

Traditional livelihoods and survival crisis: the politics of biodiversity conservation in Sundarban, West Bengal

Abstract

In this study, I document the economic and socio-cultural vulnerability of a forest-dependent community inhabiting the forest fringe island of Satjelia in Sundarban in India. Using simple artisanal methods, they have practiced traditional livelihoods like fishing and collecting wild honey from the forests for more than a century. Despite having established cultural integrity and traditional occupations, this group is not indigenous, and are therefore treated as 'others' and 'settlers'. An ethnographic study describes these various forms of livelihoods and the ways that threatens local subsistence. I examine the bureaucratic and hierarchical structure of protected area (PA) management, showing it has little or no accommodation of this community's local traditional knowledge within the present PA management network. To this end, I ask three questions: Firstly, what is the difference between 'indigenous people' and 'other' marginalized communities, in terms of collective rights, cultural heritage and livelihood options? Secondly, how are traditional conservation norms articulated within the realm of the 'non indigenous'? Thirdly, how do the forest department's restrictions and coercions marginalize these 'non indigenous' forest dependent communities culturally, politically and economically?

Keywords: Conservation, conflict, indigenous, political ecology, Sundarban, traditional livelihoods

1. Introduction

The Bengali month of *Kartik* (late autumn) brought an implausible life turn for Paritosh. As a part of his routine, he summoned two other fellow neighbours from Mridhapara, his village, and ventured onto a narrow creek of the Sajna River near Pirkhali in his small boat, searching for tiger-prawn (*Penaeus monodon*) seeds in the brackish water. Using their pull nets, they caught juvenile prawn seeds until the weather turned gloomy and the murky waters made them rest their boat with a *Hental* tree (*Phoenix paludosa*) on the mudflats. Their work was done for the day, and they waited for morning. It was a full moon and the tidal surge had just started to recede, leaving behind corroded mudflats on the two sides. The moonlit forest above appeared to be creepy when three of them tied the boat to the shaft. As Paritosh made space in the front of the boat for a doze, a tigress grabbed him, missing its usual target (the neck of the prey), and dragged him away by the hands. While his other companions froze with terror, Paritosh fought back for over half an hour, managing to clutch its tongue and punch its cheek. His compatriots, terrified by the gaze of the tigress, managed only to turn the pulling net towards it, of which tigers are usually afraid. Maybe this 'archaic' pulling net saved his life that day, but that was the last fishing expedition for Paritosh. He is now jobless.

In the present study, we explore an unprincipled exploitation of the traditional livelihoods by the conservation practices in India, which portray forest dependent people as potential adversaries. In doing so, we adopt an approach based on 'political ecology'. 'Politics' in political ecology, as Bryant (1998:80) points out, is the attempt to understand the ways in which human environment interaction explains environmental degradation. Political ecology is a way of thinking about the environment which postulates that the kinds of access and use of the ecological resources are marked by inequality, power relations and distribution conflicts (Guha and Alier 1997:23-45; Harrison and Mdee 2017). By conceptualizing an image of nature as intrinsically related to human lives, scholarships on political ecology combines the issue of conservation with a plea for social justice (Baviskar 1995; Cronon 1995; Adams and Hutton 2007; Forsyth 2008; Robbins 2012). Political ecology discusses about the kinds of political actions and social movements which emanate from ecological distribution conflicts. It engages with the 'agency of idea and actions of social, economic and discursive power' in addressing the relationship between nature and society (Kull, Sartre and Larranaga 2015: 123). Political ecology is considered as an extension of 'cultural ecology', which dwells on the traditional ecological practices from an anthropological angle (Forsyth 2003: 8). Building on this framework, this article examines the economic and socio-cultural vulnerability of a 'non-indigenous' forest dependent community inhabiting the Indian Sundarban, positioning them in relation to 'nature'. Drawing on an ethnographic fieldwork in the island of Satjelia in Gosaba block, in the district of South 24 Parganas in West Bengal (see map), we describe, using informants' own words, the methods of fishing and wild honey collection as practiced by the forest dependent communities. The use of political ecology in the context of the present study is significant, since the empirical observations establish the extent of state interventions in the allocation of forest resources, a process implicit in the method of conservation (Baviskar 1995:30).

According to Escobar (1998: 58), most of international conventions on biodiversity conservation are 'neoliberal imposition of industrialized countries (particularly the US) rather than an option democratically agreed upon'. Studies reveal that neoliberalism form an integral part of post-structuralist political ecology, incorporating resource privatization, capitalist markets, decentralization and international agencies in conservation (Fletcher 2010). Similarly, environmental plans for the Sundarban have been dominated by discourses dictated in the name of western 'eco-science' that never took into account the plight of the inhabitants of the region (Jalais 2004:201). For instance, tiger attacks on those trying to eke livelihoods from the forests of Sundarban, as the aforementioned illustration shows are integral to the inhabitants. Yet, there is a growing indifference among state officials towards such attacks and towards traditional livelihoods in general. In this context, we pose several questions. Firstly, what is the difference between 'indigenous people' and 'other' marginalized forest dependent communities, in terms of collective rights, cultural heritage and livelihood options? Secondly, how are traditional conservation norms articulated within the realm of the 'non indigenous'? Thirdly, how do the forest department's restrictions and coercions marginalize these 'non indigenous' forest dependent communities culturally, politically and economically?

Our questions have a particular bearing to the fact that in Sundarban Biosphere Reserve (SBR)¹, the use of the words 'traditional' and 'indigenous' are problematic due to an influx of migrants. Since the colonial period, there was an influx of tribal migration from the adjoining states of Bihar, Jharkhand and Orissa, who were brought as indentured labourers by the British administrators to reclaim the forests (Chakrabarti 2009). After India's independence from British colonialism in 1947, rural people from East Midnapore and Bangladesh migrated to the region. Beteille (1998: 190) mentions that 'the idea of indigenous people must have some basis in the territory inhabited by them in the past and the present'. Having said this, he asserts that the term 'indigenous' is symbolic of a homogenous identity, necessarily based on associations with a particular settlement since the past. Subsequent generations of a community coming and settling in other dispersed locations from their natives are 'settlers'; not 'indigenous' (ibid). But formal definitions of indigeneity may be at odds with the self-identity of a community, and their history of occupancy. According to Gurr (2000), indigenous people are merely those who are the descendants of the earlier inhabitants of a region, living in conformity with traditional social, economic and cultural customs that are sharply distinct from those of dominant groups. Frank Wilmer (1993) defines indigenous people as those with tradition based cultures, who were politically autonomous before colonization and who continue to struggle for the preservation of their cultural identity, economic self-reliance and political independence by resisting the assimilationist policies of the nation state. Both cases imply that adhering to the distinct community identity and subscribing to the traditional traits of living is important, irrespective of where they subsequently settle.

In Sundarban, cultural identity is not based on an ascribed status like caste or class, or on venerable autonomy, but on traditional livelihood practices and a way of legitimating those livelihoods based on customary rights. On the islands where we conducted our fieldwork, rights and practices determine local identity. We depict how the people organize themselves to preserve nature and practice livelihoods

¹ The Indian part of the Sundarban, including the forested and the inhabited area, is collectively known as SBR. In our article we refer throughout to the Indian Sundarban unless mentioned otherwise.

in an ecologically fragile landscape. We argue that 'non indigenous' economic and social contexts exist, as in the case of Sundarban, where communities *adapt* ways and practices to seek the cooperation of nature in sustaining themselves as well as the resources.

2. Relevance of 'indigenous': politics of conservation and the context in Sundarban

According to the United Nations (UN), indigenous communities practice unique traditions, retain social, cultural, economic and political characteristics, and are distinct from those of the dominant societies in which they live. Gadgil, Berkes and Folke (1993:151) pointed out that 'indigenous knowledge is defined as a cumulative body of knowledge and beliefs handed down through generations by cultural transmission about the relationship of living beings (including humans) with one another and with their environment'. Traditional ecological knowledge may be considered as a subset of indigenous knowledge, referring to the traditional relationship of the communities with nature, inherited and sustained culturally through generations by involving ritualistic practices of reverence (Dudgeon and Berkes 2003:76). In political ecology, the term 'indigenous people' subscribes to communities who oppose their disenfranchisement to traditional resource claims, through political actions and movements against the state (Peluso 1993; Adams and Hutton 2007). Greenough (2001: 142) traced the intimate dependence of the indigenous people with the gifts of nature, in their material efforts to avoid market intrusion and technical innovations as well as their respect and traditional bonds with nature. For indigenous people, their territory is their cultural identity and includes the forests, rivers and earth.

