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Conservation amidst Shifting Sands in India's Marine Fisheries

*Divya Karnad**

Every day along India's coast, boats are readied, nets and lines expertly folded, and people shout back and forth before they set off to fish. Fishing is one of India's oldest livelihoods, dating back to the Stone Age (Murty 1981). Stability is not a hallmark of marine fishing. A fisherman has to be adaptable, modifying his techniques based on wind, weather, currents and the type of fish. This characteristic adaptability has allowed the Indian marine fishing industry to transform. How this affects the lives of marine fishers who perceive their livelihood as traditional has important consequences for the exploitation of the fishery. A tide has turned in the Indian Ocean.

Across the globe, fishing is discussed within the categories of biological and economic sustainability, but in India—as in other countries with fishing communities—fishing means a lot more. Fishing creates a sense of place (Relph 1976) and provides identity. The poetry of the Sangam period (300 BCE–CE 300) of Tamil literature reflects this sense of place, describing the coast with imagery of people with nets and boats on beaches, wetlands, estuaries and mangroves. The loss of this 'place' is characterised

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Image 2.1: Beach landing vessels, as seen in the foreground, are the mainstay of small-scale fishermen, who are often called 'traditional fishermen', but as more fishermen switch to small, mechanised vessels, as seen in the background, the meaning of 'traditional' is expanding.

Source: Divya Karnad, 2014.

by the loss of relationships between people that allowed such places to exist. Relationships in fishing communities are a feature that set them apart. While most Indians will identify first with caste and class, fisher folk's occupational identity in some cases supersedes their caste or class affiliations (Bavinck 2001). This strange inter-caste and sometimes inter-religious tolerance of migratory fishers and acceptance of participation by people from 'non-fishing' castes has allowed fishers to be spoken of as a single entity (Bavinck 2001).

Echoes of this perception of marine fisher folk as a unified 'other' occur in the colonial era (Madras Fisheries Bureau 1915). The secretary to Sir Frederick Nicholson, the first Madras Fisheries Bureau honorary director, was V. Govindan, a 'native authority' who formulated policies related to 'natives' for the British government. He was instrumental in establishing the idea, within the bureaucracy, that fishers were culturally distinct from agriculturalists and were in need of social uplift (Subramanian 2009). This association between being a fisherman and being

culturally backward fed into the identity of being 'traditional'. To be clear, the term 'traditional' is not used here in its popular connotation of primitive, isolated, ritualistic cultures, but is understood to be socially constructed to serve a purpose (for more on social construction, see Demeritt 2002; Gerber 1997).

Despite debate surrounding its usage, the term 'traditional' is retained in this chapter due to its use by fishers to self-identify. Even as technological changes swept the Indian fisheries during and after the 1970s, many fishers continued to identify themselves as 'traditional' (Sundar 2011). The politics of identity have also had an important role to play in postcolonial regional and national politics (Chatterjee 1997). For instance, fishers of Tamil Nadu leveraged their backward identity to become an important vote bank during the formation of the All India Anna Dravida Munnetra Kazhagam (AIADMK), a major political party in Tamil Nadu (Bavinck 2001). However, even while non-fishers have continued to essentialise the definition of a 'fisherman', important distinctions have emerged within fishing societies.

Key to these distinctions is the identification of 'traditional'. Dragging its net across the sea floor, a boat is tossed by stomach-churning waves off the coast of Puducherry. This is a typical bottom-trawling vessel. On-board, a crew of six, all from the same coastal village and whose families have fished for generations, introduce me to their friend who has given up fishing. Taking in the sea breeze that is whipping his hair, he says:

> I really miss being at sea, but it gets too difficult with no security, no safety. There were times when I could catch a hundred thousand fish but other times I only had enough to cook at home. With no safety equipment on board, there was no guarantee that I would ever come home. I may now earn less than a fisherman from being an electrician, but at least it's a steady, safe income.[1]

This statement represents a critical shift in thinking. If a clear boundary line has to be drawn between 'traditional' and non-

traditional marine fishers, it is in the division caused by this shift in thinking amongst traditional fishers. In contrast to viewing fishing as an unpredictable and unsafe occupation, a gill-net fisherman from Maharashtra says, 'This is who I am; I am a fisherman, just like my father and his father before him. If you take that away from me, what am I left with? I can call myself a painter or a plumber, but what I really know, are the secrets of fishing.'[2] The clear distinction between 'traditional' and non-traditional marine fishers is not one that is visible on the surface. Rather than being a question of economic class, technology and industrialisation, the difference lies in a fisher's approach to marine ecosystems, a commitment to fishing and the sea.

