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Informal governance through patron–client relationships and destructive fishing in Spermonde Archipelago, Indonesia

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Abstract Efforts to preserve fragile ecosystems that focus on removing human intervention from the environment risk ignoring the political and social systems underlying environmentally destructive economic activities. In contrast, a biocultural diversity perspective allows for environmental protection to be approached with sensitivity to human needs. This paper explores the case of Karanrang Island, Spermonde Archipelago, South Sulawesi, Indonesia, where fishing with toxins and bombs is proving detrimental to fish stocks and the surrounding coral reefs. Interviews with Karanrang fishers reveal that these destructive fishing practices are bound up with the region's *punggawa-sawi* political and social system of patron–client relationships. The paper shows how the informal governance operating through these patron–client relationships traps fishers into destructive fishing practices. It is argued that environmental protection efforts should take into account political and social contexts.

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Introduction

This paper discusses the intersection between an informal governance system and environmental protection in a small Indonesian fishing community. Through an examination of the case of Karanrang Island, Indonesia, we will draw conclusions on the how local politics and society can affect attempts to protect the environment.

Recent research has placed focus on the importance of biocultural diversity – that is, on the links between biological diversity and cultural diversity “in landscapes where traditional livelihoods, and ultimately human survival, are based on natural resources” (Hong, 2013). This recognition of the role of people in the environment and *vice versa* presents a remedy to the ‘classic’ environmental conservation approach of seeking to remove humans from the environment. By seeking to bypass the tension that can exist between local human and environmental needs (see, for example, Hayward and Mosse, 2012), this latter approach risks privileging the metropolitan and urban experience at the expense of rural and peripheral society. ‘Classic’ approaches to conservation also

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posit an ideal state for the ecosystem absent human intervention, which – though perhaps partially achievable at an ultra-local scale – ignores the wider flows of capital, labour, power, and pollution that threaten the sustainability of even the best cordoned-off nature reserves and marine protection areas. There is, furthermore, considerable evidence that, besides being ethically questionable, environmental conservation tactics that do not seek to engage with affected human communities are often exercises in failure (Szuster and Albasri, 2010). Even when an environmental conservation project is successful, failure to take local cultural values into account can risk the sustainability of the environmental protection measure itself as the local society comes under pressure due its exclusion from traditional human-environment practices and interactions (Okano and Matsuda, 2013).

A focus on legalistic solutions to environmental conservation may fail to effectively protect the ecosystem in question if they ignore the root causes of the unsustainable human behaviour. Bioculturally sensitive conservation strategies that take a “holistic” approach to environmental protection (Makhzoumi et al., 2012) may have better success in safeguarding both environmental and human needs. Along these lines, the present paper explores the case of Karanrang Island in the Spermonde Archipelago, South Sulawesi, Indonesia, where action is necessary to preserve a coral reef ecosystem – which forms the bedrock of the local economy – from the detrimental effects of human activity but where legalistic conservation tactics are proving ineffective. We will highlight how patron–client relationships have created a local system of informal governance that encourages destructive fishing practices.

Environmentally unsustainable practices represent an immediate economic threat to communities that are directly dependent on exploitation of local natural resources. We shall argue, however, that policies focused on combatting unsustainable natural resource exploitation by local communities may miss the point, for such practices are tied up with wider political, social, and economic realities.

Environment and economy of the Spermonde Archipelago, Indonesia

Indonesia is the world’s largest and most populous archipelago. The country’s tropical location, long coastline (81,000 km), and massive marine territory (5.8 million km²) result in Indonesian waters possessing a spectacular level of marine biodiversity, which can be said to represent an inherent environmental good. Expanses of mangrove forest in Indonesia’s coastal waters serve as natural breakwaters and help protect the land from the onslaught of waves, lessening erosion. The mangrove forests also protect coral reefs by filtering and neutralising toxic chemicals from shore before they reach the oceanic ecosystem.

