journey was all starting from fishermen’s hands, each of the crustacean species made a supply chain of its own in the following stages. After fishermen collected swimming crabs from the gillnets, fishermen sold directly to swimming crab–processing mini-plants. Alternatively, for fishermen living away from Muncar, they traded their swimming crabs to local intermediaries. In either way, swimming crabs reached to swimming crab–processing mini-plants in Muncar. From there, swimming crabs continued to travel overseas through exporters in Surabaya. Ultimately, the swimming crabs arrived at the American seafood market. In so doing, swimming crabs attained at the plate of seafood customers. (See Fig. 3 for the illustration of the supply chain).

The supply chain of lobsters was different from that of the swimming crabs. The best known in lobsters was that the size of lobsters determined the trade destination of the lobsters. Indeed, juvenile lobsters generally traveled from fishermen’s

Fig. 3 The generalized supply chain of crustacean species in Banyuwangi

hands to as far as lobster cage farms in Vietnam. However, some local lobster farms also made a demand for juvenile lobsters from the local intermediaries. Nonetheless, such international seafood trade was not for adult lobsters. The adult lobsters had domestic seafood trades in Bali and Jakarta. To supply adult lobsters incessantly for the domestic seafood market, the local intermediaries already faced hard times owing to the shortages of the adult lobsters in Banyuwangi.

Identification of existing crustacean production and consumption practices

The researcher asked permission to record their answers and activities before conducting the interviews. In this research, their names referred to their professions in quotations for privacy matters. The researcher explained that all the acquired information was only for educational purposes. In doing so, the researcher could convince the practitioners to participate in the research.

The researcher conducted semi-structured interviews and participant observation based on snowball sampling and stakeholder analysis. The semi-structured interviews and participation in the fieldwork occurred from the 1st of September to the 30th of September 2017. After the fieldwork, the researcher continued the interviews through a phone call to add

and clarify the acquired information from the stakeholders. The interviews and observations help to give a clear picture of current fishing, purchasing, and processing. These practices generally contributed to crustacean exploitations in the sea. The role of monitoring and controlling towards illegal fishing was, as well, covered in this research.

In the fieldwork, the research duration varied. The semi-structured interviews ended from one to 2 h for every practitioner, while the observation took up to 3 h, depending on crustacean availability. The more crustaceans the practitioners obtained, the longer the duration for the observation. Identified practitioners became the informants of the research. It consists of various practitioners (see Table 4 below).

The participant observation focused on whether practitioners caught, bought, and processed crustacean species regardless of egg-bearing and juvenile crustaceans. It investigated whether they discarded forbidden swimming crabs or lobsters as a response to follow the catch ban rule. In doing so, the researcher could understand whether the practitioners changed their practices after they understood and were aware of the rule (Table 5).

The observation helped the researcher to verify the information given during the interviews. The interviews tried to distinguish between those knowingly breaking the rule, and those just following traditional practices without paying

Table 4 Research informants and their practices

No.	Types of practitioners	Number (n)	Types of practices
1.	The local fisheries department officer, at regional level	1	Monitoring and controls
2.	The local fisheries department officer, at district	1	Monitoring and controls, and educational campaigns
3.	Fishermen	11	Fishing
4.	Local intermediaries	6	Purchasing
5.	Swimming crab mini-plant owners	2	Purchasing
6.	Female swimming crab processors	5	Processing
7.	Seafood customers	3	Purchasing (eating)
8.	Restaurant chefs	2	Purchasing (cooking)
Total		31	

Table 5 How to observe practices in the fieldwork

No.	Types of Practitioners	Types of Practices	The case study area	Observed activities
1.	Fisherman	Fishing	Badean village	How fishermen caught crustacean species in the sea, whether they released juvenile and egg-bearing crustacean species
2.	Female workers at swimming crab processing mini-plants	Processing	Tambak Rejo	From whom they purchased crustacean species, and whether they processed all crustacean species regardless of juvenile and egg-bearing crustaceans
3.	Intermediaries (e.g., local fish traders and suppliers in Banyuwangi)	Purchasing	Badean Village	How intermediary purchased crustacean species from fishermen. Did they purchased only legally caught crustacean species?

attention to whether the crustaceans they handled were illegal. To accomplish that, the researcher asked some questions regarding the understanding of the catch ban rule. Along with the questions, the researcher also asked why they did not follow the rule.