IDENTITY AS COMMITMENT

Hames (1987) examined the linkages between traditional (meant here in the popular sense) societies and conservation ethics. He found little evidence to support the sweeping and popular generalisation that traditional cultures were in tune with conservation. However, a re-examination of his data suggests that traditional societies are connected by relations of high investment to the resources that they harvest. Fishing communities follow a similar pattern. By virtue of participating in the relationships that allow their peers to recognise them as fisher folk, fishing communities invest heavily in the marine ecosystem. Gendered relationships are integrally connected to marine species—men usually operate boats with large nets for the main share of fish catch, while women restrict themselves to near-shore cast-netting or estuarine invertebrate collection (Hapke 1996).

Women also play a large role in the fishing economy, acting as traders and marketers (Hapke 2001a). The loss of species such as estuarine invertebrates leads to a loss of identity for fisherwomen, shifting their work away from the estuaries and into their households. Similarly, the loss of trading opportunities due to capitalist development leads to the economic marginalisation of these women, again forcing them to concentrate on household

chores (Hapke 2001b). The shift in identity of fisherwomen disconnects them both from the resource as well as the market. This has severe consequences for marine species, since a shift away from women traders, who had limited distribution and market networks, has also meant a move towards industrial scale marine harvests to feed global markets (Rubinoff 1999 is an exception to this pattern).

Fishing culture affects fishing practice—the way that people fish, and which species are caught. 'Traditional' fishers see themselves as invested in fishing in the long term. Perceiving himself as akin to tribal hunter-gatherers, a fisherman in Andhra Pradesh says, 'fishers hunt for their catch'.[3] Despite the primitive imagery of this statement, this particular fisherman negotiates daily with traders and exporters with more sophisticated market links. Despite perceiving declines in fish catch, he says 'What can I do other than fish? If I go and work on a boat in Vishakhapatnam [the nearest big fishing harbour], working conditions are bad. My only option is to stay here and somehow make it work.'

On the other hand, a trawl boat owner from Ramnathapuram district, Tamil Nadu opines, 'My aim is to catch as much fish as I can as fast as I can, so that I can afford to send my children to engineering college. I do not want them to have to depend on fishing for their income.'[4] This sentiment was also echoed by a trawl boat owner in Sindhudurg district, Maharashtra, who adds in despair, 'No matter what I have done for him [in terms of education], my son is still interested in the fishing business'.[5] His son appears to be interested in maintaining his family legacy of fishing, despite being in the non-traditional trawling business. Associating the 'traditional' epithet only with certain types of fishing gear or fishing practices is tenuous, if not impossible.

India has about 15 million people who identify themselves as participating in fishing (Livestock Census 2003). However, no census data is available to distinguish those who are fishing as a business (non-traditional) versus those who approach fishing as a livelihood ('traditional'). Instead, they are treated as a unified group by government bodies such as the Marine

Products Development Authority (2012), which lists over 200 commercially important marine species in India, and suggest that not enough is being done to exploit India's marine export potential.

Species vary in importance to 'traditional' and non-traditional fishers. Only a few species fetch high prices, if they can be sold beyond the local scale, the price increasing exponentially with distance from fish landing site. Export-oriented fishers focus on the veritable marine cash-crops like the tiger prawn (*Penaeus monodon*), sardines (*Sardinella longiceps*), and squid (*Loligo* spp.). They are driven to search relentlessly for more expensive species, often catching or discarding low-value species in the process (Lobo et al 2010). Those with specialised global networks can target threatened species like the reef manta ray (*Manta alfredi*) and sea cucumbers (*Holothuria* spp.). Those with smaller-scale, passive fishing gear focus on species that have local demand like the milk shark (*Rhizoprionodon acutus*) and the Indian mackerel (*Rastrelliger kanagurta*). While it might appear that fishers focusing on local markets automatically have lower impacts, their targets nevertheless include threatened species, such as the dogfish (*Scoliodon laticaudus*), which are not protected by Indian law or the Convention on Trade in Endangered Species (CITES). Linking 'traditional' values to sustainable fishing is not, therefore, a straightforward affair.