Indonesia is highly dependent on its marine economy. Besides an increasing reliance on fish and shrimp farming (mariculture), which have proved destructive to the mangrove forests over recent decades, the country possesses a substantial offshore fishing industry. Together, mariculture and fishing help fuel Indonesia’s wider economy by generating foreign exchange through exports. Farmed fish and shrimp are exported for foreign consumption, and the reefs themselves are a major source of live food fish and ornamental aquarium fish globally. The health of the mangrove and coral reef ecosys-

tems is thus of direct importance to the country’s economy as a whole, even disregarding their intangible environmental value or their value to the economy’s secondary sector.

Fishing also plays a vital role in the local context, being the major source of employment and food for local consumption in many of Indonesia’s coastal communities. Around 60% of Indonesia’s population lives and works near the coast. Indonesia’s coastal settlements are economically and socially vulnerable, with high population densities placing pressure on local ecosystems and contributing to poor health due to limited access to clean water, sanitation, and health facilities. In addition, most people in coastal areas are vulnerable to floods and storms. Even the level of education in coastal areas is lower than that in inland areas as a whole.

These problems are exacerbated in the case of rural or peripheral coastal communities. In a large archipelagic state like Indonesia, many such communities are located a considerable distance from and possess difficult access to major population centres, resulting in local economies that are dependent on very narrow import and export streams and are thus highly vulnerable to the vagaries of external supply and demand.

This is evident in the case of the island of Karanrang (population around 2960), located in the Spermonde Archipelago (population around 100,000) off the coast of Sulawesi Island. The majority of Karanrang Islanders are of Bugis-Makassar ethnicity and speak the Makassar language. Karanrang can be reached by a 2–3 h motor boat trip from port city of Makassar, capital of the South Sulawesi province. Makassar is the largest city of Sulawesi Island, with a population of over 1.3 million, and there is a sense in which its size exacerbates Karanrang’s isolation, for from the perspective of a Makassar resident, Karanrang is a place of very little importance. As part of the Pangkep District, Karanrang is administered by a municipal government based on the South Sulawesi mainland, but some police officers and minor government officials are also resident on the island of Barrang Lompo, around 22 km from Karanrang. Karanrang is thus in a position of multiple peripherality, affected by the complex dynamics of archipelagic travel and transport (see, for example, Grydehøj and Hayward, 2014; Spilanis et al., 2012).

Destructive fishing practices in Spermonde

Indonesia has genuine problems enforcing its fishery zone, and there is significant illegal fishing by foreign-flagged vessels. The present article, however, focuses on illegal fishing carried out by Spermonde islanders themselves.

Spermonde’s coral reef ecosystem is threatened not just by ‘overfishing’ in an abstract sense but also by particular destructive fishing practices: the use of toxins (potassium cyanide) and bombs that destroy marine life.

The use of explosives (blast fishing) has a long history in Indonesia, dating back to at least World War II, when fishers were taught the technique by Japanese soldiers. However, the actual technology involved in blast fishing has changed over the years, shifting from dynamite to industrial explosives to fertiliser-and-kerosene bombs (Pet-Soede and Erdmann, 1998a, pp. 4–5). Blast fishing has the advantage of saving considerably on labour. Bombs are, however, dangerous to the fishers themselves, resulting in frequent physical injuries. They are also expensive: In their 1997 study, Pet-Soede and

Erdmann (1998a, p. 7) find that small-scale fishers can spend over half of their income on the purchase of explosives.

Toxins are used primarily for ornamental fish and for catching live food fish for export, such as grouper and humphead wrasse. Potassium cyanide is squirted at fish in order to stun them and allow for easy collection. The export of live reef fish for food emerged as a major industry with the development of the Hong Kong market in the 1960s (Glaser and Glaser, 2011). Fishing with toxins dates from the mid-1980s, when it was introduced to the area by fishers on Hong Kong and Taiwanese boats (Prasetyamartati, 2006, p. 9). Indonesia's fishing export industry is centuries old and has long resulted in differential valuations and targeting of specific species. Even today, new species become targeted as a result of international demand (Schwerdtner Máñez and Paragay, 2013). However, the advent of the (food and ornamental) live reef fish export market has strongly incentivised the use of toxins (Pet-Soede and Erdmann, 1998).