Findings

The overview of crustacean production and consumption practices

In this section, one will look closely at routinized practices in crustacean production and consumption. In general, the entire production and consumption practice in the crustacean supply chain appeared to have contributed to exploiting crustacean regardless of egg-bearing and juvenile crustaceans. These practices include fishing, purchasing, and processing.

The origin of the illegal fishing

Almost every fisherman in the study mentioned that they worked in the fishery industry because they inherited the fishing skills and the jobs from their fathers. Before the crustacean catch prohibition rule, they learned how to use trawl-fishing gears to capture crustacean species in the sea. A trawl-fishing gear is an active fishing gear that fishermen drag using their boats to sweep the sea bottom habitats. Local fisheries department officers in the district and provincial level claimed that the trawl-fishing gears operations were harmful to marine habitats and crustacean stock in the wild. They entangled every marine species on the seabed habitats, which deteriorate coral reefs and seagrasses (Zuliyati 2018; McConnaughey et al. 2020).

Fisheries for crustacean species in Banyuwangi evolve along with the globalized seafood market. At first, lobsters were the most popular crustacean species in Banyuwangi. Many local intermediaries already supplied lobsters from local fishermen to restaurants in Bali. The lobster selling expansion occurred to the international market after the local

intermediaries learned how to transport lobsters in a long distance. The retailers in Jakarta and Surabaya taught them on how to perform anesthesia to lobsters using low water temperature and *cengkeh* (clove extracts). This technique made their lobsters unconscious for roughly 2 to 4 h. They adjusted the effect duration of the anesthesia technique based on the distance of the trade destinations. In doing so, they could transport the lobsters to retailers in Surabaya and Jakarta, which, to a great extent, the lobsters traveled again to overseas as China and Vietnam. The swimming crabs, however, were not as commercially valuable as lobsters. They were cheap and only for the domestic seafood market. After the swimming crab export market was introduced, it changed the swimming crabs' price and the market destinations.

The introduction of the swimming crab export follows some stages influenced by social connections and economic and human capital. The extended relatives of local intermediaries from Probolinggo had a business visit in Muncar. They already established the swimming crab mini-plants in Probolinggo. The swimming crab-processing mini-plants in Probolinggo has already supplied the processed swimming crab products to American seafood market through retailers in Jakarta and Surabaya. In doing so, they earned better incomes in comparison with selling raw swimming crabs. They shared such a business prospect of processed swimming crab products to the local intermediaries in Muncar. With the market opportunity, the local intermediaries in Muncar became interested in the idea of the processed swimming crab products.

The local intermediaries further invested their money to build the swimming crab mini-plants of their own in Muncar. They asked the owners of the swimming crab-processing mini-plants in Probolinggo to send their skilled female processors. These female processors from Probolinggo trained the wives and daughters of local fishermen in Muncar. After 1 to 2 weeks of training, the local female processor candidates were capable of processing the swimming crabs. From here, the local intermediaries shifted their roles from only purchasing to processing swimming crabs.

The existence of swimming crab-processing mini-plants resulted in economic booms in the crustacean commodities.

The price of swimming crabs had drastically increased, up to 200,000 rupiahs per kilogram. This processing changed the value of the swimming crabs and the incomes of local fishermen. Many fishermen increased their catches for swimming crabs, providing them with a good income for a living. In addition to that, many children in the village then learned how to fish crustacean species in the sea. They left their early educations to help their fathers to catch the crustacean species in the sea. Thus, the entire families of the local fishermen became increasingly dependent on crustacean species, which were essential for their family economy.