BYZANTINE BUREAUCRACY

Suggesting that culture and identity encompass the entirety of making marine conservation work oversimplifies complex fisher–environment relationships. A fisher laying out a net cannot predict with certainty which species of fish or how much of it will be caught. Despite this, India's conservation policies are aimed at species-specific conservation, through the process of banning the capture, landing or sale of species listed on Schedule 1 and 2 of India's Wildlife (Protection) Act (1972). For instance, some species (for example, four species of sharks, two species of rays, one species of guitarfish and three species of sawfish) have failed to be protected, despite their inclusion

as 'Scheduled' (or protected) species in India's Wildlife Act (Order No.1–2/2001 WL1 dated 28 May 2001). Recognition of this failure resulted in a four-month long blanket ban on the capture and trade of sharks. The top-down nature of this ban resulted in fishers being apprehended for catching sharks, while completely unaware of this new policy (Hausfather 2004). The resulting uproar from fishers in the home state of the then minister for environment and forests (Hausfather 2004), T. R. Baalu, put pressure on his political party, the Dravida Munnetra Kazhagam (DMK, a traditional rival of the AIADMK), which had formed the government in the state of Tamil Nadu. The ban was then repealed.

Image 2.2: Indiscriminate fishing is easy, given the maze of legislation and poor enforcement. The result of such indiscriminate fishing is plain to see, in the juvenile groupers being caught before they have a chance to grow and breed, and even before they attain a size where they fetch their full market value.

Source: Divya Karnad, 2014.

More recent marine conservation efforts are being approached slightly differently. Chatterjee (1997) identifies that among the

people who have received few benefits from modern development in postcolonial times, the framing of this debate is about the question of democracy. The rhetoric of the government, at least for the decade until 2015, highlighted the significance of the idea of democratic governance among the Indian public. From landmark legislation, such as the Scheduled Tribes and Other Forest Dweller (Recognition of Forest Rights) Act of 2006, to public consultations about proposed legislations, the government's rhetoric was one of inclusion. However well-intentioned these attempts were, the implementation of government policy was often foiled by bureaucratic process and ritual (Gupta 2012).

For instance, in 2015, a meeting (Sea Turtle Conservation Workshop of the East Coastal States of India, April 2015) was convened to consult the fishing communities about ways to conserve marine species that are protected by the Indian Wildlife (Protection) Act (1972). Present in the room were representatives from the Forest Department, Fisheries Department, Port Authority, Central Marine Fisheries Research Institute, Central Institute of Fisheries Technology, Indian Navy, Indian Coast Guard, Marine Police, Non-Governmental Organisations (NGOs), independent researchers including myself, and representatives from fishing communities (fishers). It had all the makings of a successful and inclusive decision making process. However, a certain 'structural violence' (Gupta 2012) marked the nature of the proceedings.

The naturalised hierarchy meant government officials and celebrities monopolised the microphones, while everyone else was relegated to the status of audience. The colonial approach of treating fishers as outsiders or the 'other' was manifested in this meeting through the use of the English language, a language common to everyone other than the fishers, who neither spoke nor understood the proceedings. Occasional translations into the regional language were hurried summaries that tested the patience of the VIPs on stage. The fishers, despite being physically present, were not only left out of the proceedings, they eventually left the meeting. By the second day of the three-day event, there was no representation from the fishing community.

It is no surprise, therefore, to find fishing communities unwilling to participate in government schemes to promote more sustainable fisheries. Experiments with improved fishing technology, such as bycatch reduction devices for fishing nets by indigenous research institutions like the Central Institute of Fisheries Technology, have remained unpopular with fishers. Instead, fisheries bycatch has found a new market, being sold as fishmeal for animal feed (Lobo et al 2010). Despite efforts by various government officials to individually reach out to fishing communities, systemic problems continue to dog the relationship between government and fishers. The rift between government and fisher folk is too wide to expect non-English speaking fisher folk to be aware of species protected by India's Wildlife Act (1972) or keep up with the latest list of threatened marine species by the International Union for Conservation of Nature (IUCN 2014).