Both blast fishing and use of toxins are environmentally problematic because they affect more than just the target catches. Use of explosives is indiscriminately lethal to fish, coral, and unshelled invertebrates while use of toxins can be fatal for both adult and juvenile fish, coral, and other invertebrates (Frey and Berkes, 2014; Fox and Caldwell, 2006). As a result, reef habitats have been degraded and destroyed, and there have been significant reductions in the overall availability of fish for export. Other types of illegal fishing involve the use of equipment that does not conform to regulations (for example, nets with too small a mesh) and violations of site-specific trawling bans. Such methods have resulted in a decrease in the size of fish targeted for fishing.

Preventing or at least reducing destructive fishing around Karanrang is necessary if the local ecosystem – and thus the local fishing culture and economy – is to be preserved. Attempts have been made to empower community members by encouraging them to participate directly in fisheries policy and raise awareness that management of marine resources is not just about maximising catches but also about optimising utilisation of these resources to balance economic and environmental needs. This work has highlighted the extent to which local societal structures are implicated in destructive fishing.

Research methodology

In order to assess the dynamics of the local fishing industry, a research team from *Institut Pemerintahan Dalam Negeri* undertook ethnographic fieldwork in Spermonde in 2010, with follow-up observation in 2011, 2012, and 2013. The ethnographic fieldwork included small-group interviews with 229 fishers on Karanrang. The fishers attended these informal interviews, held in the village office, during their spare time and were provided with snacks and meals, depending on the time of the interview. Respondents were asked questions about the Indonesian government's social welfare programme and its programme aimed at minimising the practice of blast fishing. Because blast fishing is illegal and is known to be especially prevalent around Karanrang, special precautions were taken both to protect the fishers and to ensure the accuracy of the collected data: Fishers were not asked directly whether they engaged in destructive fishing practices, and data was instead acquired through a relaxed, informal conversation. The researchers also spoke with the village head.

Structure of the Karanrang fishing industry

In order to clarify the structure of the Karanrang fishing industry, it is important to recognise the range of actors involved in it. We can divide these into direct and indirect actors (for a more detailed examination of Spermonde fishing actors, see Radjawali, 2012).

Direct actors

Direct actors can be broadly classified into two categories: (1) onshore owners of fishing businesses, infrastructure, land, housing, and equipment (hereafter, *Owners*) and (2) individuals who participate in fishing activities aboard the boats (*Fishers*).

Indirect actors

Indirect actors consist of: (1) investors who fund operations and are often based in Makassar (*Investors*), (2) buyers who purchase the catch and export it overseas and are often based in Jakarta (*Buyers*), (3) suppliers of equipment and materials (*Suppliers*), (4) police officers based on Ballang Lompo (*Police*), and (5) and public officials involved in fishing activities and based on Barrang Lompo and mainland Sulawesi Island (*Officials*).

These various actors are involved in the so-called *punggawa-sawi* system of patron–client relationships, which ultimately represents a system of informal governance in the region. That is to say, although Karanrang and the other Spermonde islands are formally integrated into the Indonesian governmental system, much of the actual social, economic, and political activity that takes place here is guided by actors operating outside of this formal system. This is in part due to the strength of the *punggawa-sawi* system itself and in part due to the dysfunctionality of the state's formal system of fisheries regulation (Ferse et al., 2012a, pp. 537–540).

Fishers are reliant on Owners not only for their land and housing but also for materials and assets (onshore facilities, boats, equipment, etc.) that are necessary for undertaking fishing operations. Owners are also responsible for the safety and security of the Fishers and their families. Owners thus take on a degree of financial risk. The Fishers on a boat are responsible for distributing their catch among themselves – and then paying their Owner in fish for use of facilities, boats, equipment, materials, housing, land, etc.