The intense fishing pressures exerted on crustacean stock resulted in the decreasing number of crustacean species in the sea. In 2015, the local fishermen experienced the catch drop of lobsters and swimming crabs in Muncar, Badean, and Red Island district. As mentioned earlier in the method, the local fisheries department officers in the district levels responded to this fishing issue through educational campaigns. They started to socialize the catch ban rule and promote the use of gillnets through educational campaigns (see what the educational campaign entails in the method). Unlike the trawl-fishing gears, the gillnet is a passive fishing gear that fishermen deployed and waited until the crustacean species swam and became trapped. The gillnets did not damage the seafloor as the trawl-fishing nets.

Most fishermen in the village shifted the use of trawl-nets to gillnets. They expected to harvest more crustacean species in the sea as they employed, which were described as “environmentally friendly fishing gears,” the gillnets. They urged other fishermen to use the gillnets. This idea was to prevent the benthic habitat deterioration in the hope that the coral reefs, where lobsters and swimming crabs live, stayed healthy so that the crustacean population recovers. However, in practice, the use of gillnets only limited the destruction of the sea bottom habitats

but was not selective and, thus, did not solve issues with the catch of the juvenile and egg-bearing crustacean species.

Along with the gillnet operations, the fishermen in Muncar and Badean used fishing traps to increase the catches of swimming crabs. The type of fishing trap is a box in shape and made from strong wires. According to the fishermen, the fishing traps originally came from Taiwan. The fishermen from Probolinggo introduced the use of the fishing traps to the fishermen in Badean to catch swimming crabs. The local fisheries department officers did not forbid the use of the fishing traps. They considered that only a few numbers of fishermen using the fishing traps in Muncar and Badean village and the fishing traps catch specifically crustacean species. A fishing trap alone is a passive fishing gear. It uses fish as a bait to lure swimming crabs to go inside the fishing trap. They cannot escape from the fishing trap unless its mesh size is bigger than the size of swimming crabs.

Even though the change in fishing gears had radically occurred, the reality was they still suffered from a decreasing number of crustacean catches over time. In the past, they could, regularly, catch on average 200 kg of swimming crabs, for instance. Now it is impossible to harvest the swimming crab to supply the local intermediaries and processors (see Fig. 4 below).

Dealing with the difficulty of acquiring crustacean species, the current generation of the local fishermen faced a poverty trap. They had a low educational background. They only relied on crustacean species to earn money. At the same time, no job alternatives for earning a living were available in the village. Furthermore, the crustacean scarcity resulted in the rising price of the crustacean products, from 100,000 to 200,000 rupiah per kilogram in the intermediaries and processors. Such high price drove the fishermen to catch every last crustacean entangled in gillnets.

Fig. 4 The decreasing number of catches for swimming crabs daily. Note: the data was obtained during the participant observation. The researcher observed the scaling process of the swimming crabs captured by three fishermen. During the interviews, almost all fishermen confirmed that they caught more likely the same number of catches, as shown in the figure

Fishing for earning a living

Fishing is the primary practice, directly removing the crustacean from the sea. Fishermen regularly captured swimming crabs. They generally started deploying the fishing gear(s) at 4 p.m. After deploying the fishing gear in the ocean, the fishermen went home and took a rest. The next morning, the fishermen came to harvest the trapped crustaceans and other fish in the fishing net. The process of the hauling gears took place at 4 am.

Based on the local knowledge, the most abundant crustacean population was in the rainy season, from August to December. Fishermen caught mostly swimming crabs. According to them, they caught more crustaceans in turbid water during the rainy season. The crustaceans could not see gillnets clearly in muddy water. Hence, they were unable to avoid the gillnets.

The use of gillnet allowed fishermen to catch multiple species of crustacean species (crabs, lobsters, shrimps, and swimming crabs), octopus, eels, and fin-fish. They thus provided different streams of income from selling the different species of marine organisms. Meanwhile, other fishermen in other villages combined both fishing traps and gillnets to increase their crustacean production (see in detail for the use of different fishing gears in Table 3).

Each fisherman caught less than 5 kg of crustaceans daily. They obtained only 1.5 kg of swimming crabs per day and 2–3 kg of swimming crabs in the rainy season, for instance. In

previous years, they could catch at least 100 kg of swimming crabs each day. The scarcity of crustaceans forced the fishermen to fish out indiscriminately, including juvenile and egg-bearing crustaceans (Figs. 5 and 6).