An additional obstacle to building trust is the confusion created by the complex legal architecture governing the use of the sea. Human activity in the Indian Exclusive Economic Zone (EEZ) is regulated by legislation in no less than 16 Acts, in addition to several notifications and policies. The Water (Prevention & Control of Pollution) Act (1974) includes within its scope the sea and tidal waters, but leaves it to the states to specify the extent. In addition to regulating the release of effluents and sewage into water bodies, this Act permits the deposition of materials along the water's edge for the purpose of reclaiming land or protecting the coastline. Landless fishers living on the coast can, therefore, be legally displaced for coastal activities that claim to serve this purpose.

The Territorial Waters Continental Shelf–Exclusive Economic Zone and Other Maritime Zones Act (1976) identifies the area within 12 nautical miles of the high tide line as the territorial waters of India. The Indian Fisheries Act (1987) devolves fishing regulations to the six coastal states within territorial waters, while retaining control over fishing in the rest of the EEZ. In addition are policies such as the Deep Sea Fishing Policy (1991), which serves to define the terms of fishing beyond territorial waters, but within the EEZ. The State Fishing Acts and their

subsequent modifications are not completely in sync with each other. For instance, West Bengal, Andhra Pradesh, Tamil Nadu and Kerala impose an annual fishing ban of 47 days (applied since 1988–89). Odisha, whose coastline is between that of West Bengal and Andhra Pradesh, has a 60-day ban (applied since 2000). Gujarat, Maharashtra and Goa impose bans of 67 days (effective from 1989–90), whereas neighbouring Daman and Diu bans fishing for 75 days and Karnataka imposes a ban of 57 days.

Shipping and the building of fishing harbours is regulated by Indian Ports Act (1908), Major Port Trust Act (1963) and the Merchant Shipping Act (1958). The Indian Ports Act devolves authority to the state governments to build minor ports. For instance, the Maharashtra Maritime Board (MMB) Act (1996) authorises the MMB to develop all minor ports in Maharashtra to boost economic activity. Since fishing harbours do not have a separate legal designation, they come under the purview of the MMB, a body that is not legally required to represent fishing interests.

Based on the principles provided in the Forest (Conservation) Act (1980), Environmental Protection Act (1986), Indian Wildlife (Protection) Act (1972) and the Biological Diversity Act (2002), marine species conservation can be approached in two ways. The first is through the process of banning the capture or harvest of individual species. Second is by designating some areas off-limits for fishing and coastal-marine development. These are known as marine protected areas (MPAs), and there are 24 designated MPAs along the coast of mainland India (Sivakumar 2013). In the more well-known MPAs, such as the Gulf of Mannar National Park and Biosphere Reserve, international interest has ensured a stream of financial aid to ensure that the park's objectives are met through a process of consultation and provision of alternate livelihoods (Rajagopalan 2008). However, fishers feel that they are only being involved in the implementation, not in decision making (Rajagopalan 2008). As a result, levels of cooperation with non-consensual governmental regulations are low (Karnad et al 2014).

Fishers report very low levels of law enforcement, particularly since the area is a designated multiple-use biosphere reserve. The fallout is a high level of overcapitalisation—far more boats than can be supported in those regional waters (Karnad et al 2014). This causes spillovers into surrounding areas, depleting fish stocks in the region as a whole (Menon et al (2016) identified this phenomenon in the Palk Bay, Tamil Nadu). Consequently, this protected area has an impact that is completely opposite to what is expected. Other policies affecting marine environmental concerns include the Hazardous Waste Management Act (1989), Coastal Regulation Zone Notification (2014) and the Environmental Impact Assessment Notification (1994).