Since, in their relationship with Fishers, it is the Owners who set the prices for buying (fish), selling (materials), and renting (assets), they have a financial incentive to balance prices in such a way as to keep Fishers indebted to them. It is thus that, in our research, many Fishers reported a constant need to borrow money from their Owners, especially when, during poor weather, the Fishers are stuck onshore. As Radjawali (2012: 595) notes, when the weather improves, and Fishers are able to resume work, they find it necessary to accept low prices from the Owners in order to repay their debts. The result is a power imbalance, with Fishers trapped in debt to Owners and unable to break the cycle of coerced labour or veritable debt slavery (Prasetyamartati, 2006, pp. 12–13; Pelras, 2000). This is not to say that the Fishers are necessarily desperately impoverished (Pet-Soede and Erdmann,

1998b, p. 33) or that the Owners do not offer them financial security and other positives (Glaeser and Glaser, 2011; Ferse et al., 2012b), only that Fishers possess limited practical ability to change livelihoods or turn to fishing techniques not supported by Owners.

Of course, an Owner's ability to make a profit from fishing operations is dependent on his own ability to sell fish at a good price. Owners who run small-scale operations sell the catch to small Buyers, i.e. middlemen who subsequently sell on to collectors or wholesalers. An Owner who wishes to benefit from improved economies of scale and to skip the middlemen by selling directly to larger Buyers needs to raise the necessary additional capital for running a larger operation. This requires the assistance of Investors, who are themselves paid in fish.

Karanrang Islanders are Muslims, and most of its Fishers are married men. They engage primarily in the following fishing activities: angling, sea cucumber harvesting, fishing with toxins, and blast fishing. Of these, angling stands out for not requiring a great level of technological sophistication. It is usually carried out by Fishers who have little access to capital and cannot afford to buy or are unable to rent a motor boat. Instead, such Fishers go out in small non-motorised boats and undertake line fishing around the island, at the edge of the reef. They mainly target pelagic fish, such as snapper, kite, coral trout, and grouper but sometimes also fish for squid by night.

In contrast, the other dominant fishing methods require resources that must be sourced from off of the island and are thus relatively capital intensive. For instance, the harvesting of sea cucumbers involves going out in motor boats to deeper waters (20–30 m) and using scuba gear (air tanks, masks, and fins). Like angling, sea cucumber harvesting is not inherently unsustainable: If appropriate numbers of animals are taken, such fishing need not be incompatible with environmental conservation.

The same is not true for fishing with toxins and bombs. Fishing with toxins offers the potential for high financial gain, but it also requires expensive technology inasmuch as, besides the necessity of paying for a motor boat and scuba gear, one must also acquire the potassium cyanide itself. This is also the case with blast fishing, which requires a motor boat, masks, bomb materials, and sometimes scuba gear. Three or four Fishers go out in a motor boat and – after gauging the number of fish in the water through a mask – set off bombs underwater. The subsequent explosions stun or kill fish in the vicinity, and a number of these fish then float to the surface for easy collection. In light weather conditions, blast fishing is undertaken quite far offshore to the east of the island, but in heavier weather, it is undertaken close to shore to the west of the island. Fishers use bombs either on their own or alongside other equipment. Explosives are usually placed in jerry cans or similar containers, resulting in bombs that allow for easy collection of the catch. Some Fishers use bombs only in situations when these are more productive than legal equipment such as traps, trolling lines, extended lines, trawl nets, and seines. Large-scale fishing operations make use of further assistive equipment, such as basic scuba gear while small-scale Fishers simply dive with masks when collecting fish following a blast.

Fishers who engage in destructive fishing practices typically spend the morning 10–11 km offshore and return home in the afternoon. Fishing with toxins and bombs around the island

has taken place for decades, as is evident from the deteriorated condition of the reef ecosystem. As a result, Fishers have moved increasingly farther offshore.

Of the 229 Karanrang fishers who took part in this study, 194 (65%) use bombs and/or toxins in their fishing. Of these, 133 (69%) use bombs, 52 (27%) use toxins, and 9 (5%) use both bombs and toxins. Further data obtained from the 133 respondents who use bombs shows that approximately 44% of this destructive fishing takes place far offshore, 43% takes place directly above the coral reefs, and 4% takes place near shore. A further 9% of the fishing takes place at the outer edge of the reef or on the open water.

