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Emerging customs: small-scale fishing practices in Aceh, Indonesia

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Abstract

Off the western coast of Sumatra among the islands of Pulau Banyak, fishing is the primary occupation for the men of Haloban. They are self-described “traditional” fishers, using low-tech gear and small boats to catch fish, octopus, lobster, and other sealife in the nearby coral reefs and mangroves. Women also regularly venture out into the deep mud of the mangroves to collect clams. Their efforts to extract livelihoods and subsistence from the reefs take place in an open-access commons with few formal institutions or enforcement mechanisms to regulate resource use. While explicit regulations and customary limitations on fishing in the coral reef commons are lacking, Haloban fishers improvise some common etiquette and practices that are adaptable to the shifting context. This case study presents Haloban fishers' use of the commons as situated practices, unarticulated and embedded within a complex socialecological system. These practices reflect fishers' understanding of, and relationship with, their environment, and may represent a nascent form of local “rules-in-use”, informing behavior without direct social mechanisms for enforcement. This paper presents research collected using ethnographic methods, including participant observation at sea. As NGOs and government agencies work to craft management plans that share use of the reefs with tourism and conservation, a better understanding of actual resource use and fishing practice may inform more nuanced, adaptable, and truly “local” community-based management.

Key Words

Situated practice, Indonesia, common-pool resources, marine commons, fisheries management, emergent institutions

Highlights

- Small-scale fishers in Pulau Banyak, Indonesia use an open-access reef commons
- Fishers exhibit situated practices that influence resource use behaviors
- These may form the basis for emergent institutions for resource management
- Zoning management plans would benefit from incorporating these practices

1. Introduction

Small-scale fishers are increasingly recognized as a critical sector of research in relation to marine resource management (Allison & Ellis, 2001; Berkes, Mahon, McConney, Pollnac, & Pomeroy, 2001). In contrast to commercial enterprises, this sector is generally recognized as those who fish primarily for subsistence and local consumption, employing small boats and low-tech gear (World Fisheries Trust, 2008). Around the world, small-scale fisheries employ over 200 million people, about 90 percent of people involved in all fishing, and are largely from indigenous cultures and marginalized communities in the developing world (FAO, 2014). Managing these diverse, often open-access fisheries remains a formidable challenge to marine resource management practitioners (Andrew et al., 2007) and centralized approaches have largely failed. The promising successes of community-based co-management has brought small-scale fishing communities into the spotlight (Berkes et al., 2001; Cinner et al., 2012; Gutierrez, Hilborn, & Defeo, 2011) and inspired more research into their adaptive approaches.

Using customary tenure and other local and traditional “rules-in-use” as the basis for the management of small-scale fisheries appears to offer the promise of effective, equitable, and culturally-relevant regulation (Berkes, Folke, & Colding, 1998; Johannes, 2002). In application, co-management approaches that seek to integrate local cultural norms into regulation do appear to support greater participation, compliance, and stronger governance in shared property commons (Agrawal, 2008; Bromley et al., 1992; Ostrom et al., 2002). However, regulative behaviors that do not fit expectations about institutions or “traditional” practices may be inadvertently overlooked (Colding & Folke, 2001; Li, 2001). Identifying relevant practices and behaviors that are not explicitly codified into rules and institutions, and understanding how they emerge, remains a challenge for researchers (McCay, 2002).

In this paper, I present a case study from a community in Aceh, Indonesia where fishers in a marine commons with little regulation or enforcement exhibit situated practices that shape their resource use. Inspired by McCay’s (2002) approach emphasizing “situation” and emergent properties, I draw on common-pool resource theory to consider the factors supporting the development of local institutions and the emergence of rules-of-use. I also use the concept of situated practice, developed from situated knowledge theory, to discuss fishers’ actual use of a coral reef commons. As I will explain, their use of the commons is not guided strictly by formal and informal institutions; nor are they wholly opportunistic. Their practices are unarticulated and contextual, emerging within a dynamic, coupled social-ecological environment (Liu, Dietz, Carpenter, & Folke, 2007). With this paper, I hope to contribute a practice-centered approach to the discussion of marine resource management for small-scale fisheries, and suggest these practices and emerging norms may provide a culturally appropriate basis for regulation development. I also encourage a more nuanced examination of actual practices of fishers that avoids assumptions of opportunism in open-access commons.