The charge of monitoring human activities at sea is given to several different bodies through the Coast Guard Act (1978), The Customs Act (1962), the Navy Act (1957) and the state fisheries Acts. The consequence of so much legislation is that while marine ecosystems are theoretically well regulated, confusion ensues in practice. Boundaries between regulatory acts are fuzzy and the different government bodies empowered by each law are left to make subjective interpretations about their jurisdiction. Hazy legal boundaries make for hazy physical ones. For instance, the coast guard's primary mandate is to enforce maritime law. Logistical constraints, combined with scant resources to monitor illegal fishing, are further exacerbated by practical problems such as the lack of training about marine activities prohibited under all these laws. The combination of these factors does not bode well for threatened species like sea turtles, whales, dolphins and sharks, who continue to be impacted by fishing activity.

MANAGING A COMPLEX MARINE COMMONS

Marine conservation in India is complex because marine ecosystems are *commons*. Gordon (1954) and Hardin (1968) identified a *commons* as an area or resource having no single owner, rather providing for multiple users. While these authors suggested that users of common resources operate with individualistic economic motives, a lot of subsequent research

has identified cooperative management of commons (McCay and Acheson 1987; Ostrom 1990). Marine ecosystems are especially exploited commons—they are simultaneously used for fishing, tourism, transport, mining, as well as to provide ecological services. This means that a diverse group of users needs to work together to manage resources. In addition, the primary users, fisher folk, are subjected to differential treatment by government policies and schemes that seek to promote one group at the cost of others (Karnad et al 2014). While there is evidence of traditional commons management amongst marine fishers in India (Bavinck 2001), researchers question the ability of these traditional systems to deal with changes brought about by modernisation (Kurien and Vijayan 1995).

In the 1950s, the modernisation of India's fishing fleet was encouraged by promoting more 'efficient' fishing techniques to make fishers' lives easier, while contributing to the national treasury by catching seafood for export. India's experiment with 'modernising' her fishing fleet began with the seemingly innocuous Indo-Norwegian Fisheries Community Development project to bring Norwegian technical aid, vessels and machinery to the Kerala coast in 1953 (Kurien 1985). Until then, the fishery was mainly defined by non-mechanised, artisanal fishing. Kurien and Vijayan (1995) describe the pre-project fishery thus: 'the overall picture in Kerala fisheries was one of abundant fish availability in the inshore waters, easily accessible to the large number of artisanal fishers'. With the help of the Kerala State Government, the project trained two fishing villages north of Kollam, Kerala, to operate trawl nets in order to take advantage of the newly-discovered prawn fishery. This technology then spread to the rest of the country, with the help of loans and subsidies offered by the National Co-operative Development Corporation (Karnad et al 2014).

By the 1980s, trawl boats were the way to fish. Merchants were quick to respond to this change in fish production, offering transport, preservation and market facilities to suit the larger fish catches. The new fish economy made the basket-laden fisherwoman superfluous. Her place was taken by touts, agents and middlemen. The Norwegian project was living up to the

first of its objectives: to increase production by modifying fishing methods. Ironically, it did so by destroying the social and ecological fabric of fishing. Rather than better the conditions of existing fishers, they created a new kind: city-dwelling owners of over 20 vessels who have never been to sea, and have none of the precious knowledge of where fish live and how to find them. They merely equip their crew with digital fish finders and send them out relentlessly (Karnad 2012).

The fragmentation of fishing society led to new groups of commons users, whose motivations coincided with those of the government. The aim was to usher in mechanisation and commercialisation in order to bring in profits for the country through export quality seafood. The expectation was that this would raise the standard of living for all fishers. The result was that a relatively egalitarian society was converted into one divided by economic class (Karnad 2012). The politics of fisher identity played into these divisions, with 'traditional' and non-traditional fishers finding fewer ways to cooperate and fewer platforms of commonality. Blame for unsustainable fishing is more easily passed around, and research that is able to distinguish between the impacts of different types of fishing is sadly lacking.

BALANCING THE FUTURE BY ACCEPTING THE PAST

A new economic and political world order has changed various resource-dependent communities across the world, no matter how isolated or insulated they may be. Fishers are forced to adapt to, and manipulate their new circumstances, in order to sustain the environment and all the natural resources on which they depend. It is out of these very interactions, however, that some very powerful examples of environmental action and grassroots activism arise.