Personally, I do not want to discard the egg-bearing crustaceans. Catching the crustaceans has been tough, let alone releasing what I have caught. I think this happens because currently, somehow, crustaceans are very rare in the sea. (Fisher I, personal communication, 2017)

The lack of improvement disillusioned the fishermen after the gillnets were adopted. The fishermen expected that changing the fishing gears might improve coral reefs' health, which may help the crustacean stock recover. However, in practice, even though they adopted gillnets for catching crustacean species, it did not improve the crustacean catch decline condition. In addition to that, the local fisheries department officers always informed that the gillnets were the cure for marine habitat degradations and overfishing due to the previous trawl-fishing gear operations. Little did they know that the fishermen modified the mesh size of the gillnets. As mentioned earlier in the “Methods” section, they recommended using the gillnets with a mesh size of 4.5 to 5 in. This mesh size may increase selectivity, helping fishermen to avoid catching the juvenile crustacean species. Nonetheless, the fishermen initiatively modified the mesh size of gillnets, either 2 or

Fig. 5 The timeline of the event in the wild capture fisheries for crustacean species. Note: the fishing target determines the fishing area. Swimming crabs' fishing area is near shore at the water depth of 50 to 100 m approximately, while the fishing location of fin-fish is offshore

Fig. 6 A Young female crab processors and B swimming crab eggs

3 in. This modification allowed them to capture crustacean species in all sizes, along with other fish and marine species.

Most fishermen in the research complained about the feasibility of the catch ban rule during the interview. They could not pay their costs or feed their families if they took only crustaceans that did not fall under the ban. Furthermore, the ban's different elements were contradictory: if they took only crustaceans over 200 g, per the rules that meant targeting egg-bearing crustaceans, which were also banned. Meanwhile, if they avoided egg-bearing crustaceans, they were left with crustaceans under 200 g.

The unconscious threat of purchasing for crustacean commodities

Three types of intermediaries—crab intermediaries, swimming crab processors, and lobster intermediaries, purchased different species of crustaceans from fishermen. The type and the size of their purchases were mostly dependent on their seafood buyers. Some of these intermediaries were market opportunists. They purchased every species of crustaceans (lobsters, crabs, and swimming crabs) to supply the crustaceans to other business colleagues. This practice appeared to involve a business-to-business relationship with large crustacean intermediaries, local seafood restaurants, swimming crab processors, and retailers.

The crab intermediaries gathered crabs through direct buying from the fishermen. In the transaction, the intermediaries weighed the crabs to determine the price of the crabs for fishermen. During the participant observation, the cost of the crabs was high, about 200,000 rupiah per kilogram. The scarcity of crabs in the local fishing areas resulted in the rising price of crabs in the intermediaries. They purchased crabs in all sizes, including juvenile and egg-bearing crabs. They mentioned that they supplied the juvenile crabs for crab farms in Banyuwangi. The local crab farmers further cultivated the juvenile crabs until the juvenile crabs reached marketable sizes. The price system of crab was

similar to other crustacean commodities such as swimming crabs and lobsters. The price of lobster was the most expensive among the other crustacean species. The lobster price was worth 500,000 rupiahs per kilogram.

Fishermen outside Muncar sold their crustacean commodities to their local seafood intermediaries. After the intermediaries obtained a minimum quantity of crustaceans stored in a designated water tank, they delivered crabs, swimming crabs, and lobsters to the central intermediaries in Muncar, Banyuwangi.

The type of crustacean species determines trade destinations. The local intermediaries supplied juvenile lobsters to the Vietnamese aquaculture. They did not sell the juvenile lobsters to the local farms. The local fisheries department officers at the district level did not allow local lobster farms to operate. This prohibition aimed to cut the cycle of juvenile lobster exploitation from local lobster cultivation activities. This restriction, however, did not apply for crabs. They did not prohibit local intermediaries from purchasing crabs in all sizes because the crabs were for local markets only. They assumed that the local market did not buy crabs as many as the international markets purchased juvenile lobsters and swimming crabs. This assumption convinced them that crabs' local market did not pose as environmentally harmful as the international markets for juvenile lobsters.