Following, I will begin with the basis for my theoretical approach and methodology, including the initial research questions. Next, I present a brief description of the

community of Haloban in Aceh, Indonesia, why it was chosen for study, and the social, ecological, and recent historical context. The results section includes data and analysis of the study's findings on fishing practices and local institutions, particularly the emergent, uncodified practices and behaviors of fishers. Finally, a conclusion section considers the relevance of these practices to the commons discussion and offers some brief policy implications.

2. Theoretical Approach: Emerging Traditions

Pulau Banyak, Indonesia is a marine and near-shore commons with access limited by geographic features and a few, poorly-enforced regulations (described in section 4). Such a classically-defined common-pool resource (Ostrom, 1990) is usually distinguished between open access, with no property claims or rights, or closed access: collective property claims and rules of use with mechanisms for enforcement (Agrawal, 2001; Bromley et al., 1992). The difference lies in the presence of social and political agents and institutions with enforcement power, from fines to shaming, to modify behaviors. Although institutions are usually thought of as formal governance, many “rules of the game” (North, 1990) are informal, “created, communicated, and enforced outside of officially sanctioned channels” (Helmke & Levitsky, 2004). For some scholars, informal institutions include social mores such as norms, values, and traditions (Bardhan & Ray, 2008; Glasser, Baitoningsih, Ferese, Neil, & Deswandi, 2010; McCay, 2002). Whether formal or informal, a closed commons has social mechanisms for regulating users' behavior.

Institutions for common-pool resource regulation can be challenging for researchers to recognize, and it is not well understood how and why they emerge. Regulative behaviors are sometimes obscured by expectations for formalized institutions, that they must be legible to outsiders, articulated by insiders, and “legitimized by tradition” (Colding & Folke, 2001; Knudsen, 1995). This perspective is reinforced by rational choice approaches that emphasize conscious decision-making by individuals. There is also poor understanding of how local institutions emerge, or the “key variables” that enable formal and informal institutions to form (Acheson, 2006; Agrawal, 2008; Ostrom et al., 2002). However, if social norms and traditions are the constant collective interpretation of the past to create the future (Glassie, 1995), then understanding how they “emerge” or form within a dynamic social-ecological system must require more focus on situation and context. Scholars have noted that attention to cultural complexity, power, and change are often absent from abstract definitions and expectations of institutions, and analysis benefits from a qualitative approach (Fabinyi, Knudsen, & Segi, 2010; West, 2005).

To understand institutions that may be “invisible” and how they emerge, it seems useful to observe the patterns of behavior and practice that are embedded in the commons, and which may potentially evolve into access controls and “traditions” for management. To accomplish this, I use the concept of situated practice, actions that are “intrinsically dynamic and partially improvised” (Lauer, 2012:183) to focus on the tacit behaviors of fishers. It is based in the growing literature of situated knowledge theory (found in

economic geography, sociology, and anthropology), which casts ‘knowing’ as an iterative process of performance and place rather than a static object (Ibert, 2007; Lave, 1993). ‘Knowing’ and practice are viewed as “reciprocally constitutive” within a “community of practice”, (Orlikowski, 2002:250), each changing the other through the experimentation, reflection, and sharing by actors. Situated practice similarly acknowledges that “rules in use” are not necessarily generated through rational or abstract cognition by individuals. Rather, as a facet of ‘knowing’, they may also emerge through the regular collective performance of actors in association with their gear, environment, and shared stories and histories, while embedded in social-ecological processes (Ingold, 2000; Lauer & Aswani, 2009). This approach encompasses the inventiveness and adaptability of a community of actors that we seek to stimulate and emulate in community-based resource management. While inspired by McCay’s (2002) call for greater incorporation of context and situation in institutional analysis, use of situated practice breaks somewhat with the common focus on rational decision-making. Situated practice is especially relevant to fishers, who engage with a dynamic environment requiring contextualized skill, knowledge, and decision-making that is often co-constructed with habitat and setting (García-Quijano, 2007; Knudsen, 2008) and simultaneously social, spatial, and ecological (Ibert, 2007; Lauer & Aswani, 2009; Pálsson, 1998).