The Government of West Bengal however represents the inhabitants of Sundarban as 'non-indigenous', since they are not 'native' but migrant settlers from adjoining regions. Descendants of such migrants cease to retain the entitlements of being 'indigenous', despite their abject and miserable social and economic conditions (Beteille 1998: 190). Looking at the context of Sundarban, one is tempted to point out, following Gupta (1998:18), that the 'the effectiveness of indigenous identity depends on its recognition by hegemonic discourses of imperialist nostalgia, where poor and marginal people were romanticised at the same time that their life is destroyed'. In the village where our study was conducted, inhabitants belong to the scheduled castes (SCs), Scheduled Tribes (STs) and Other Backward Castes (OBCs).² While the SCs migrated from Bangladesh, the STs migrated from places like Jharkhand, Bihar, Orissa etc to reclaim forest lands and make them settled. OBCs migrated from the district of Midnapore in West Bengal. Although all the three categories are migrants to the village, many SCs have traditional associations with forest based occupations like fishing and honey collection, inherited from their forefathers in Bangladesh. For the STs and the OBCs, ecological knowledge are not inherited but mostly 'locality-specific', learnt from their experiences and growing associations with the forest after

² In the four tier Indian caste system, the SCs are people who occupy the lowest tiers of the hierarchy, and were historically regarded as untouchables and profane by the upper castes. Due to their social disadvantage, they are now entitled to certain privileges by the government, the most important of which being the reservation of seats for SC people in employment opportunities. According to Article 366 of the Constitution of India, the STs are such tribes or tribal communities, or parts of or groups within such tribal communities, which exhibits primitive traits, distinct culture, geographical isolation, shyness of contact and backwardness (Ministry of Tribal Affairs). OBCs are regarded as the 'socially and educationally backward classes' by the Government of India. Their economic positions are little better off than the SCs and STs.

they migrated to the village. Close living between the three categories in the region points towards a kind of assimilation of cultures and practices and an influence over each other. Collectively known as 'forest workers', these forest dependent communities in Sundarban exhibit established norms of forest usage and sacralised practices of reverence towards forest wildlife and deities (Hunter 1875; Chatterjee Sarkar 2010; Jalais 2010), an essential qualification of being 'indigenous'. Such reverence associated with forests in Sundarban can be traced as early as the period of Mughal Empire, when professional woodcutters and fishermen entered the realm of the forest only after worshipping the sylvan deity presiding over that particular tract (Eaton 1990:9). If 'indigenous' is an imposed category to recognize traditional rights, can political ecology expose the customary rights and the dilemmas of a category of forest workers that claim socio-economic and cultural similarities to recognized 'indigenous communities'?

Indigenous communities are more widely represented in academic scholarships, due to the historical basis of their claims. According to Corntassel (2003: 76), the dilemma over 'who is indigenous' has become increasingly politicized as indigenous people have attained distinct legal standing under international laws and conventions. International Labour Organization's (ILO) Convention of 1989 (No 169) allocates indigenous rights to development, customary practices, lands and territories inhabited by them.³ Protection of their cultural heritage and traditional knowledge, including knowledge of ecological resources and rights to land are recognized under Article 31 of the UN 'Declaration on the Rights of Indigenous People', 2007. Despite legal safeguards, indigenous people suffered dispossession from their lands, territories and resources owing to conservation of forest tracts (Baviskar 1997; Capistrano 2010; Gadgil and Guha 1995; Shahabuddin and Rangarajan 2007; Chouhan, Parthasarathy and Pattanaik 2016). Gadgil and Rao (1995:57) refers to this approach of conservation as 'centralized', 'sectoral', 'economically wasteful', 'anti-development', 'bureaucratic and 'regulatory'. In modern times the exclusionary policies of conservation have increasingly acquired a sharp ecological edge, being played out against the backdrop of resource scarcities (Gadgil and Guha 1992; 1994: 118). The politics of state control over conserving ecological resources is acted out through 'legitimate' violence over marginalized groups, who sustain on the resources (Peluso 1993: 199). For instance, the dispossession of the indigenous communities like the Masai, Kamba and Orma of Kenya from their land and livelihood activities was prompted by the alliance between international conservation agencies and the Kenyan state, prioritizing wildlife protection (ibid, 202). Rangeland degradation of the Qinghai-Tibetan plateau in China have been linearly attributed to livestock grazing activities by the pastoral Tibetans and Mongolians, without any systematic surveys conducted by the government (Harris 2010). Escobar (1998) reflects on the social movements of the indigenous black communities in the Pacific rainforest region of Colombia, which are focused on the denial of traditional ecological associations and livelihood activities like hunting and gathering, fishing, timber collection etc. According to Cronon

...the myth of the wilderness as 'virgin' uninhabited land had always been especially cruel when seen from the perspective of the Indians who once called that land home. Now they were forced to move elsewhere with the result that tourists could enjoy the illusion that they were seeing their nation in its pristine, original state. (1995: 9)

³ See 'Indigenous Peoples and United Nations Human Rights System' (2013).

Indigenous livelihoods and knowledge systems have proven their worth for conservation. Forest islands in the Amazon Basin called *apete* by the Kayapo Indians of Brazil create an architectural zone of medicinal species, palms and vines which produce drinking water. Many of the ancient fish rearing systems of China, Hawaii, Indonesia and elsewhere make use of a mix of species taking advantage of the ecological characteristics of each, and make full use of wastes, recycled to provide food (Gadgil, Berkes and Folke 1993: 155). For traditional communities, most knowledge about the environment is ingrained in a set of material and ideological practices (Baviskar 2000). Alfred and Wilmer (1997: 27) argued 'indigenous' identities to be linked to tradition-based cultures, political autonomy prior to any colonization, cultural integrity, economic self-reliance and political independence. But what of the non-indigenous communities we studied, also living close to the forest? We argue that identities in political ecology based on pre-defined categories like 'indigenous', obscures understandings that suggest human-oriented approaches in conservation elsewhere. Through our documentation of the traditional livelihoods in Satjelia, we portray that the established definitional standards of 'indigenous' identification might exclude 'other' marginalized forest dependent communities from their rights to livelihood, their ideas of community building and their self identification and belief systems.

3. Background of the study area and methods

Sundarban is the largest mangrove forest in the world encompassing an area of 25,500 km², of which 9,630 km² falls within India and the rest in Bangladesh. SBR, as the region is known in India, is partly inhabited (5367 km²) and partly forested (4263 km²). The inhabited area or the transition zone of SBR falls outside the forest area and is divided within the two districts of North and South 24 Parganas. Sundarban forest is the largest remaining tract of the Royal Bengal Tiger (*Panthera tigris*), a predator who occupies an integral core of the terrestrial food-chain and is known for its valour in man-eating trait. The eminence of the tiger coupled with a range of exotic mangrove species and aquatic resources have acquired the forest of SBR a status of Tiger Reserve in 1973, National Park in 1984 and Critical Tiger Habitat in 2007. UNESCO recognized the forest as a World Heritage Site in the year 1987.