Some of the more easily manageable marine resources are those whose movements are limited. For instance, lobsters and shellfish are being sustainably managed by initiatives as widely separated as Maine, USA (McCay and Acheson 1987) and Baja California, Mexico (McCay et al 2014). These types of

management have improved marine resources and are built on a platform of egalitarianism and transparency. One noticeable similarity between these examples is that they were developed by the local communities within the context of local culture and traditions. Local rules include giving fishing rights, designating areas fishers are allowed to access and so on, and these have been shown to be successfully enforced by fishing communities at a small scale (Ruddle and Akimichi 1984; Johannes 1978).

Successful enforcement is often based on using culturally-appropriate apprehension and punishment, without the involvement of formal law-enforcement authorities. For instance, the successful *Pacifico Norte* cooperatives in Mexico (McCay et al 2014) have capitalised on identifying community-based fishing territories by integrating scientific inputs with traditional marine territories maintained by fishers. The communities who fish in these cooperatives function as resilient, equitable organisations to manage near-shore lobster and fish fisheries. At the relatively small scale of fishing communities, transparent governance and democracy work successfully.

In 2008, a small island nation in the Pacific decided to do what most large, industrialised nations recommended but have not acted upon in any significant way. The Republic of Kiribati is a mere dot in the Pacific Ocean, almost invisible on regular world maps, and is highly vulnerable to climate change. A vocal participant at the meetings of the United Nations Framework Convention on Climate Change (UNFCCC), Kiribati is a very ecologically aware nation. As with most small islands, Kiribati is poor in natural capital, except for its rich marine resources. These electric blue waters have never seen large-scale fishing and multi-coloured corals of innumerable shapes teem with fish, invertebrates and reptiles. In a gift to the world, the nation set aside a 4.25 thousand km square area as a multi-use marine protected area (at the time the world's largest), which included most of their legally-designated EEZ, where industrial fishing would be controlled and eventually phased out. Starting with a complete ban on fishing over 7,400 km, the country plans to control industrial fishing by foreign vessels within the marine protected area in the next decade, despite obvious food security

issues, and the license fee losses from foreign fishing vessels, which contributes significantly to the nation's income. Kiribati decided to prioritise self-sufficiency in marine resources, over the inexorable pull of a high GDP.

The initiative by Kiribati has spurred other Pacific nations to declare larger marine protected areas. The Cook Islands and New Caledonia are now beginning to negotiate the choppy waters of sustainable fishing, despite the waters around these island nations being the world's largest source of tuna. Together, all these nations now have the distinction of setting up a network of Pacific marine protected areas that dwarf the combined area of the rest of the world's marine protected areas. The people of Kiribati have set the bar high in terms of environmental goals and aspirations for Polynesia. Island nations have set goals, but their lack of resources could compromise their citizen's quality of life. Nevertheless, they have taken a stand on big businesses, industry and have publicly asked the world to rethink the impacts of certain paths to development.

Back in the Indian Ocean, India's islands and coastal states face similar pressures of fishing and climate change. Yet, the government continues to promote large-scale, mechanised fishing. In the coral reefs of the Gulf of Mannar, Tamil Nadu, fishing is taken for granted. At the same time, rules, culture, identity and ecology are almost a daily negotiation between fishing communities and government authorities trying to impose a sense of order. What is clear is that legal restrictions on fishing meet with very poor compliance. However, the fishers are not immune to the need for sustainable fishing. Finding that perfect balance between the best of traditional practices and modern thinking to achieve social and environmental goals is perhaps the most universal of aspirations. A fisher who fishes in the Gulf of Mannar, the strip of water that divides northern Sri Lanka from southern India, sits back from repairing his net, as he formulates his thoughts about his fishing aspirations. His face takes on a dreamy quality as he says:

> I want a better life, for me and my children. I'd like to have a nice house and a comfortable working environment. But I also want more fish. If there were more fish I wouldn't need to

> struggle to find them, like I do every day. I could just go out and be back in a few hours with enough fish to have an easy life. If there were fewer destructive fishing gear, we would all have more fish.[6]

His best memories of fishing with his father reveal a parallel, 'We had more fish back then, we would all fish together and there was enough to go around. There were no trawl nets, purse-seines and drag nets then, no dynamiting or poisoning of the reefs.' In his future, therefore, he aspires to bits of his past; those that were lost to technology and the hand of the market.