3. Methodology

For this research, I used common-property theory and situated practice as a framework for understanding the actual practices of small-scale fishers. My initial research questions focused on two aspects of the community’s relationship with the environment: 1) how marine resources are actually used in practice, and 2) the existence and application of any regulation to resource use, including formal, informal, or customary forms of environmental management. My research objectives developed from discussions with local community members and the leadership of a conservation NGO, who were pressing the government for ecotourism development and restrictions on fishing. It was clear that they had little information about actual fishing practices, catches, use zones, or behaviors, but were relying on ecological assessments to develop a conservation plan. I hoped to add a social dimension to their understanding and provide a means for community members to engage in the process.

Field research was conducted between late July to early October of 2011 in Haloban using a mixed-methods approach. I conducted a pilot study in Pulau Banyak in 2010 to form the research questions and methods. Haloban was selected because local informants identified it as the “most traditional” community within the islands of Pulau Banyak, heavily reliant on small-scale fishing for livelihoods. A household survey of 92 homes (out of 294) provided quantitative data on the community’s standard of living, consumption, fishing and gleaning activities, and personal perceptions of the environment. The survey employed stratified random sampling, with effort made to include all of Haloban’s identified neighborhoods and outlying settlements.

In addition, I gathered qualitative data using ethnographic methods, including semi-structured interviews with fishers and participant observation on multiple fishing trips

with different independent fishers, totaling over 100 hours at sea in the local coral reef commons. Participating fishers were recruited through key informants' kinship and social networks and chosen to represent varied gear types and techniques. I also observed and participated in mangrove mud gleaning and foraging by women.

Eight semi-structured long interviews were conducted with fishers and complimented with informal interviews and observation. I also conducted two interviews with the *Panglima Laot*, the traditional Acehnese leader for fisheries, each lasting about one hour and recorded with a digital audio recorder. Interviews took place in the fish market dock, local coffee shops, homes, and during excursions at sea. Support and assistance in the field came from three local research assistants with language skills in English, Bahasa Indonesia, and local Haloban dialects (including Nias and Simeulue) as well as many other local leaders and community members. I also conducted interviews with the *Pak Camat* (district official), officials from the office of Marine Affairs in Aceh Singkil, and staff members with an environmental conservation group operating in the region, Yayasan Pulau Banyak.

4. Haloban: a fishing community

The community of Haloban lies on the periphery in every way: geographically, politically, and culturally. It is located on the island of Tuangku, the largest island in an archipelago aptly named Pulau Banyak ("Many Islands", sometimes called the Banyak Islands in English) off the western coast of Sumatra in the Indian Ocean, at 90°3'40"-97°27'58"E longitude and 1°58'25"-2°22'25"N latitude. Recent surveys approximate around 70 islands and additional mangrove stands in shallow waters, although locals count closer to 99 islands. These islands are part of a fringing coral reef, which sustains a rich variety of sealife, including coral and pelagic fish, crustaceans, sea turtles, and more (Venegas & Morales, 2009). Politically, the islands are part of the Regency of Aceh Singkil in the Province of Aceh. The islands shelter several rural villages and small settlements, totaling about 5,000 people from diverse ethnic and linguistic affiliations.