Due to the crustacean scarcity, fishermen asked for loans from the local intermediaries. The fishermen used the loans for fishing costs (e.g., fishing gear maintenance cost, and the gasoline cost). In return, fishermen had to pay back the loans by continuously supplying the crustacean species to the loan givers. That said, due to debt, they could not sell their crustacean species to other local intermediaries, even though the crustacean species' prices were different. Their loan givers may purchase crustacean species at a lower price as compared to other local intermediaries. During the interview, one local intermediary did not provide such a loan. However, he knew some local intermediaries in Muncar still used the loan

binding contract to get crustacean species. He was afraid that the fishermen could not pay back the money because the catches of crustacean species in the village were depleting over time.

I had to capture all the swimming crabs, sir. You joined me yesterday, how hard it was to get the swimming crabs. Even if we waited for two hours during our fishing trips, we did not catch any crustacean species. At the same time, I had to pay back my loan given by my bosses (Fishermen II, personal communication, 2017).

The existence of the loans distinguished fishermen into two categories, such as loan free fishermen and loan in debt fishermen. At least, during the interview, five fishermen mentioned that they did not have the loans from the local intermediaries, while two fishermen were still in debt. The loan free fishermen were able to sell the crustacean species to different local intermediaries. They sold the crustaceans to the local intermediaries that purchased their crustaceans at a high price. They explained that the loan binding contract between fishermen and local intermediaries still existed.

The loan binding contract has two sides of the same coin. It helped fishermen to continue fishing crustacean species and earned incomes provided that they caught many crustacean species and fin-fish. Nevertheless, they had to shoulder the burden of paying back the loan if they did not catch enough crustacean species.

Purchasing practice at the intermediary level played a vital role for many other practitioners. The local intermediaries bought crustacean species directly from fishermen. They supplied crustacean commodities to crustacean farms (e.g., crab and lobster farms), seafood restaurants, and swimming crab processors. In general, they disregarded the catch ban regulations as they purchased crustacean species in all sizes. They considered purchasing crabs and lobsters from fishermen meant helping the livelihoods of fishermen and, at the same time, sustaining their businesses for their livings.

The importance of processing for women in the village

The processing mini-plant relied on skilled female laborers to boil, wash, and peel the swimming crabs. The senior female laborers initially learned how to peel and pack the crabs from crab processors in Probolinggo. Now they passed on their crab-processing skills to their female peers in the processing mini-plants. The female processors explained that when swimming crabs were abundant, many local intermediaries switched from purchasing to processing to earn more revenues from the crab business. However, since now the crustaceans were rare, those companies had to put a halt on their business.

Only two remaining processing mini-plant continued actively to produce and export processed swimming crabs in Muncar.

To the women in the village, their crab-processing skills gave high values in their lives. They did not need to move out of the village to have another job to support their families. This opportunity also meant that they could look after their children and husbands. When the crisis of swimming crab scarcity hit their companies, it had some negative consequences on their lives. They could not help their husbands to support the needs of their families. It also became the precursor for a high rate of divorces in the village. Most of their husbands worked as crustacean fishermen. That said when their husbands did not catch swimming crabs for the mini-plants, both the female processors and fishermen became unemployed.

The unemployment eventually forced the women (ex-swimming crab processors) to work abroad. This decision to work outside the village created family conflict and led to divorces.

The swimming crabs processed in the processing mini-plant varied from small to egg-bearing swimming crabs. The carapace width of the small swimming crabs was less than 10 cm; the weight was under 60 g. In comparison, the carapace width of egg-bearing swimming crabs was 15 cm or more with the weight, on average, above 100 g. Many female processors made varieties of swimming crabs products (e.g., colossal, medium, and small swimming crabs) to satisfy the US market. In addition to that, they removed the swimming crabs' eggs to make the swimming crabs salable. After they collected the eggs, the owner of the swimming crab-processing mini-plants sold the eggs to the local restaurants.