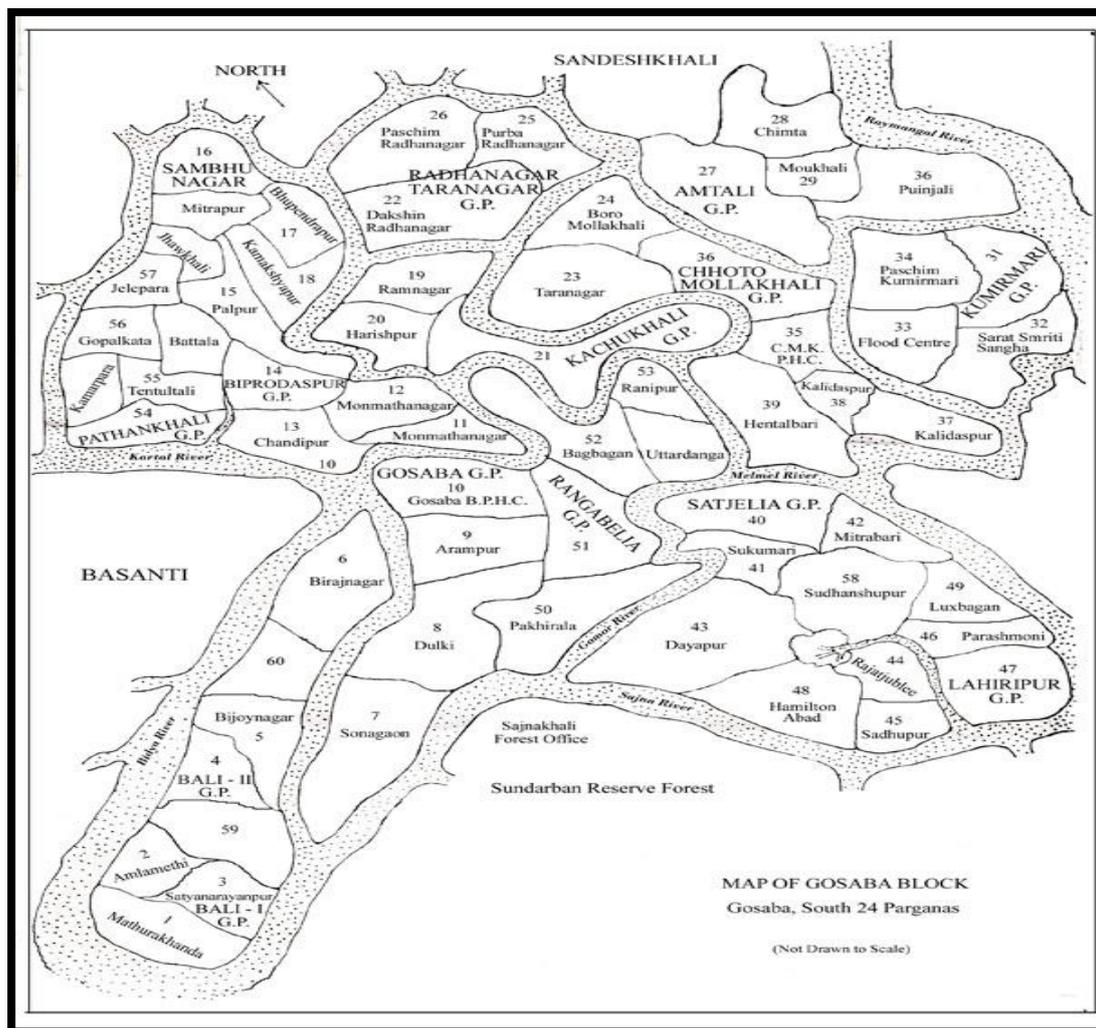
The present study draws from an ethnographic fieldwork carried out in a village called Emilibari in the year 2015 and 2016. Situated in the island of Satjelia in Gosaba block of South 24 Parganas district, Emilibari is a forest fringe village sharing close proximity with Sundarban Tiger Reserve (STR)⁴ and has 2300 people in 356 households. The three categories of people in the village, as introduced in the previous section, are the SCs, STs and the OBCs. The southernmost islands like Satjelia, which is part of the active delta⁵, constitutes an unstable land surface since they are interspersed by small rivulets and are subjected to regular tidal swells, erosion and intrusion of saline water. As agriculture is erratic and unpredictable due to saline soil conditions, people in Emilibari mainly rely on forest based livelihoods. Forest workers, as the forest dependent people are known in the village, constitute both a class of

⁴ STR falls within the forest area of SBR and measures 2584.89 km².

⁵ There is a difference between 'active delta' and 'stable delta' in the Indian Sundarban. By stable delta we mean the islands which are situated upstream, and are less exposed to the tidal currents of the rivers. They are therefore much developed, are near to the cities and have low risks of river erosion. Active deltas on the other hand are the islands located downstream, more near the forests and the mouth of the river. Tidal currents are always inundating them and they are under the constant risk of building and rebuilding by the tidal waves (Jalais 2010).

marginalized landless people, entirely dependent on the forest resources to subsist, as well as others who depend on the forest resource in varying degree to supplement their income.⁶

Figure 1: Map of the Gosaba block, showing Satjelia Island to the south



Source: Office of the STR (field-visit)

Data for our study was collected through 75 household interviews with the forest workers, dividing the sample into 12 ST and 63 SC households. 28 SC households were descendents of traditional fishing communities in Bangladesh. Snowball sampling was used to identify respondents. We complemented the interview method with informal free flowing discussions and focused group discussions, since we felt that formal interview schedules would elicit poor response rates and reduce the chances of building a rapport with the respondents. All the households interviewed depend on the forests for livelihood, without supplementary income and were mostly landless. The two foremost occupations discovered were fishing (prawn seed collection, fish collection and crab collection) and honey collection. We only interviewed artisanal fishermen who practice inland fishing in the creeks and estuarine rivers with handmade nets and human driven wooden boats. We also consulted international NGOs like World Wide Fund for Nature (WWF) and local NGOs like Direct Initiative for Social and Health Actions (DISHA) and South Asian Forum for Environment (SAFE). There were discussions with local

⁶ The forest based livelihoods which are commonly practiced by the forest workers in Emilibari includes forest fishing for fish, crab and prawn seed collection, honey and bee-wax collection.

Fishermen's Unions including the *Dakshinbanga Matsyaibi Forum* (DMF) and *Sundarban Matsyajibi Joutha Sangram Committee* (SMJSC).

4. Forest fishing for subsistence: traditional practices and dilemmas

The 13 inhabited blocks of SBR within the district of South 24 Parganas, have a total marine fisher folk of 197, 781 in 40684 households, spread over 68 village councils (*gram panchayats*)⁷, according to Central Marine Fisheries Research Institute (CMFRI 2010). According to other estimates, 35,330 people work in the forest of SBR annually, of which 4580 collect timber and firewood, 24900 are fishermen, 1350 collect honey and 4500 are involved in other activities (DISHA 2009). However, in the estimate provided by CMFRI (2010), only 7 blocks out of the 13 are covered. Gosaba block does not feature at all; neither does Basanti, which has many fishing families. The 7 blocks out of the 13 which are represented in the estimates are Joynagar II, Kakdwip, Mathurapur I, Mathurapur II, Namkhana, Patharpratima and Sagar. The exclusion of Gosaba and Basanti from the estimate is essentially misleading, since these blocks are home to large number of fishing communities (Chacraverti 2014: 32). Also, term 'traditional fishermen' used in the CMFRI estimate is ambiguous – since it does not mention how 'traditional' is determined; by ancestral lineage or by the traditional equipments used (ibid). Given the fact that our survey shows a significant number of forest fishers⁸ as hailing from fishermen families in Bangladesh and employing traditional fishing skills and equipment, having excluded them from the count is also inaccurate.

After the formation of STR in 1973, Boat Licence Certificates (BLCs)⁹ were issued to each boat owner who was a fisherman. Presently, the total number of BLC is 923 under STR area and 3,750 under the reserved forest area, outside the STR. However, only 650 BLCs are active now in STR, far less than is needed, while the rest are dysfunctional. A fisherman with a BLC has to pay Rs 40 (US\$ 0.62) as a pass to the STR forest office to fish in the admissible areas - catching crabs costs Rs 10 (US\$ 0.15) per gear per trip. Two things need to be clarified regarding the issue and ownership of BLCs. Firstly; these BLCs have been around a long time and are now mainly owned by rich agriculturalists and the middlemen, whose ancestors were fishers.¹⁰ The middlemen buy fish from the fishermen when they return from fishing. These middlemen, known as *aratdaars* or *khotidaars*, lend money to the fishermen and provide them boat and net on the condition that the fish caught has to be sold to them at concessional rates.¹¹ The poor fishermen, who are in present need of the BLCs, thus have to rent them from the *aratdaars* at

⁷Gram panchayats in India are the local self governance institutions in individual villages. Its members are elected by the adult members of a village, for a period of five years.

⁸In this study, forest fishers are referred to as those forest workers who fish in the forest creeks and interspersed rivers for crab, prawn seeds and other fish species. They do not practice marine fishing and use human driven wooden boats to fish.

⁹BLC implies a registration certificate to be issued to all registered fishers by the government to carry out fishing within the permitted water bodies inside SBR. BLCs can be inherited through ancestral lineage but are non-transferable. However they can be rented to others.

¹⁰ These people have escalated their economic status over the years and have given up on fishing.

¹¹ In Sundarban, *arat* or *khoti* is a trading camp that governs the fish trade. It is usually located in the villages inhabited by the fishers along the riverbank. *Aratdaars* manage or own these fishing camps and are economically wealthier than the forest fishers.

Rs 30,000- 45,000 (around US\$698) for a period of nine months to one year, during the fishing season. This rent applies to the BLCs within STR, while for the BLCs outside STR; the rent is a little lower, around Rs 10,000-15,000 (US\$ 233). Secondly, considering the growing number of forest fishers over the years, no fresh BLCs have been issued by the Forest Department after the initial allocation of 923 around 44 years back. As a result of this, most of the fishermen have to fish without a licence. Gopalkrishna Haldar, a fisherman and a resident of Jahar Colony in Lahiripur, told us that the charge for renewing the licence per year from the Forest Department office amounts to Rs 500 (US\$ 7.76) presently, while the renting of a BLC from *arataars* costs Rs 45,000 (US\$698) a year (in 2016). Thus if a boat, which usually consists of three people while going for crab collection catches Rs 100,000 (US\$1553) per season (November to March), the amount that goes on rent is Rs 45,000(US\$698). Rs 500 (US\$7.76) has to be paid as a renewal charges of the BLC from the Forest Department. The remaining Rs 54,500 (US\$846) is divided between the three people on the boat as the income from the season - Rs 18,000 (US\$ 279) to sustain a family. But the owner of the boat receives an amount higher than the other two.