In fact, fishers' aspirations to make economic gains from the fishery rather than turn their backs on the sea and send their children into alternate professions merges well with the reasoning behind sustainable fishing and marine conservation initiatives. The fishers' unions have begun to seek external help in order to develop sustainability initiatives that are more culturally appropriate and infused with their extensive knowledge of local marine life and habitats. 'The unions have set aside dates, on which their members will not go out to sea, instead spending their time at an ecosystem based management workshop that they want us to conduct'[7], said a representative from an NGO that works closely with the unions. 'They have made the time and taken the initiative, we (the NGO) did not even suggest this idea to them!', he adds.

In a happy turn of events, fishers may be taking steps to achieve their own aspirations. The solution is integrated into the foundation of most nations: good governance and democracy. Building up from grassroots movements, such as the fishers' unions within countries or small island nations on the global canvas, there is no telling what the combined forces of thousands of voices will achieve.

NOTES

1. Conversation with Raj Sahaimurthy (name changed, as with all other fishers' names) on trawl vessel off the Puducherry coast in 2013.
2. Interview with Ajay Doori in Sindhudurg district of Maharashtra in 2014.

3. Interview with V. Ramulu in Srikakulam district of Andhra Pradesh in 2014.
4. Interview with Jason Peter in Ramnathapuram district of Tamil Nadu in 2011.
5. Interview with D'Souza in Ratnagiri district of Maharashtra in 2015.
6. Interview with Tamilarasan in Ramnathapuram district of Tamil Nadu in 2011.
7. Conversation with NGO representative from International Collective in Support of Fishworkers, Chennai in 2013.

REFERENCES

Bavinck, M. 2001. *Marine Resource Management: Conflict and Regulation in the Fisheries of the Coromandel Coast*. New Delhi: Sage Publications.

Chatterjee, P. 1997. 'Beyond the Nation or Within?' *Economic and Political Weekly* XXXII: 1–2, pp. 30–34.

Demeritt, D. 2002. 'What is the "Social Construction of Nature"? A Typology and Sympathetic Critique'. *Progress in Human Geography* 26: 6, pp. 767–90.

Gerber, J. 1997. 'Beyond Dualism–The Social Construction of Nature and the Natural and Social Construction of Human Beings'. *Progress in Human Geography* 21: 1, pp. 1–17.

Gupta, A. 2012. *Red Tape: Bureaucracy, Structural Violence, and Poverty in India*. Durham: Duke University Press.

Gordon, H. S. 1954. 'The Economic Theory of a Common-Property Resource: The Fishery'. In *Classic Papers in Natural Resource Economics*, ed. C. Gopalakrishnan. London: Palgrave Macmillan, pp. 178–203.

———. 1991. 'The Economic Theory of a Common-Property Resource: The Fishery'. *Bulletin of Mathematical Biology* 53: 1–2, pp. 231–52.

Hames, R. 1987. 'Game Conservation or Efficient Hunting'. In *The Question of the Commons: The Culture and Ecology of Communal Resources*, eds B. J. McCay and J. M. Acheson. Tuscon: University of Arizona Press.

Hapke, H. M. 1996. 'Fish Mongers, Markets, and Mechanization: Gender and the Economic Transformation of an Indian Fishery'. PhD Thesis, Syracuse University, New York.

Hapke, H. M. 2001a. 'Gender, Work, and Household Survival in South Indian Fishing Communities: A Preliminary Analysis'. *The Professional Geographer* 53: 3, pp. 313–31.

———. 2001b. 'Petty Traders, Gender, and Development in a South Indian Fishery'. *Economic Geography* 77: 3, pp. 225–49.

Hardin, G. 1968. 'The Tragedy of the Commons'. *Science* 162: 3859, pp. 1243–48.

Hausfather, Z. 2004. 'India's Shark Trade: An Analysis of Indian Shark Landings based on Shark Fin Exports'. *Marine Studies (MAST)* 3: 1, pp. 25–40.

IUCN. 2014. 'The Red List'. Available at http://www.iucnredlist.org/ (Accessed on 30 Jan 2015).