In general, they gave special treatment to the big swimming crabs. They separated the big swimming crabs from small swimming crabs. Nevertheless, they processed every single swimming crab regardless of size or egg-bearing status. They peeled all of them quickly. Furthermore, they put the meat of the swimming crabs in the package to later be stored in the freezer before the processed swimming crabs were sent to the retailers.

Daily, we process all size of swimming crabs including egg-bearing swimming crabs and small swimming crabs (female processor I, personal communication, 2017)

Many young women did not have a chance to continue their education due to poverty. In the swimming crab mini-plant, they could learn the processing skills and earn some amount of money to support their lives. It was normal in the village to see young women aged 15 becoming the laborers for the swimming crab mini-plants. The owner of the processing mini-plants recruited women because women were considered hygienic, tidy, and compliant with the company policy (Fig. 7).

Fig. 7 a Female processors b removed eggs of swimming crabs

Discussions

Capability and knowledge in crustacean production and consumption

Fishermen required skills and knowledge to reproduce fishing, purchasing, and processing in crustacean production and consumption. Often the knowledge and the skills went beyond their existence. In fishing, the use of gillnets did not exist in fishing communities before fisheries managers at the district level introduced the fishing gear to fishermen. Fishermen did not only learn about the procedural knowledge on how to operate the gillnets but also the objectives of the gillnet operations. It gave them meaning in saving the sea bottom habitats in the hope that crustacean species recovered. Despite the lack of improvement in their total catches after the adoption of the gillnets, fishermen still routinized the gillnet operations to catch crustacean species in the sea.

The sharing skills and knowledge for improving social practices also took place in local intermediaries and swimming crab-processing mini-plants. Local intermediaries learned how to perform anesthesia techniques using *cengkeh* (clove extract) and low water temperature from the seafood buyers in Jakarta. It allowed them to sell the lobsters to Jakarta and even overseas. The researcher argues that they could obtain such skills because they had access through their seafood trader networks, where they already trusted each other. The trust was built due to daily indirect interactions of selling and buying lobsters. Without the built trust, the local intermediaries did not obtain the anesthesia skills from the buyers.

In processing, the swimming crab mini-plants did not only come with the business objectives but also indirectly women empowerment. They trained women in the village on how to boil, peel, and pack the swimming crabs. The processors in Probolinggo played a vital role in sharing such processing skills with women in the villages. With the processing skills, women in the village became skillful processors and assets of the swimming crab-processing mini-plants.

These capabilities and knowledge in fishing, purchasing, and processing passed on from generation to generation. It gave a new meaning for fishermen, local intermediaries, and processors in the village. According to Spaargaren et al. (2016), practitioners routinized their social practices because they gave them meaning in their lives. There existed diverse meanings in crustacean production and consumption, from protecting the seabed habitat, expanding the business to women empowerment. This entirety led such social practices to be culturally embedded within fishermen, local intermediaries, and processors.

The culturally embedded practices vs. the regulatory intervention

Even though almost every practitioner understood the catch ban rule's objectives, this understanding did not stop them from exploiting crustacean species non-selectively. Each of them normalized their indiscriminate fishing, purchasing, and processing. These culturally embedded practices were both against the rule and causing crustacean stock degradations. Without these practices, nonetheless, the practitioners suffered from economic and social consequences. After the crustacean scarcity hit the fishing activities, fishermen decided to catch every last crustacean species in the sea for their livings. The crustacean species alone determined the continuation of the processing mini-plants in the village. If there were no crustaceans, the processing mini-plants did not operate in the village. That said, women in the village lose swimming crab-processing activities. This job unemployment further ruined their family relationship, which led to divorces.

The catch ban regulation only paid attention to the illegal fishing in the sea without acknowledging “the root of the problems.” The researcher argued that the root of the problems in illegal fishing came from the interdependence of fishing, purchasing, and processing. The set of interdependent practices is that one practice does not exist without another (Spaargaren 2003). On the one hand, the indiscriminate purchasing and processing catalyzed the existence of illegal

fishing in the sea. On the other hand, illegal fishing maintained the existence of purchasing and processing activities. This interdependence constructed the habit of illegal fishing. It formed non-compliant behaviors of fishermen, local intermediaries, and processors.