With the extension of the core forest area of STR from 1330.12km² to 1699.62 km² in 2007, following its declaration as Critical Tiger Habitat, the villagers in Emilibari say they have been disposed without their consent. The areas where fishing is permitted within the buffer zones (522.85km²) are congested and overfished. The fishermen have to enter the core areas secretly, risking a fine of Rs 500 (US\$ 7.76) for the first offence, Rs 1000 (US\$ 15.52) for the second and Rs 1100 (US\$ 17.08) for the third if caught by a forest guard patrol boat. They have their BLC, boat and fishing gears confiscated if they are caught a fourth time. In this event, the patrolling boat usually transports them back to their village and leaves with the confiscated belongings. To release the licence and fishing equipments from the forest guards, fishermen travel long distances to the head office of the Forest Department and pay a ransom as penalty. Drawing on Bryant (1998: 85), such instances remind us of the colonial legacy in the third world, where political and economic elites accumulate wealth and power based on arrangements replicating colonial authorities. The BLC mentions the name and address of the boat owner and the other fishermen (usually three) on board, linked to *Janata* insurance¹², the number and description of fishing and other equipment as well as firewood quantity carried by the fishermen for cooking purposes in their boats while they are in their fishing expeditions for days. If a fishing boat takes a simpler route to reach a permitted area of fishing in less time, it has to cross the wildlife sanctuary which falls under the core conservation area (Chacraverti 2014: 64). However, the Forest Department does not allow innocent passage through the core (ibid). All of our respondents in Emilibari reported verbal abuse when found in a core conservation area during the passage, and some respondents reported physical abuse. The fishermen are often confronted by the forest guards even if they are found in the buffer zone, simply because the guards presume that these fishermen are retreating from restricted or core areas. Their boats, BLCs, fish catch and fishing nets are often confiscated and heavy fines are imposed.

¹²*Janata* Personal Accident Insurance is fetched from National Insurance Companies to people going for fishing and honey collection below 60 years of age. An annual premium of Rs 100 is collected from the people for getting this insurance (Ghosh 2014).

Harvesting crabs, fishing, and prawn seed collection are the three main activities along the forested creeks and rivers of STR. These involve three discrete locations. While catching crab, forest fishers enter the innumerable creeks within the islands which are inundated during high tides and dry during low tides. Fishing occurs in creeks but mainly along main river bodies, apart from a few fish species found in creeks. Prawn seed can be caught along river banks with pulling nets. In many cases, the fishermen have to travel at least a day to reach a location, and their trips last 7 to 14 days. Prawn seeds, on the other hand, can be caught while pulling the fishing nets along the bank of the river or from a boat. We now elaborate on the three methods.

According to the respondents from Emilibari, fishing occurs from June to the end of October. Hand driven wooden boats carry five to six people on board. Fishermen look for a section of collapsed riverbank. They know that species including *Bhetki* (*Lates calcarifer*) and *Tengra* (*Pimelodus cenia*) will be abundant. They encircle this breached area with a drag shore seine net which has wooden sticks attached to both ends and middle. Two people take the head of the net and move into the water towards the bank and two more do the same in the middle. The remaining two exits from the other end of the boat, encircling the breached bank. This system is called *bait*. Then, after some time, using sticks, the fishermen dig into the mud to make it easier for the fish to enter the nets with the water current. Gradually, the net is lifted up and emptied into the boat. It is risky because many times, it attracts crocodiles. In that case, the net has to be released from one side to avoid tearing, or a crocodile attack.

The second technique involves the use of a gillnet, locally known as *galsha*, which six to eight fishermen carry in a bigger boat. This net is almost 25 feet in width with a mesh size of 10 inches and is made of nylon threads. The net usually attracts bigger fish. Using the same process as above, the sticks fix one end of the net at a riverbank and the other is anchored some distance away. White buoys mark it and keep it afloat. These nets are fixed usually during night at the ebb tide. Next day, after the high tide when the ebb tides returns, the nets are withdrawn so that the fish remains caught in the mesh and cannot recede with the outgoing tide. Ten to fifteen such nets are placed across the rivers. Fish are *Dyatne* (common carp), *Parse* (*Liza Parsia*), *Topse* (*Polynemus paradiseus*) and *Bhetki*.

The third system uses a small dinghy boat with two wooden poles attached on either side to which the fishing net is attached. These are floated for a distance of about 200-300 feet length and have a mesh size of around 75mm. There are three crew members, with one steering. The fishing net is spread along the belly of the river and pulled by hand from each banks. The fish caught include *Parshe*, *Pyra* (*Scatophagus argus*) and *Chingri* (shrimp). The fishing nets used are called fixed bagnet or *Beoundi*, locally.

The fourth technique involves the use of hook and line or *kata don*, locally. Four to five lines have fishing hooks like elongated knives attached along them (called *borshi*). A little snail or small trout are attached as bait. Lines are tied to a wooden log on one side of the bank, and stretch out downstream at a small distance from the edge, and are reattached at the other end. After an hour or two, the fishermen come looking for fish along the thread. This type of fishing is practiced in very narrow creeks. The fish caught by this method include *Tengra*, *Bhetki*, *Baan* (*Anguilla bengalensis*) and *Kajli* (*Tenualosa Toli*).

The fifth system is comparatively common -the use of a spreading net or *khyapla jal* which is thrown into the water standing at the bank of the river. This net is quite heavy and is lined with lead weights, which imprisons the fish. Spreading net is thrown into the river by an individual, standing at the riverbank. It does not need a group.

The last system, which also uses fishing net, is practiced in a very narrow creek just when the water starts receding from the forest land. These creeks are almost devoid of water during the ebb tide and have dense mangrove forests on two sides; an ideal home to the tiger. The nets used are known as *Khalpata* or channel seine nets, usually hundred to two hundred feet long and are fixed across the mouth of the creek. One end of the net is placed by a rope tied to the trunk of a tree during low tide, so it can be pulled during high tides. These nets are fully immersed during high tide. When the water completely recedes, the fish caught within them can't go back. The mouth of the net has to be shut during the high tide to prevent the fish from coming out. The fisherman has to get onto the land from where the water has receded, to take the few fish which are still caught in the muddy water, after washing them in the river water. At this time, they are vulnerable to tiger attacks as they are working in the dried up creeks. *Parshe*, *Chingri* and *Baan* are the popular varieties of fish caught by this technique. Another kind of net, called fixed shore net or *Charpata* is also used. This is almost 100 metres in length with a mesh size of 20mm and is tied with a bamboo pole at regular intervals during the ebb tide. Unlike *khalpata*, *charpatas* are fixed during ebb tides. As the water rises, the fishermen pull up the net gradually and the fish remains caught, coming with the inflow of water and then getting stuck. Tiger attacks are also possible as the operator is bending down to push the water towards the net. The two sides of the creeks are high after the water recedes, from where it is easier for the tiger to spot the man standing on the land below, engrossed in catching fish, thus attacking him from behind.

The second form of forest fishing involves the harvesting of crabs (*Brachyura*) which is accomplished within the narrow creeks of Sundarban. The crab harvesting season, as the collectors say, roughly extends from September to March, although the best catch is expected from November to March. For catching crabs, the STR forest office issues a permit for four people, per boat. But usually three occupy one boat since the income earned is very low and is not sufficient to support four families, after paying for the licence and the permit. Crab collection follows a definite lunar cycle i.e., the period of fifteen days following the new moon and the full moon, known as *Suklapaksha* and *Krishnapaksha* respectively. The day of full moon is known as *punnima* while the day of new moon is called *amabasya*. The duration of the tides and their timings during crab fishing season controls the movement of fishers. *Suklapaksha* and *Krishnapaksha* are divided further into short spans by the fishers depending upon the time when the tide is strongest and the catch is highest. The period of five days from the start of *suklapaksha* and *krishnapaksha* is the time when the tide is strongest and the catch of crabs is highest. During this period, the river creeks are inundated with water to its maximum. Most of the crab collectors venture out for collection during this time. The period after that for consecutive four to five days is the weakest tide and catch is less. During the preceding few days of full moon or new moon, the tide is again very strong and crabs are abundant. The crab collectors usually start on the tenth day of the fifteen day cycle, i.e. five days before *amabasya* or *punnima* and come back on the third or fourth day of the cycle. Each fifteen day cycle is locally known as *gon*. The crab fishers do not start their first journey

of the collection season on Saturdays and Tuesdays or on the day of full moon or new moon. For the entire period of collection inside the forest, which extends for around seven days, the fishermen carry with them rice, grocery, drinking water and vegetables for their daily meals on boat. The essential stock for a crew of three fishers includes cooking utensils, 1kg edible oil, 15kg rice, 1kg potato, spices, 500 gm pulses, 500gm kerosene and 6 barrels of drinking water, each barrel having a capacity of 16 litres. They also have to carry 800-1000 kg of ice to preserve the crab, placed in a wooden cold store (Ghosh 2014:137).