Much destructive fishing takes place on or near the reefs because these are home to the most economically valuable fish and because the relatively weak water flow makes it easier to collect one's catch using nets. Fishing in the non-reef areas is dominated by line fishing. Respondents also report that Karanrang fishing practices are seasonally conditioned (see also Radjawali, 2012, p. 550). During the season dominated by a west wind, use of explosives is concentrated in the vicinity of the central Spermonde islands, while during the season dominated by the east wind, explosives are more often used in the more peripheral islands in the archipelago (about a four-hour boat trip for most fishers).

Given Karanrang's peripheral location, it is necessary to import many supplies not only for fishing in general (such as motor boats, nets, line, fuel, and scuba gear) but also for destructive fishing in particular (such as potassium cyanide, fertiliser, detonators, and fuses). Karanrang respondents admit to constructing their own bombs, but potentially due to the illegal nature of destructive fishing, they are reluctant to reveal their direct source of potassium cyanide and bomb materials. However, respondents from other Spermonde island communities assert that Fishers on Karanrang receive these materials from their Owners and that the Owners in turn source these materials from Suppliers at Paotere Harbour in Makassar. Of the 133 Karanrang Fisher respondents who use explosives, 79 (59%) state that the explosives they use come primarily from specialised traders who have a close relationship with the Investors. A number of respondents implicate local Police in the distribution of explosives.

Of course, the complete distribution network of Suppliers is very wide, extending from those who produce component materials abroad to inter-regional brokers to direct traders on the island. Since use of explosives and toxins in this manner is banned by the government, local Suppliers use a variety of methods to shield themselves from scrutiny, for instance by working with Investors in the distribution of the illegal materials. In order to protect their investments, Investors sometimes lobby Officials and deal with the Police in the event that the direct actors' operations run into barriers. There are indications that corrupt Officials cooperate with Fishers who use explosives and that some local Police fail to take action against Fishers who break the law. Some Fishers complain of police officers collecting illegal 'taxes' at the fishing dock on the mainland or during surprise visits to Fishers' homes. Although such activity by Police and Officials is clearly illegal, it is part of a "prosecution insurance network" (Radjawali, 2012, pp. 553–555) that ultimately protects Fishers, Owners, Investors, and Buyers from prosecution. The strength of this network of actors allows it to function as an alternative – and indeed, dominant – governance system.

These findings echo those previously reported by [Lowe \(2002\)](#) from elsewhere in Sulawesi: Live fish export businesses (Buyers) provide Fishers with cyanide and equipment free of charge, encouraging Fishers to become indebted to motor boat providers (Owners) and dependent upon the (often-purchasable) goodwill of Police and Officials. Generally speaking:

Poor fishers are the first to suffer penalties and to assume the greatest risks in live fishing, and they are also excluded from the highest live fish profits and from protection from prosecution. Rules as they are enforced within the entrepreneurial Indonesian bureaucracy tend to enrich bureaucrats and traders while failing to protect either species or citizens ([Lowe, 2002, pp. 14–15](#)).

Because of their own ability to set prices for fish, to control distribution of supplies, to influence law enforcement, and to turn the flow of capital on or off, Investors are themselves patrons to the Owners within the *punggawa-sawi* system.

Drivers of destructive fishing

Destructive fishing is difficult to prevent for a variety of reasons. Since destructive fishing is illegal on account of its environmental impact, government preventative efforts have traditionally rested on public environmental awareness and law enforcement. Environmental awareness is indeed a major issue inasmuch as many fishers lack an understanding as to why destructive fishing methods are problematic in practice. Among the research's 229 respondents, 12% never completed primary school, 77% possess primary school educations, and the remainder have post-primary educations. There is a positive correlation between lack of education and lack of awareness of the importance of environmental conservation. A common perception of marine resources among the fishers is that 'The number of fish in the sea will run out once the trees on land have run out of leaves' – i.e. never. With this mindset, it is little wonder that concepts of sustainable development have difficulty gaining traction.