Haloban is an ethnically diverse Muslim community, defined by social and religious affiliation rather than spatial boundaries¹. The village of Haloban and the center of the community lie at the northern end of Tuangku, the largest island in the archipelago. Ringed by mangroves and covered in dense tropical vegetation in the undulating interior, the island's coast was used as a temporary shelter for fishers and traders from Simeulue and Nias who traveled through the area, until a permanent settlement was formed in the nineteenth century, according to local historians (Hasbi, 2011). The newly-created district (*kecamatan*) of Pulau Banyak Barat is administered from Haloban, providing jobs and a new center of political action. Today, Haloban is home to 294 households of diverse ethnic and linguistic backgrounds, who heavily depend on the surrounding environment for their sustenance and livelihoods.

¹ Haloban is a village, one of several villages and settlements on Tuangku. However, the moniker is most commonly used to refer to the larger community, encompassing other nearby Muslim villages and settlements, which are treated as neighborhoods, and distinctive from the Christian villages.

The islands of Pulau Banyak were twice devastated by tsunami events, just months apart: Haloban was first struck by the Indian Ocean Tsunami in December 2004. In March of 2005, an 8.7 earthquake called the Nias Earthquake and centered just 20 kilometers from Haloban struck, shifting coastline and destroying buildings even before a tsunami wave flooded the shoreline (Nalbant, Steacy, Sieh, Natawidjaja, & McCloskey, 2005). The reefs were also affected by a coral bleaching incident that affected much of Sumatra in 2005 (Venegas & Morales, 2009). These events remain physically and emotionally present in the community, where destroyed houses and uplifted coral are ever-present to residents.

In spite of these events, and in spite of frequent bomb fishing on the reefs a decade ago, much of the reef system remains biologically healthy and productive (Venegas & Morales, 2009). The effects of the tsunami and the enabling political environment that followed inspired new efforts for conservation. An environmental NGO (Yayasan Pulau Banyak) has catalyzed government policies and volunteer programs to protect turtle-nesting beaches on the western island of Bangkaru. Recently, the organization supported the development of zoning plans to limit fishing in sensitive areas and designate new zones exclusively for ecotourism and restoration.

4.1 Resource Use

Pulau Banyak's residents utilize the local coral and marine resources for consumption and sale, with no evidence of use for explicitly religious or cultural values. The primary natural resource used is the wide variety of sea life: fish, cephalopods, gastropods, and crustaceans are collected for personal consumption, exchange within the community, and some commercial export. In addition, ecotourism development is ongoing and there are small numbers of foreign tourists who visit the area. The principle livelihood in Haloban is by far small-scale fishing: 80% of male heads of household reported it as their primary occupation. Men employed in other professions, including teachers and farmers, also heavily engage in fishing as a secondary occupation for household consumption. No women reported fishing, however all adult women identified in the household survey described gleaning mud clams in mangroves for food and for local sale. Some clam collection occurs within walking distance of the village, but like fishing areas, the most productive mangroves require boat transportation to reach.

4.2 Fishing Methods and Gear

Fishermen in Haloban use several distinct gear types (Table 1) to collect a wide variety of coral and pelagic fish, octopus, and crustaceans. All Haloban fishermen employ small boats (*perahu* or *kanu*) equipped with 5.5 HP engines operated by solitary fishermen or up to four companions. Most fishers practice multiple methods during their trip and are prepared with a variety of gear types, though each has a specialization and preferred method. Fish are caught with live-baited hook and line, lure, floating nets, and spear guns, while crustaceans, mollusks and cephalopods are captured by hand by free-diving or the use of air compressors. Most of the gear is locally fashioned, including homemade spear guns and lures, although most of the nets in use were provided by relief agencies or

purchased. Use of potassium cyanide (*racun* or *potas*) by divers to stun lobster, octopus, and live catch fish was also acknowledged to occur, though no one self-reported this practice.

Table 1. Fishing Methods Reported by Survey Respondents, n= 66

Line	Lure	Net	Diving	Spear Gun	Compressor diving
34	6	14	24	1	4

Fishers from Haloban travel away from the village to fish and frequent the healthy coral and mangrove habitats within Pulau Banyak, particularly along the southeastern coast of Tuangku and near the islands stretching east of the village. A limited amount of fishing occurs in deeper ocean waters. Fishers were rarely observed fishing from village shores and docks which are used primarily for recreation and mostly by children.