The procedure of crab harvesting involves tying tiny trout called *chuno* to long threads of plastic or nylon (*don*). These trouts are dried beforehand, so that the crab cannot devour one easily. The line spreads linearly for about 500 feet long distance, immersed at low tide along very narrow creeks where tiger attacks are possible, so narrow that in many cases the vegetation has to be cut back as they move along and drop the line. Since the creeks are narrow, the banks on the two sides make it easier for a tiger to jump onto the boat. The bush of a *Hental* tree or a *Garjan* (*Rhizophora mucronata*) tree is so dense that visibility is too poor to spot a camouflaged tiger. One person stays at the back of the boat, one at the middle and one at the front. The person at the middle drops the trout while the other two steer. After the line is laid, they anchor and wait at the end of the creek for about fifteen to twenty minutes for the crabs to be hooked, and then withdraw the line. They use a spoon like vessel called *jalti*, to fetch the crab from the fishing line. Another method involves the use of an iron rod (*sheek*), with a bent mouth to dig the holes where the crabs are found. An experienced crab collector usually knows the holes where big crabs reside. Larger crabs have greater market value. The crab collectors estimate that if the catch is good, around 100 crabs can be caught on a 50 feet long line. The crabs are sold to the *aratdaars* owning the BLC, to whom they are contracted. Of course the *aratdaar* buys cheap and sells at a much higher price. While the crabs were earlier graded (female and 250 gm or more) by the *aradataar* before paying the fishermen, presently the crab fishermen sell the stock of any size at Rs 24,000 (US\$375) or Rs 25,000 (US\$389) per quintal (100 kg) to the *aratdaar*. Selling crabs in bulk does allow those weighing less than 100gm to be sold, which encourages harvesting smaller crabs, but depletes stocks. *Aratdaars* sell the crabs to the fish market in the cities through the traders (*paikars*)¹³, quoting a higher price. Hereby, female egg laden crabs are sold separately and are the most expensive (Rs 500/US\$7.8 for 180 gm). Those without eggs are Rs 300(US\$4.68) per 180 gm or more. Male crabs are cheaper, costing around Rs 200 (US\$3.12) for 200gms, Rs 300 (US\$4.68) for 300 grams and the like. *Aratdaars* sell these crabs in Canning from where *paikars* auction them and send them to Kolkata, where these are packaged and mostly exported to places like Taiwan, Shanghai, and Bangkok etc. However, crab fetches a seasonally high rate to the collectors, than fish.

Prawn seed collection is the third major fishing activity. We came across families where almost all members of a family pull nets at the bank of a river. There are a few techniques for procuring prawn seed. The first method involves the use of a pulling net, commonly known as *tana jal* which is attached to a rope by its end. This is three to four feet wide and five to six feet long and looks like a mosquito net. This pulling net is mainly used by women, at the evening and early morning during high tide, when they wade through chest deep water of the river along the banks in the villages, pulling the nets. Pulling

¹³ According to Mukhopadhyay (2016: xii), *paikars* are traders who buy fish from the *aratdaars* and sell them to the business people in the city of Kolkata.

nets are also used along the banks of the river close to the forest. The banks of the forest are, of course, susceptible to tiger and crocodile attacks. The second method involves the use of a net which is dipped into the water from a boat in mid-river, although poor families do not possess boats. This net is triangular in shape and is tied to wooden poles attached to the boat. This net is also known as a shoot net. One end of the pole is fixed in the mud bank while the other end is tied to a nylon rope. The collected prawn seeds are kept in a white aluminium pot to segregate them from fish or bugs. Prawn seeds are in many cases caught by people who are not fishermen by profession. It is a very local occupation which might earn a family a day's expenses. Since people go chest deep into water to spread the net, crocodile attacks are common, along with tiger attacks, as previously mentioned. After collection, prawn seeds are counted and segregated carefully, which is a long process. Seeds are then sold off to *aratdaars* who come to each village in search of collectors who have just returned from fishing. According to Jalais (2010), the price fetched by the prawn seed collectors from the *aratdaars* during the monsoon months goes as low as Rs 50 (US\$0.78) for 1000 seeds while during lean seasons of January and February, 1000 seeds can fetch about Rs1000 (US\$15.55) to the collectors. The *aratdaars* deposit their purchases from the collectors at their landing centres. Here the seedlings are kept in a water tub for two week to grow, and are then sold off to the prawn fisheries. However this entire process of collecting and selling of prawn seeds is conflictual in terms of price, quantity and cheating during the counting process (Jalais 2010).

Apart from the forest fishers who descended from fishermen families in Bangladesh, others have 'adapted' to the local knowledge of forest fishing through experience and acquisition of skills, staying in the region for a long time. For instance, knowledge about the tides and the moon during crab harvesting, the kinds of net required for different locations and fish species and use of pull nets for prawn seeds are largely 'locality-specific'. Fishing techniques are not ancestrally imbibed, but learnt and adapted through the growing associations with the forest, after migrating to the island. Contrary to the culturally inherited ecological knowledge of the indigenous communities, for the forest fishers in Sundarban, ecological knowledge is 'learnt' to seek nature's cooperation in eking livelihoods. Despite practicing traditional methods of sustainable fishing, which are analogous to the indigenous methods of subsistence, Forest Department ceases to regard the forest fishers as indigenous. Since state bodies are empowered to control and regulate natural resources, they consider enforcement or coercive conservation as the easiest way of establishing control over people and resources (Peluso 1993:201; Gadgil and Rao 1995). In Sundarban, complexities in determining access and rights over resources are further acted out through social identity, since struggles over meaning influence resource allocation as much as struggles over surplus or labour process (Bryant 1992:22). Ideas about cultural identity, rights and traditional practices which inform the 'indigenous' are debilitating for the forest workers in Sundarban, since they are migrants, lacking cultural attachments in relation to the space.

5. The practice of *Mahal*: wild honey collection in the Sundarban forest

Honey collection is another traditional occupation with a substantial contribution to rural livelihoods. Emilibari has a significant number of people who are honey collectors. They are also involved in fishing during its season. So the livelihood activities in Sundarban are not mutually exclusive, driven by extreme poverty. The entire system of honey collection is a cycle beginning and ending at home, and is

known as *mahal*, locally in Sundarban. The STR issues pass/ licence to at least 1000 boats, each honey collecting season. The season includes the two Bengali months of *Boishakh* and *Joistho* (April and May) for a period of fifteen days each. However, some of the collectors noted that passes are sometimes issued for 21 days as well. Before venturing out, a meeting is held by a team of honey collectors prior to leaving the following day. This meeting is headed by the *sajandar* or the team head, who decides the place of visit and the plan. An entire boat with a crew of 7 to 8 collectors gets a licence for a payment of Rs 27 (US\$ 0.42). During this period, honey collectors, who are known as *mawaley* in Sundarban, sail to the forests from their villages, in groups of seven or nine boats together.

While reaching a particular island, all but one of the team disembarks. The honey collectors go deep inside the forest where hardly any sunlight enters even during daytime, due to the density of the flora. The remaining person (*bhorel*) carries a loud whistle called *singhe* with him to help the others retrace their steps while coming back. Formal procedures are followed before entering the dense forest. Before entering a particular forest, a tiger charmer (locally known as *bawaley*) touches the ground (known as *maal*) with his hands as a sign of praying to mother *Bonbibi*¹⁴ to protect the group from any impending danger. Tiger charmers are believed to inherit mystical powers through the blessings on *Bonbibi*. They can thus 'control the environment of the forest', including the movement of a tiger, shut its open mouth and predict areas in the forest where a tiger can be present. If he senses any danger, he advises others to leave that particular land and search for honey elsewhere. Slang and prohibited words are forbidden inside the forest. Collectors dress only in a cloth from waist to knee, and hold a stick on their right shoulder. They carry a steel vessel in which the honey is to be stored and a large knife with them to cut the hive. They should wear a rubber face mask on the rear of their head to confuse tigers and keep them away, but collectors rarely do so, believing it will enrage *Bonbibi*. On entering, the team disperses, horizontally at a distance of 20 hands from each other while moving in, in search of trees like *Hental*, *Genwa* (*Exocoecaria agallocha*), *Khalsi* (*Aegiceras corniculatum*), *Garjan* and *Keora* (*Sonneratia apetala*). Since they remain dispersed from each other while searching for a hive, they communicate to the others through a sign language on locating a honeycomb. All of them then gather under the tree bearing the honeycomb, to extract the honey.