That said, the negative impacts of destructive fishing practices are increasingly recognised locally. In the words of one *Karanrang* Fisher, "We know the impact of fishing and bombs. Actually, many of our friends have lost their arms when a bomb has exploded before it was thrown. We also know the environmental impact, such as the destruction of coral reefs, but because of our economy, we need to keep catching fish by using bombs and stunning."

Given that the use of bombs and toxins is illegal, continued destructive fishing is only possible when combined with weak or uneven law enforcement. The data collected for this study suggests that just 10% of police cases involving destructive fishing in *Spermonde* make it to court. It is regarded as common knowledge that the local Police are engaged in a culture of corruption and collusion, which causes them to protect destructive fishing activities.

The informal governance system rooted in the *punggawa-sawi* system drives such corruption and collusion by subverting formal governmental structures of authority: The needs of the patrons are elevated above those of the law. When viewed from the perspective of this informal governance system, the absence of rule of law is positive for the Fishers themselves: Given the debt incurred by Fishers to Owners, many Fishers

could not fish profitably using legal methods. As one Fisher puts it, "Using toxins and bombs, we can easily catch reef fish of high economic value and ornamental fish without it taking a long time to get the fish. This is how we can make money sufficient for our daily lives in the not-too-distant future." In other words, the legal (and less environmentally destructive) nets that are currently available to local Fishers cannot ensure large enough catches to cover the Fishers's expenses. There is a vicious circle involved here: Foreign and domestic demand is increasing, leading to increasing prices, at the same time as destructive fishing is reducing fish populations, causing catches to decrease. This further incentivises maximising catches by fishing destructively while simultaneously disincentivising legal fishing, which becomes increasingly difficult to carry out successfully as fish populations decline.

Conclusion

Spermonde fishers have begun to realise that their catches have been declining, though this is popularly attributed not only to fishing with bombs and toxins but also to other unsustainable fishing practices, such as the use of fine-mesh nets. Although the *Karanrang* Fishers are aware that destructive fishing is illegal, they argued until recently that fishing with bombs and toxins provided fast, efficient, and practical yields. Furthermore, the lack of alternative employment in the archipelago and the economic demands placed on the Fishers as a result of their continual indebtedness to Owners and Investors drives them to focus on the short-term maximisation of catches. Evidence from other research ([Prasetyamartati, 2006, p. 18](#)) suggests that even though many Fishers who do not use explosives or toxins are aware of the destructive nature of these methods, because these tend to small, independent Fishers, they have difficulty effectively opposing or protesting against the use of destructive methods by more organised fishing operations. Such organised fishing operations are protected through their embeddedness in the *punggawa-sawi* system and its role as a system of informal governance.

The government of Indonesia feels that the *Spermonde* Archipelago's marine resources should be used for the benefit of society, with an aim toward sustainability and environmental preservation. Prevention of destructive fishing practices should be grounded in the rule of law, and law enforcement should be taken seriously. But how can the rule of law be maintained when the societal and economic cards are stacked against it? A number of government programmes to increase environmental protection exist. For instance, in some regions, capital, equipment, and medical and housing support are provided to small-scale operators. Public attention has been captured by the introduction of free educational programmes from the primary to upper-secondary levels. One programme specifically aimed at Fishers has involved the introduction of seaweed farming as an alternative livelihood. The cultivation of seaweed could prove even more profitable than fishing with explosives. The fact that seaweed can be killed by the toxins used for fishing has the potential to drive home to Fishers the negative impacts of such destructive fishing. As a result, many Fishers have stopped using destructive fishing techniques and have, indeed, become environmental activists.

These Indonesian government initiatives represent attempts to get to grips with the underlying causes of environmentally

unsustainable economic activities and thus a recognition of the links between environment and culture. It remains to be seen whether such efforts will succeed in empowering communities such as that on Karanrang and allowing them to ‘make the most of smallness’ and sustainably exploit the community capacity advantages that come from small island status (Grydehøj, 2011).

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