4.3 Regulation of the Commons

The seas and reefs of Pulau Banyak are primarily an open-access, geographically defined commons. There are no legal access restrictions on use by Indonesian nationals, although vessels from outside the district are officially required to register with local authorities. Haloban fishers themselves perceive the area as open access, and while they were very aware and watchful of the occasional visiting vessel, those interviewed were clear that anyone could fish the local area. In practice however, the shallow coral reefs deny entry to larger fishing boats within the islands, minimizing the impacts of outsiders and large commercial vessels. Therefore, while deeper surrounding waters are shared, coral reefs and mangroves are accessed almost exclusively by local residents.

Table 2. Articulated Restrictions on Marine Resource Use

Regulations and social norms	Institutions, Authorities	Penalty	Enforcement
No bomb fishing or coral extraction	Department of Fisheries	Fines and jail time	Department of Fisheries and PL (Limited)
No net fishing near Bangkaru Island, no taking of sea turtle eggs	BKSDA- Aceh (Natural Resource Conservation Agency)	Not specified	Volunteer patrols of rookery beaches by NGO Yayasan Pulau Banyak
Visiting boats must register before fishing	Kecamatan (district office)	To be determined	(Limited)
No fishing on Fridays or religious holidays	Panglima Laot	To be determined	PL (Limited)

Legal restrictions at the national and provincial levels are limited and not well enforced (Table 2). There are no legal restrictions on gear types or resource extraction, apart from prohibitions on coral removal, cyanide poisoning, and bomb-fishing, the penalties for which are posted on signs inside the village. The exception to the lack of formal

restrictions in Pulau Banyak is the island of Bangkaru, the second largest in the area and the farthest west, which is designated a Nature Park (*Taman Wisata Alam*) and monitored by a NGO, Yayasan Pulau Banyak, in partnership with the Nature Resource Conservation Agency of Aceh (BKSDA). The main conservation concern is nesting beaches for endangered green and leatherback turtles (*C. mydas* and *D. coriacea*), and YPB staff and volunteers regularly patrol the beaches to prevent poaching. Although surrounding waters are protected and net fishing near the turtle nesting beaches is prohibited, there are no boat patrols to monitor fishing. Haloban fishers do report making trips to Bangkaru for fishing, particularly for lobster, but infrequently: there is increased risk and day trips are not possible due to distance and rough seas.

A few local customs do limit fishing access, but are again poorly enforced. In Haloban, the only formal social restriction is a prohibition on fishing on Fridays, a day of prayer, and Muslim holy days (*Hari Raya*), such as at the start of Ramadan. The *Panglima Laot*, an Acehnese traditional leadership position for fishing and maritime issues, has responsibility for enforcing these restrictions. Recognized since the 14th century throughout Aceh, the *Panglima Laot* post is filled by vote among the community's fishers (Janssen, 2005) and described as both representing the interests of local fishers to the government as well as enforcing "traditional" regulations and prohibitions. This customary role has now become codified within the provincial government with an organized reporting structure and distinctive territories across the province ("*Panglima Laot Aceh* | Official,"). In some regions, particularly close to the center of government, research shows this customary leadership can provide local voice to issues and support good regulation (Setiawan, Cinner, Sutton, & Mukminin, 2012), but the authority of the *Panglima Laot* is not strong in Haloban.