When the regulatory intervention focused on changing fisheries activities in the sea, the local intermediaries and processors circumvented the rule to obtain crustacean species incessantly. Amid the swimming scarcity, the processors diversified their processed swimming crab products. It allowed them to process diverse sizes and types of swimming crabs. They made use of all swimming crab resources to keep their businesses exist. Not to mention that they removed the eggs of swimming crabs to escape from the rule sanctions. The American seafood market accepted the varieties of processed swimming crab products. Through the crustacean supply chain, the American seafood customers purchased the swimming crab products with, or without, knowingly breaking the Indonesian rule.

From the fishermen's perspective, the processed crab product diversification provided a "practical" way of fishing for fishermen. Fishermen could catch swimming crabs in all sizes to supply processors, without any obligation to discard juvenile and egg-bearing swimming crabs. When complying with the rule, in the sea, fishermen had to measure the sizes of crustacean species. Ideally, they should discard the juvenile and the egg-bearing crustaceans back into the sea. Given that the processors bought swimming crabs in all sizes, fishermen did not carry out all the measurement activities for their captured swimming crabs. In addition to that, fishermen reduced the mesh size of the gillnets to optimize their total catch. The mesh size-reduction enabled fishermen to entangle swimming crabs, fin-fish, and other crustaceans. It gave them benefits in providing food for their families and earning money from the local intermediaries.

The local intermediaries had to invest their money in fisheries to get the supply of crustaceans. The local intermediaries provided binding loans to fishermen. Without the binding loans, fishermen sold their crustaceans to the local intermediaries who purchased their crustaceans at high prices. The binding loans alone meant purchasing crustacean species before they captured the crustaceans. It compensated fishing costs (e.g., gillnets and fishing boats). Often, poor fishermen required the loans to continue fishing crustacean species in the sea.

The existing loans were two sides of the same coin. On the one hand, fishermen could continue harvesting lobsters and crabs regularly. On the other hand, fishermen should pay back the loans to the local intermediaries by supplying crustaceans to local intermediaries to the extent the debt was resolved. Nevertheless, loans free fishermen in the village seemed to catch crustacean non-selectively. In retrospect, fishermen did not change their non-selective fishing into selective fishing

with or without the binding loans. However, the researcher argues that the existence of the loans worsened the current situation. It did not only contribute to crustacean stock overfishing and marine habitat degradations but also led fishermen to fall prey to the so-called poverty trap.

The transboundary problem and political economy for crustacean resources

The illegal fishing problems have transformed into transboundary problems that involve other actors within and beyond the Indonesian territory. Current fishing, purchasing, and processing in Banyuwangi were in favor of illegal fishing. They were the product of the relationship between the local and the global seafood market. One may argue that illegal fishing cannot exist without the demand of crustacean species from America and Vietnam.

The battle between the agenda of sustainable fishing and neoliberalists exists in such illegal crustacean fisheries. The Indonesian Ministry of Fisheries and Marine Affairs aimed to protect crustacean stock biodiversity by imposing the catch ban regulation. On the one hand, they prohibited the catch of egg-bearing and juvenile crustacean species. This regulatory intervention aspired to change current indiscriminate fishing to be (more) sustainable fishing. The American seafood market and Vietnamese lobster farms as neoliberalists, on the other hand, was not in line with the objective of the regulatory interventions. They purchased every crustacean from fishermen and local intermediaries in Banyuwangi. The emergence of such a global seafood market had more influence in determining a way to fish, purchase, and process instead of the existing fishing rule. According to Venugopal (2015), neoliberalists used their purchasing powers to drive poor communities to exploit their natural resources. That is why the researcher mentions the American seafood market and Vietnamese lobster farms as the neoliberalists in the illegal crustacean fisheries issues.

Such a global political economy changes the historical dimension of the social relations of the economy and environment (Kütting 2010). The empirical findings showed that the American seafood market improved the well-being of fishermen, local intermediaries, and processors. Almost every fisherman changed their primary fishing targets from fin-fish to swimming crabs, which resulted in the dwindling amount of swimming crab populations (Hamid, 2015).