While moving, the buzz of the honeybee (*Apis dorsata*) is the only signal of a hive of honey. Sign language informs the team of a hive discovery. Grass and *Hental* leaves are lit in a fire, known as *bullen*, so that the smoke disables and disperses the bees. When smoke emerges, the bees instinctively behave as if the forest is on fire and disperse, since they are programmed to believe the hive is doomed and there is no point protecting it. These giant Asian honey bees feed on the nectar of the mangrove flowers, and in the process, pollinate them. They are also the most aggressive. Before extracting the honey, the collectors cover their entire face apart from their eyes with a towel to prevent bee stings. However attacks still occur, after the smoke is set, since the bees associate people with threats to their hive. A collector (commonly known as *gachal*) climbs up the tree to break the hive with the knife, while

¹⁴*Bonbibi* is a goddess who is widely worshipped in the Sundarban, especially by the forest workers like fishermen and the honey collectors. She along with her brother, *Shah Janguli* is believed to protect the forest workers from the clairvoyant and the ominous tiger demon *Dakshin Ray*, who rules the forest and feeds on forest workers. *Bonbibi* and *Shah Janguli* defeated him and thus protect the forest workers from the tigers. *Bonbibi* although being an Islamic goddess, is widely worshipped by the Muslims and the Hindus as well as other religious communities, irrespective of caste and creed. For details see Chatterjee Sarkar (2010), Jalais (2010).

the others stand below holding the aluminium pot (*aari*) to collect the honey. The collectors always leave behind a considerable part of the hive, so the bees can make a new one within 14-15 days. Even after the first chunk of hive is broken, they offer the first piece as a sacrament to *Bonbibi*. A mature bee hive can fetch the collectors up to 20 kg of honey. The pot is carried back to the boat based on the direction given by the *bhorel* and his *singhe*. They collect honey the entire day, starting from seven in the morning till four in the evening. But in the afternoon, they do not enter the forest, since it is believed to be the resting time of the animals and breaching this rule would enrage *Bonbibi*. They stay collectively on the creeks for the fifteen days of the permitted collection season, sleeping in the boat at night. With the break of the dawn, they again venture into the forest.

The Sundarban forest is particularly dangerous for life, as we have explained, and collecting honey is one of the most dangerous occupations. Syama, who lives in a small hutment in Emilibari village beyond the embankment, explained that the deepest forest is normally the resting places of the tiger in the summer months of April and May. It is difficult for them to come out of the forests in search of prey because of the heat and they prefer to stay at a cooler place, preferably shades of dense trees like *Hental*, *Garjan* and *Khalsi*; the same trees that host the hives. Secondly, as the honey collectors usually say, 'finding honey in the trees is tantamount to finding a tiger', every step has to be taken cautiously. Tigers commonly attack prey from the rear. Added to this, the dense smoke reduces visibility, making tigers harder to spot. Thirdly, tigers do not attack a person without targeting him/her first. They usually have fixed territories of their own which they can demarcate by the stench of their excreta. Thus they become very aggressive when any other creature enters the zone demarcated by them. *Mawaleys* recall that there are certain honeys bearing trees which the tiger visits almost every day, evident from the fresh paw prints. This is because, they say, they know people will come there and this will be easy prey. A combination of these three factors has made the *mawaleys* vulnerable to tiger attacks.

It is well known to their families that they all might not come back. This very reason makes them reliant on *Bonbibi*, who is worshipped early in the morning the day the *mawaleys* leave for honey collection from their home, at around four in the morning. During the period of *mahal*, their wives refrains from putting vermilion on their foreheads till their husbands return, do not entertain guest, do not visit crematoriums, do not wash utensils and keeps the door open all day, mimicking a mourning period. There have been several instances where many people have been saved miraculously from the tiger, which they believe was the gift of mother *Bonbibi*. An area near Jamespur, close to Emilibari, houses a region known as 'colony of the widows' (*bidhaba pally* in local language), which is just opposite the forest. This is a place where almost all the men have been killed by a tiger and the widows and their small children are left behind. Shyamal Mandal, a resident of Emilibari, told us that ten years back, while he was coming back from the forests, a tiger spotted him. He was walking along the bank of a creek when he heard two people from the bank warning him that a tiger has spotted him from the forests at the left. This is a place called Kalir Char near the Bangladesh border. He immediately turned back and chanting of a hymn (*mother, a tiger is going to devour me*) dedicated to mother *Bonbibi* made the tiger leave and spare him. This belief system of the *mawaley* is rooted in their long traditional association with and use of the forests. They believe that the forest and *Bonbibi* sustains them. This belief system has further gained grounds in the voices of the tiger charmers who are said to be versed in

mythical hymns that drive the tigers away if they are recited in front of them. Tiger charmers are believed to inherit the hymns from mother *Bonbibi* and thus they usually keep them secret, except when they grow old, transmitting them to an heir. A tiger charmer is always a member of a honey expedition. They have certain prohibitions - not entering the forest on Fridays, and refraining from eating pork and crab. They are also believed to control storms or prevent ailments along with the power to drive away evil spirits (Jalais, 2010: 76). However, people should not take resources from the forests beyond their needs.

The honey collectors are the poorest sector of population residing with Sundarban. Their only other occupation is fishing, they have practically no income during the lean seasons when honey collection is not permitted, lack basic education, as suffer waterborne diseases. If an 'accident'¹⁵ happens in the family, there is little support. The collection of honey, for which the Forest Department is dependent upon the islanders, constitutes a threat of life at every moment. While the honey collectors venture the forests in search of honey, bee stings are treated as auspicious. They believe that if a honey bee attacks them, they will be spared from any disease throughout the year. They live at the side of the river, bordering the embankment and prone to loss of live and home at any time.

In their work, it is striking that they have no defences other than resorting to supernatural beliefs. Venomous snakes are also found in the forests, and crocodiles. With each journey into the forests, the honey collectors carry with them a set of traditional practices and rituals, and their own sense of precaution and experience. This traditional respect for the forest means they spare flowering trees which will yield honey in the future. They also spare the small bees and its eggs and cut the honey so that the eggs remain intact. The *mawaleys* are quite adept with identifying the best quality, thick honey. Fishermen forums like *Sundarban Matshyajibi Committee* have recommended the development of factories in the region where wooden equipment and matchboxes could diversify the regional economy. But no initiative has been undertaken by the village councils and the state.

The honey which the *mawaleys* collect braving their lives, has to be deposited to the Forest Offices at a current rate of Rs 150 (US\$2.34)/kg in 2015. Previously it was Rs 50 (US\$ 0.78) to Rs 75 (US\$1.17), which is quite nominal compared to market rates. Honey is then sold to companies like Dabur, at a rate of Rs 350- Rs 370 (US\$5.5-5.8)/kg after adding preservatives and water, according to all the honey collectors with whom we interacted. Figure 1 shows that crude honey collection was lower between 2008 and 2011, but has increased substantially in the last two years.

According to the honey collectors, an 'accident' or death brings additional harassment by the Forest Department. Establishing a death is arduous, since the forest guards accompany the companions of the deceased to locate the place of the accident, but in an atmosphere of suspicion. Thus the victim's family is often, as with fisherfolk, denied compensation. There is a serious concern among the honey collectors about whether the forests of Sundarban can actually be conserved by functionaries of the state who, according to them know very little about the forests, its flora and fauna. PA management with distrust of local people is frequently called into question. According to local people, forest need to be cut and re-grown to remain healthy. The Core conservation areas are not maintaining their biodiversity. Rich

¹⁵Tiger attacks and subsequent deaths are usually referred to as accidents by the people.

mangrove species like *Garjan* have already started to rupture and break down. *Garjan*, according to the locals, if cut well from below, develops at least four to five stilts. But since it is not allowed, the existing *Garjan* are dilapidating and no new varieties are growing. The branches of Nipa Palm (*Nepa fruticans*), commonly known as *Golpata*, needs to be cut from time to time, through the brown edges of its mature branches. But the forest guards do not allow cutting them as a result of which Nipa are not thriving. Wood is losing its dexterity and is becoming fragile. People can demonstrate the greater success of trees on the inhabited islands which they cut from time to time. These have vigour, while the closed areas have bushes rather than trees. Well maintained flowering plants would be thriving sites for honey.