In contrast, customary systems for land management do exist in the form of *adat* and are active, but are not transferable or reflected in marine settings. *Adat* is a highly adaptive process for conflict resolution and community regulation (Henley & Davidson, 2008; Rodgers Siregar, 1979). The term is used to describe a myriad of indigenous traditions and local customs found across Indonesia, which does not do justice to its diversity and situated nature (Soekanto, 1981). *Adat* can sometimes be obscured by expectations for formality and historical continuity (Li, 2001). The "revival" of *adat* has provided a platform for local and indigenous groups to assert their rights to access and manage natural resources, and it can be molded to provide a space for negotiation between state regulations and community needs (Acciaioli, 2001; Affif & Lowe, 2007; Zerner, 1994). Forms of *adat* have been found in marine settings; for example, *sasi* is a form of customary tenure found in eastern Indonesia which has proven effective in community-based resource management (McLeod, Szuster, & Salm, 2009). Although disputes over land use are subject to *adat* mechanisms and leadership in Haloban, not even the *Panglima Laot* has authority to settle disputes at sea, if they were to occur. This may reflect the heterogeneous origins of the community and the more recent development of social relationships and traditions in a marine environment.

In all, the coral fishing areas of Pulau Banyak represent a predominantly open-access commons with few regulations, institutions, or customary tenure systems to stop

opportunistic overfishing. Yet, in practice, fishers do not necessarily maximize their exploitation of fishing areas. Instead, their situated practices reflected a more complex relationship with the coupled social-ecological environment.

4.4 Unarticulated Practices

Initially, my research questions focused on legal and *adat* practices that would regulate resource use behaviors; however, through participant observation at sea with fishers, other practices which served to modify and restrict fishing activities became evident. Regardless of the fishing method or gear, I regularly observed fishers make choices about fishing locations that were not consistent with an opportunistic approach seeking to maximize their exploitation of resources. I refer to these as unarticulated practices, because they are not proscribed by formal laws, informal rules, or customary *adat* practices that regulate behaviors through mediation or punishment, nor do they seem to be consciously recognized by the fishers themselves. In spite of the limitations they implicitly create for fishers' potential individual success, the practices described here are not shaped by explicit rules, enforcement, or punishment. In particular, behaviors of first-come privileges, self-spacing, and avoidance of repetition were frequently observed in both fishing and mangrove clam collection.

The first example of these unarticulated practices is first-come privileges. When a fisher arrives at an area and finds another boat in the space, they will move to another spot and put substantial distance between themselves and the other boat. When asked, fishers explained that the first to arrive in a spot has priority over that area, regardless of where they are from, how often they fish there, or any other criteria. Mangrove fishers would avoid bays where a boat was already present, and on one occasion the fisher I accompanied opted for an area he reckoned would be less productive (because of the water level) rather than share a bay with another fisher. Accompanying a group of early morning net fishers, we returned to our regular spot to find it occupied by another boat. Although the bay was large, several kilometers long, they chose to move down the shore until the boat was out of sight. First-come rights are discussed in many contexts, but with them are attached informal or formal methods for censoring fishers who do not comply with established norms (Knudsen, 2008). Here, fishers consistently answered that there were no consequences for joining another boat that was already established; it just was not done.

In these instances where a fisher arrives at a preferred spot to find another boat, whether that fisher is from Haloban or not, there is a consistent practice of self-spacing. Fishers leave a contextually determined distance between themselves and other boats, and make adjustments throughout their activities to maintain it. There is no minimal or predetermined distance. When asked about the consequences of fishing near another boat, one fisher answered that it was not a problem to join fishers who have already claimed a spot; a second also told me you *can* join other fishers, but you risk upsetting them. Self-spacing was observed on every trip to sea. It was specifically noted on at least ten different occasions as an ongoing process. On one trip diving for octopus, three boats were visible at a distance but they remained out of earshot, and the fisher I accompanied constantly monitored their position in relation to ours throughout the day. Each time,

there was no direct discussion or verbal negotiation of space. Fishers found a comfortable, regular distance tacitly, with no reference to rules or norms.