The shift in the fishing trends also took place in fishermen whose primary fishing target was adult lobsters. The industrialization of the lobster farms became the precursors of the juvenile lobster fishing trends. They mainly purchased juvenile spiny lobsters (*Panulirus spp.*), which inhabited the Indonesian water area (Syafrizal et al. 2018). In Banyuwangi, this Vietnamese juvenile lobster trading attracted fishermen to catch juvenile lobsters instead of adult

lobsters. According to a previous study conducted by Petrossian et al. (2015), the high price and the accessibility of the juvenile lobster were two key factors causing the high rate of juvenile lobster poaching in Indonesia and worldwide. Underpinning this study, according to fishermen in the Red Islands, juvenile lobster habitats were different from those of the adult lobsters. Juvenile lobsters inhabited the coastal marine water area, while the habitats adult lobsters were in the deep sea.

According to Milton et al. (2014), the different habitats of the adult and juvenile lobsters were due to their life cycles. The juvenile lobsters stayed in their natal habitats, coastal marine waters. After they reached their adult stage, they moved to the deep sea (Setyanto et al. 2019). The researcher argues that catching juvenile lobsters was more practical due to their fishing distance compared to adult lobsters. The practicality of juvenile lobster poaching was both profitable and cost-efficient for fishermen, which prompted them to reproduce these practices daily.

Such juvenile lobster poaching and smuggling issues polarize the Indonesian political leaders' perspectives. According to Scarpello (2020), Susi Pudjiastuti, the former Indonesian Minister of Fisheries and Marine Affairs was against the juvenile lobster exports to Vietnam. If fishermen let juvenile lobsters growing up to be adult lobsters in the wild, the well-grown lobsters gave high revenues for Indonesian fishermen. Meanwhile, Luhut, the Indonesian Coordinating Minister of Economic Affairs, asked Susi to remove the catch ban regulation. He argued that the ban only encouraged people to smuggle juvenile lobsters. Such different views of the catch ban regulation also reflected the perspective of fishermen in Red Island. Fishermen claimed that if they did not catch the juvenile lobsters, the predatory fish preyed on the juvenile lobsters. They believed that the catch ban regulation did not prevent the collapsed crustacean stock from their natural mortalities. Instead, it only impoverished fishermen in Banyuwangi.

By and large, the researcher argues that solving illegal fishing issues requires radical change at every level of actors in crustacean value chains. Even though the government promoted selective fishing, this governmental effort may not terminate the cycle of illegal fishing for crabs, swimming crabs, and lobsters in Banyuwangi, Indonesia. The Indonesian government should engage with the giant private actors, American seafood firms, and Vietnamese lobster farms. Such an engagement may help to build a mutual understanding of crustacean population degradation problems, which in turn, harmed the sustainability of their crustacean business. The collaboration of rule compliance at every level of crustacean value chains may potentially sustain both the crustacean population and businesses.

Conclusion

To conclude, one may now understand that the illegal crustacean fisheries move within and beyond its existence in the sea. Other routinized practices, especially purchasing and processing, in the intermediary level required crustacean species regardless of egg-bearing and juvenile crustaceans. There are three main bottom lines in this paper, as follows:

- 1 Social practice theory helps to analyze the interdependence of purchasing, processing, and fishing in stimulating illegal fishing. It reveals that the existence of the Vietnamese lobster aquaculture and the American seafood market catalyzed the existence of illegal fishing in the sea.
- 2 Even though the set of interdependent practices was illegal, these practices were socially and culturally acceptable in the crustacean value chain.
- 3 When the local government at the district level only paid attention to the issues of illegal fishing in the sea, the existence of purchasing and processing circumvented the rule to exploit crustaceans incessantly.

Ultimately, the researcher acknowledges that poverty also played a role in setting conditions where these social practices were acceptable. That said, the practitioners at every level performed the practices to feed their families on a day-to-day basis.

Future research The research was not able to reveal the role of retailer for crustacean commodities. Thus, future research should investigate the actors in retailing on how they could export and smuggle the forbidden crustacean commodities overseas.

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Compliance with ethical standards

Conflict of interest The author declares that there is no conflict of interest.

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