Johannes, R. E. 1978. 'Traditional Marine Conservation Methods in Oceania and their Demise'. *Annual Review of Ecology and Systematic* 9, pp. 349–64.

Karnad, D., 'The blue revolution'. *The Daily Pioneer*, 10 March 2012.

Karnad, D., M. Gangal, and K. K. Karanth. 2014. 'Perceptions Matter: How Fishers' Perceptions Affect Trends of Sustainability in Indian Fisheries'. *Oryx* 48: 2, pp. 218–27.

Kurien, J. 1985. 'Technical Assistance Projects and Socio-economic Change: Norwegian Intervention in Kerala's Fisheries Development'. *Economic and Political Weekly* 20: 25–26, pp. 70–88.

Kurien, J., and A. J. Vijayan. 1995. 'Income Spreading Mechanisms in Common Property Resource: Karanila System in Kerala's Fishery'. *Economic and Political Weekly* 30: 28, pp. 1780–85.

Lewison, R. L., L. B. Crowder, A. J. Read, and S. A. Freeman. 2004. 'Understanding Impacts of Fisheries Bycatch on Marine Megafauna'. *Trends in Ecology and Evolution* 19: 11, pp. 598–604.

Livestock Census, 17th Indian Livestock Census, 2003. Available at http://dahd.nic.in/dahd/17th-indian-livestock-census-all-india-summary-report.aspx (Accessed on 30 January 2015).

Lobo, A. S., A. Balmford, R. Arthur, and A. Manica. 2010. 'Commercializing Bycatch can Push a Fishery beyond Economic Extinction', *Conservation Letters* 3: 4, pp. 277–85.

Madras Fisheries Bureau. 1915. *Papers from 1899 Relating Chiefly to the Development of the Madras Fisheries Bureau*. Madras: Government of India Press.

McCay, B. J., and J. M. Acheson, eds.1987. *The Question of the Commons: The Culture and Ecology of Communal Resources*. Tuscon: University of Arizona Press.

McCay, B. J., F. Micheli, G. Ponce-Díaz, G. Murray, G. Shester, S. Ramirez-Sanchez, and W. Weisman. 2014. 'Cooperatives, Concessions, and Co-management on the Pacific Coast of Mexico', *Marine Policy* 44: C, pp. 49–59.

Menon, A., M. Bavinck, J. Stephen, and R. Manimohan. 2016. 'The Political Ecology of Palk Bay Fisheries: Geographies of Capital, Fisher Conflict, Ethnicity and Nation State', *Antipode* 48: 2, pp. 393–411.

Marine Products Development Authority. 2012. '*Commercial Finfishes and Shellfishes of India*. Kochi: Marine Products Export Development Authority.

Murty, M. L. K. 1981. 'Hunter Gatherer Ecosystems and Archaeological Patterns of Subsistence Behaviour on the Southeast Coast of India: An Ethnographic Model'. *World Archaeology* 13: 1, pp. 47–58.

Ostrom, E. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge: Cambridge University Press.

Rajagopalan, R. 2008. *Marine Protected Areas in India*. Chennai: Samudra Monograph; International Collective in Support of Fishworkers.

Relph, E. 1976. *Place and Placelessness*. London: Pion.

Rubinoff, J. A. 1999. 'Fishing for Status: Impact of Development on Goa's Fisherwomen'. *Women's Studies International Forum* 22: 6, pp. 631–44.

Ruddle, K., and T. Akimichi, eds. 1984. *Maritime Institutions in the Western Pacific*. Osaka: National Museum of Ethnology.

Sivakumar, K. 2013. 'Coastal and Marine Biodiversity Protected Areas in India: Challenges and Way Forward'. In *Ecology and Conservation of Tropical Marine Faunal Communities*, eds K. Venkataraman, C. Sivaperuman and C. Raghunathan. Berlin: Springer-Verlag, pp. 463–76.

Subramanian, A. 2009. *Shorelines: Space and Rights in South India*. Stanford: Stanford University Press.

Sundar, A. 2011. 'Capitalist Transformation and the Evolution of Civil Society in a South Indian Fishery'. PhD Thesis, University of Toronto, Toronto.