Fishers also avoided duplicating fishing efforts in the same space in a single day. On a mangrove trip, the fisher I accompanied arrived in a familiar area to find a friend fishing the same small bay. He asked the other man which areas he had already fished and which direction he was moving around the bay, to be sure that we did not overlap areas. When I asked why, he replied the fish in those areas had already left (*sudah lari*) and it wouldn't be good for us. While net fishing with another group of fishers, we could observe another boat at a distance pulling in their nets heavy with fish. In spite of the fact that we had not been successful that day, we did not move the boat to the same area when they left. One could assume they had fished out the area; still, there is no rule to prevent fishers from attempting to try, and it again seems to contradict ideas of opportunism to avoid productive fishing grounds. Fishers never identified any explicit customary, traditional, or cultural sanctions that would dissuade them from moving into a productive area.

It was also observed that fishers from the different communities and regions of Pulau Banyak exhibited different fishing methods, although not enough data was collected directly with fishers from outside Haloban. Haloban is unique in Pulau Banyak for its exclusive use of small boats for fishing and high dependence on the reefs for livelihoods. Fishers from the two larger villages, Pulau Balai and Ujung Sialit, also use similar boats, but more of their fishing efforts employ large boats with non-related crews for deep water fishing of squid and pelagic fish outside the reefs. With these larger boats, fishers from other villages are targeting different species and utilizing different spaces within the islands, which may also serve as a control on overexploitation.

5. Discussion and Conclusions

Are these seemingly spontaneous behaviors meaningful to management and regulation of a marine commons? I believe they are critical to management, as both the expression of local practices and the potential origin of new institutions and “traditions”. The gradual, informal development of user-rights suggested by Knudsen (1995) reflects the emergent properties of informal institutions in marine settings. Practices developed through fishers' situated knowledge and experience at sea and in their community provide a natural basis for regulation. In fact, ignoring these practices and creating new institutions that potentially conflict with fishers' engagement and understanding of the environment can be dangerous, according to Berkes, because the state's rules can “*undermine local rules to limit access and to regulate behavior*” (Berkes 1992:177, original italics). Yet by their nature these incipient forms of local rules-in-use are not always articulated and therefore difficult to recognize through discourse and institutional analysis, highlighting the importance of “boat-view” observation in researching fishing practices. If local practices are the key to better co-management efforts, embracing their unarticulated, embedded character may help researchers to recognize them and provide more culturally appropriate basis for regulation development.

Recently, a zonification plan developed by Yayasan Pulau Banyak used detailed habitat and biodiversity assessments along with interviews with three fishers from another local community to determine use zones (Morales & Venegas, 2009). This initial plan was recommended to BKSDA Aceh for implementation; however, the developers also acknowledged the need for more information about local fishing practices. As noted in section 4.4, fishers from each community exhibit different fishing methods, and their interviews did not reflect Haloban's resource use. In practice, Haloban fishers depend heavily on many of the areas considered conservation, restoration, and ecotourism zones under the plan: all of the fishing and gleaning excursions I participated in occurred almost exclusively in these areas suggested for restriction. While this plan has not yet been implemented, this research demonstrates that a co-management approach that recognizes and supports the diverse practices and needs of fishers from Haloban and other Pulau Banyak communities would help to minimize negative effects on local livelihood opportunities. It also reveals the benefits of a more nuanced examination of practice and emergent behavior within the social-ecological system.

Overall, this study demonstrates the need for further attention to actual fishing practices that are not always articulated or formalized before community-based management plans are developed and implemented. In this case, participant observation at sea was crucial for identifying behaviors that are not driven by rational choice or cognitively recognized by the actors themselves. In spite of the lack of oversight in an open-access commons, the situated practices of Haloban fishers demonstrate their fishing is not purely opportunistic. Self-spacing, first-come privileges, and other courtesies were observed on every fishing excursion, regardless of a fisher's affiliation, location, timing, or gear. Apart from a few regulations and norms, their behaviors are not guided by specific rules or punishments; they are unarticulated practices that arise in context. These undirected acts may work to avoid conflict and even overuse of a commons, and may become the basis for developing management practices. I suggest that situated practices are a valuable approach for developing resource management, especially in areas that appear open-access but have regular, socially connected users. Focusing attention on actual resource use and practices will help add a layer of complexity to our understanding of emerging regulatory institutions.

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