The defiant mode of the Forest Department towards such knowledge reflects the apathy towards recognizing the ‘alternative knowledge claims from actors’ who are neglected in the creation of dominant ‘environmental narratives’ (Forsyth 2005: 168). Environmental narratives refer to the repetitive patterns of environmental explanations, on how ecosystem works or how it might get degraded (ibid). According to Agarwal (1986:4), these are the problems which ‘cannot be solved in the laboratory, and which highlight the need for a radical departure from the typical top down approach to innovation diffusion, and for some basic institutional and structural changes’. There have been cases where a *mawaley* was able to extract 1.5 quintals (150 kg) of honey from a single hive. But the permitted period in April and May is not the ideal time for the hives to fully mature. Several fishermen’s unions have asked for a two month extension, but it has not been approved by the Forest Department. There is no justification provided by the Department for taking the entire amount of honey collected by the *mawaleys*.

Figure 1: Collection of Wild honey from 2004-2014

Year	Quantity collected (in kg)	Value earned (in INR)
2004-2005	22,119.500	11,50,215.00
2005-2006	30,552.000	17,26,799.00
2006-2007	25,170.000	13,56,176.00
2007-2008	21,368.000	13,03,446.00
2008-2009	12,550.000	7,16,479.00
2009-2010	13,800.000	7,78,734.00
2010-2011	14,300.000	8,17,350.00
2011-2012	18,025.000	10,27,425.00
2012-2013	24,750.000	15,59,250.00
2013-2014	20,950.000	15,71,250.00

Source: STR Annual Report 2013-2014.

6. Marginalizing forest workers and defending the pristine wilderness

The empirical observations suggest that the forest workers, despite being ‘non indigenous’, are aware of ecological limits like fish reproduction cycles and employ sustainable honey extraction techniques. Spiritual and cultural values also play an important role in understanding local ecological processes and establishing intimate links and reverence for the forest. The process of honey collection and the rituals

observed are not only to treat forests as a consecrated space, but to integrate the local rules of forest usage and the principles of sustainable extraction (Sen 2016). Traditional methods involve fishing nets, tailored to different kinds of fishing. According to Ray (2013), fishing nets like *Khalpata* and *Charpata* are specially designed to be used in the river creeks, pleated and concealed during the ebb tide and lifted during the high tide. Seine nets are used in the reservoirs and rivers or ponds tied with two bamboo poles to form a large net wall. The fishing nets are not technology-intensive and are stitched at home, without any destructive effects. Most of our respondents started catching fish from a very early age (five or six for many respondents), and said they were aware of the breeding season and refrained from fishing during that period. Such practices continue today. According to a study by DISHA (2009), it was reported that traditional fishers knew from childhood when the different species were not to be caught. If such fish entered the net, the practice was to release them. Religious customs also prohibit eating fish at certain times. So, local knowledge of fishing is based on experience, with a unique belief system that also considers the forests as a source of healing. Especially the forest fruits like that of *Garjan* are revered by the communities and are believed to cure any disease.

Drawing on Berkes, Folke and Gadgil (1995:283), local and regional ecosystems are embedded within the social relations as well as the beliefs and practices which form traditional knowledge. Even within limited localities, the communities have an intimate knowledge of the natural resources, which has permitted the survival of several biological species (Gadgil and Rao 1995:57). However, the rigid demarcations of PAs, in this case the established designation of a tiger reserve, impinge directly on local livelihoods of the poor (Guha 1989:75). Statist resistance towards subsistence based livelihoods like forest fishing and honey collection are illustrated through the ways in which Forest Department acts as a reprimand to the values and ethics of the forest workers. Local knowledge as a reliable option for conservation (like periodic slitting for re-growth of certain mangrove species) has escaped their thinking. This, according to Forsyth (2005: 165), forms the contemporary focus of political ecology, centring the 'political authority of different knowledge claims about the environment' and the construction of 'authoritative knowledge'. International conservation groups have imposed additional pressures on the state of West Bengal to prioritize wildlife conservation in the mangrove ecosystem of Sundarban, as a World Heritage Site. The unilateral financial assistance directed by the international environmental NGOs (like Worldwide Fund of Nature) for conserving Sundarban forests has reinforced the accountability of the state forestry institutions to augment its capacity in controlling local access to resources. Identified as a trend towards neoliberal conservation, or 'a latest incarnation of capitalism' as Veron (2006: 2094) calls it, intervention of these international NGOs promote economic activities and commodification of natural resources (Fletcher 2010:172; see also Brockington and Duffy 2010). Following Peluso (1993: 201), it can be said that in Sundarban, 'global concerns over conservation have imposed additional pressures on the state, in the hope of achieving sustainable management objectives'. The socio-ecological relationships, juxtaposed against the influence of power and inequitable distribution of resources, explains the contemporary nature of political ecology. Conflicts over access are particularly relevant in the context of 'third world political ecology'; an agenda which attempts an integration of environmental and political analysis to better understand human destiny in the developing countries (Bryant 1992:28). Figure 2 provides an offence report published by the STR office during 2009-2014.

Figure 2: Forest offences and seizure from 2009-2014

	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014
POR (Preliminary Offence Report)	11	16	6	6	1
COR (Compounded Offence Report)	1684	1957	2221	2499	2577
UDOR (Undetected Offence Report)	69	72	81	58	
No of persons arrested	35	90	18	36	8
Incidence of firing by staff (in round)	NIL	NIL	NIL	17	NIL
No of offenders died	NIL	NIL	NIL	NIL	NIL
No of offenders injured	NIL	NIL	NIL	NIL	NIL
No of forest staff killed	NIL	NIL	NIL	NIL	NIL
No of forest staff injured	NIL	NIL	NIL	NIL	NIL
Total compensation realised (in Rs)	8, 25, 834,00	8, 63,690.00	10, 92, 700, 00	17, 12, 860.00	19, 65, 450.00
Quantity of timber seized (sawn and logs)	0.5 M ³	NIL	225 quintals of fuel wood	35 quintals of fuel wood	1, 8263 M ³ of timber+52, 811 M ³ of firewood
No of vehicles seized	NIL	8 Cycle Vans	1 Cycle Van	2 Van Rickshaw	NIL
No of dinghy seized	13	22	37	16	7
No of mechanized boat/trawler seized	19	37	4	3	3
No of cattle seized	91	218	52	NIL	NIL

Source: STR Annual Report (2013-2014).

A combination of factors challenges small scale fishing livelihoods in Sundarban. When the fishermen go for fishing deep inside the creeks, they have to carry their own food and drinking water, since they go for at least a week. They used to cook with wood, sourced from floating timber or around the mudflats. But now this is no longer an option. For the last few years, the Forest Department has ordered that each boat has kerosene stove. This, according to the fishermen, is time consuming; since it is frustrating to light a stove in the midst of a forest surrounded by material for a fire. Wood costs nothing and a fire complements breaks in fishing - kerosene is expensive.

Within our sample, 22% households fish with a rented BLC. Rest of them fish without a BLC, thus without an official permit. Due to the endless debt cycle of BLC rent to the *arattaars*, bribes to the forest guards and confiscation of catches, fishermen resort to illegal fishing. But there is awareness of sustainable fishing. According to the narratives recorded in Emilibari, many fishermen have switched to crab fishing as fish stocks have declined. Many fishermen propose the development of inshore aquaculture to improve their livelihood and reduce tiger attacks. The use of otters to catch fish represents one of these non obtrusive measures to catch fish, which has now become obsolete. According to Sasanka Mandal of Emilibari, who was a member of a fishermen union for twelve years, a

real problem is the concentration of assets away from the fishers themselves, through the permitting system:

‘Previously Satjelia had 22-23 BLCs (owned) which has now reduced to 3. *Aratdaars* have at a large scale monopolised them. This is preventing the fishermen to get the market price of the fish being caught by them and the *aratdaars*, acting as the middlemen, are actually getting the market price’.

He had many times raised the need to provide the fishermen with mechanised or motor boats so they can ply from these distant islands to markets in Canning, avoiding the *aratdaars* and thus receiving a proper market price. But no arrangements have been made so far.

The challenges posed by official conservation methods are several. Firstly, there is no scientific study of fish stock management within the STR. The Fisheries Department of West Bengal, CMFRI etc are not involved or rather is not allowed to get involved by the Forest Department in making a stock assessment, due to internal political reasons which were undisclosed to us. Departments, it seems, hold onto and control knowledge and power. Drawing on Veron (2006:2094), such instances can be illustrated as commoditizing nature and bringing natural resources under the ambit of privatization. Secondly, the Forest Department cannot say why only 650 out of the 923 BLCs are active. Thirdly, while forests guards confiscate equipment from the fishermen, no confiscation note is issued to them, questioning what happens to this fishing gear. Public pressure has begun on this point. Lastly, the compensation to be paid in case of the death of a person by a tiger attack inside the buffer area of the forest, the rule is that, the family of a person who enters a forest buffer area with a permit (no compensation is to be provided in case of a core area), is entitled to a cash compensation of one lakh rupees (US\$1562) from the Forest Department. The same amount is assured from *Janata* insurance, the district level council¹⁶ and the Fisheries Department. However in reality, very rarely has the Forest Department actually paid compensation. Since most of the accidents happen inside the core area, they have reasons to support this claim. The forest guards in fact tend to write down on the permit that the accident has happened inside the core conservation area to make sure that no compensation is paid in any way. Regarding the payment from district level council, it requires high level political connections to procure the money. The Fisheries Department insurance is not even known to most of the fishermen, who usually lack a biometric card indicating their occupation. The village council office in many cases doesn't certify them as fishermen after an accident happens. Thus, apart from the *Janata* insurance, families hardly receive any compensation.

In Satjelia, fishermen while fishing had themselves caught pirates felling wood within the forests but there has been no efforts to cease that wood ever since. According to the forest workers, illegal felling happens within the forests against the payment of enticement with the Forest Department and this has become so endemic that people have stopped questioning about it. The crab fishing season which is ideally permitted from June to March, is almost always delayed by a month, starting in July, due to delay in administrative procedures like issuing the pass, thus reducing a month's income of the

¹⁶ In the three tier Panchayati Raj (local self governance) system administering the villages in India, the district councils form the highest level, situated at the individual districts. District councils are followed by block level councils in individual blocks. Village councils are formed in individual villages, referred to as gram panchayats.

fishermen. Added to this, if by mistake on entering a core area, their pass is ceased by a forest guard, it will take another two weeks to release the pass, which means they miss an entire lunar cycle (*gon*) further reducing their income. Transportation costs for a fisherman for travelling to and fro to release the pass from a forest office costs another Rs 200 (US\$3.12), apart from the fine for confiscation to be paid.

Many NGOs, like Direct Initiative for Social and Health Action (DISHA), have time and again pointed out that this entire system of issuing BLC is flawed. If the Forest Department could issue passes to at least 90% of the fishermen (those who are regularly visiting forests in the last five years) every fishing season and the rest 10% be made to apply for passes, then the licensing problem would be solved. But here there is an inequality in access. The patrons of the political parties will tend to acquire licenses faster than others, requiring monitoring. According to our interview with Anamitra Anurag Danda, head of the Indian Sundarbans Programme, WWF, the allocation of the BLCs needs a rationalization since they were issued at a time prior to 1980s and nobody recollects the rationalization used back then. This rationalization should be in the direction of issuing licence to all the forest fringe villages, which would mean that the number of BLCs should be more than 650. Along with this, the problem of over exploitation also remains. But there have not been many negotiations in this regard since only one meeting has so far been possible in a fringe village at Hingalgunje, north 24 Parganas. Here again was the issue of maintaining a record of the number of boats venturing the forests.

8. Discussion and conclusions

About the first research question raised, the study suggests that making universal claims about the impact of indigenous knowledge on the local ecosystems, excludes the question of ‘cultural diversity’ within political ecology debates. Indigenous people, like the tribals, are usually typified by their geographical isolation in hill or forested region, along with high levels of ethnic closure, holding them distinct from other communities (Corbridge 1998:6). Inhabiting particular regional domains for generations, their knowledge about the ecosystem is rooted in their cultural heritage. Cultural identity thus forms a part of their claim making (Karthik and Menon 2016: 48). However the complex of beliefs and practices that influence ecological processes necessitates considering the broader symbolic representations and knowledge systems (Lanzano 2013: 5, 6). The empirical observations of this study reveal how ‘non-indigenous’ life-worlds also articulate distinct ecological knowledge and frame methods of sustainable livelihoods through cultural and ritualistic practices. Unlike indigenous ecological knowledge, the knowledge of the ‘other’ forest dependent communities in Sundarban is learnt through experience and growing associations with forests and is based on needs. Observations from the study also suggest that the watertight classification of the knowledge system into ‘indigenous’ and ‘western’ essentially founders, since growing evidences that suggests transformations, variations and exchanges in the knowledge systems (Agrawal 1995:422). Knowledge cannot be the *property* [emphasis added] of a specific group over a period of time and cannot be characterised in a particular way (ibid, 423). We argue that cultural rights and identities are equally important within the non indigenous communities as well.

To answer the second question, we draw from certain trends as reflected in the study. The mythology of *Bonbibi* supports subsistence use only of forest environments and not their overuse. The tiger charmers, who are believed to be responsible for striking a balance between human and non-human needs, set a proper time to enter the forest without disturbing the animals, and ensure other group members respect the 'rules' of the forest by keeping it clean and not procuring more than what they need (Jalais 2010: 84). Sundarban is the only context where a deity is worshipped not only as a prerequisite of a custom, but because of need, the need to gain confidence and courage before entering the forest. It is precisely because of this collective pursuit of protection, that *Bonbibi*, despite being a Muslim deity, transcends communal barriers and is worshipped by all the forest workers irrespective of caste and creed. The contemporary import of such variants in political ecology demonstrates an alternative to the preoccupation with 'indigenous'. Local fishing and honey collection practices conform to forest conservation principles and indeed have ingrained rituals and practices which revere the forest as sacred. However, such reverence is ignored by the state in its control of the PA as well as in the distinction between 'indigenous' and 'other' local knowledge. Indigenous religious practices in India, like the worship of the *sacred groves* or sizable patches of forest, are however 'immune from human interventions' due to their sacredness (Gadgil and Vartak 1975: 160). The regional criteria of indigenous knowledge might claim cultural resonance in terms of autonomy, ancestral lands, ethnicity and political exploitation. But there is little recognition of the relatively young cultural history of the forest dwellers, which has equal specificities in terms of addressing existing power relations. However, local traditional knowledge of the non indigenous forest dependent communities is undervalued, in spite of its pertinence to local conditions and a conservation agenda.

Our last question, interrogates the exploitation by the Forest Department in practice, by forging a brutal path of coercive conservation, which in the guise of protecting the reserves are actually straining the relationship between the forests and the people. According to Robbins (2012), modernist developments designed to improve production systems have in fact led to a decrease in sustainability with a linked decrease in the equity of resource distribution for local people. Locally, this is manifested as high targets for local honey collection (75 MT for 2015-2016, against 34 MT previously), and proscribed forest cutting and clearing. Denying insurance payouts to the family of the deceased, physical and verbal abuse during innocent passage through the core areas, instantiates the 'use of violence to exercise control, appropriating the language of conservation to legitimate both its claims and enforcement methods (Peluso 1993:201). The inhabitants being migrants, the Forest Department has a further recourse to deny socio ecological relations and subsistence based livelihoods. Quite interestingly, Jalais (2004: 161) notes that since most of the Forest Department staff does not hail from Sundarban, *Bonbibi* is bypassed as an element of 'superstition' by the forest workers for comforting them from tigers. The department functionaries are more inclined to worship 'mainstream goddesses' like *Kali* and *Tara*, which are well inscribed within the Hindu pantheon (ibid).

There are a few techniques which might help to achieve the imperatives of conservation without endangering local livelihoods. If the Forest Department divide the fishing boats according to odd numbers and even numbers and kept a record of the number of boats entering the forests, and each group was permitted to enter the forests in a particular lunar cycle, then restrictions on core and buffer

areas could be eased. A particular section of the forest could open for a particular period of time irrespective of its PA status, while the rest can be closed off and allowed to grow. This process could be more dynamic than the present one by keeping on rotating the resource extraction zones. A stock management of the reserve is an urgent need. Distribution of dry fuel-woods through Joint Forest Management Committees (JFMCs) also makes ecological and social sense. Although JFMCs exist in the area, elite capture and bureaucratic interventions currently dominate. Customary practices are deemed to be small scale and marginal (Sen and Pattanaik, *forthcoming*). A parallel recognition of non-indigenous community rights is particularly important – or an extension of indigenous rights to the groups described in this article. We suggest that sensitivity towards the livelihood of the ‘non-indigenous’ communities and integration of their livelihood practices with recognized indigenous groups might lead to viable capacity building measures within PA management.

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