

## Recreational services in tourism dominated coastal ecosystems: Bringing the non-economic values into focus

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### ABSTRACT

Recreation-based ecosystem services can bring possibilities for protection and sustainable use of coastal ecosystems. This paper analyzes how recreational services influence coastal ecosystem management by studying the south-west part of the Sundarbans mangroves in Bangladesh. The paper argues that a single ecosystem service, recreation based on natural environments, is perceived differently by two different stakeholders; tourists and local resource users. Such variations emerge due to the dynamics of recreation seeking activities of the tourists and the livelihood-based activities of the local resource users. The paper takes a qualitative research framework with a narrative approach and analyzes these relationships through in-depth interviews and focus group discussions. The results reveal that perceptions of recreational services by local resource harvesters can give important and new opportunities for coastal biodiversity management and conservation.

**Management implications:** This study has highlighted some key issues regarding future management of the Sundarbans mangroves in Bangladesh. These management implications can be grounded through four interlinked recommendations, which are:

- Increasing awareness on the local culture and the associated local ecological knowledge pool that ensures sustainable resource harvesting.
- Consideration of non-economic valuation of recreation related to lifestyles of indigenous and local people for a fuller appreciation of socio-ecological relations in tourism-dominated areas in the Sundarbans.
- Better the understanding of ecosystem service trade-offs which tourism brings to minimize the recreational service guided conservation at the expense of other ecosystem services.
- Combine local people's recreational values and tourism to experience full gamut of recreational ecosystem services available from the landscape.

### 1. Introduction

This paper aims to elicit how a single ecosystem service, recreation is perceived differently by local resource harvesters, tourism stakeholders, and tourists through a case study of the coastal mangrove ecosystems of Sundarbans in Bangladesh. In doing so, the paper brings a holistic perspective for the conservation and restoration of tourism dominated coastal ecosystems. Recent studies on marine and coastal ecosystems suggest that there is a need to study these ecosystems using a socio-ecological perspective; such a perspective can better inform coastal ecosystem management, especially where humans play an integral role (Berkes, 2012; Kearney, Berkes, Charles, Pinkerton, & Wiber, 2007; Ruiz-Frau, Edwards-Jones, & Kaiser, 2011). Many of the coastal areas

are also examples of Social-Ecological Systems (SES), as societies in these areas rely on coastal resources for their livelihoods, adapting to local conditions and ensuring long-term and sustainable resource use practices (Potts et al., 2014). Livelihood-based interactions make local societies coupled to coastal ecosystems. Close cultural attachment to coastal ecosystems is thus a key factor for the coupled human-environment interactions that provide multiple ecosystem services for livelihood acquisition. Cultural interactions and the geographical places where these interactions take place are mutually reinforcing (Fish, Church, & Winter, 2016). This mutual connection can lead to sustainable modes of coastal resource consumption and contribute to better human wellbeing.

Recreational services are a part of cultural ecosystem service, which

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is defined as different non-material benefits people obtain from nature. The Common International Classification of Ecosystem Services (CICES, version 5.1) describes recreation as, “Using the environment for sport and recreation; using nature to help stay fit” and “Watching plants and animals where they live; using nature to distress” (Haines-Young & Potschin, 2018). Recreational services in CICES classification falls within the domain of cultural ecosystem services, which are defined as, “characteristics of living systems that enable activities promoting health, recuperation or enjoyment through active or immersive interactions/passive or observational interactions” (Haines-Young & Potschin, 2018). Recreation has been stressed as an important ecosystem service (Kyle, Absher, Hammitt, & Cavin, 2006). Through recreation, humans assign often unquantifiable, intangible values to their ecosystems, which are difficult to judge, express and understand. These values are distinct from the tangible values, which resource users, on the other hand, feel readily as these values relate to their direct livelihood benefits (e.g., nutrition and monetary benefit among others). The unquantifiable, intangible nature makes recreational services a vital attribute of the coupled coastal SES. Coastal SES are also characterized by local ecological knowledge (LEK)-oriented resource use that maintains the resilience of the system (McMillen, Ticktin, & Kihalani, 2017; Olsson & Folke, 2001; Ruiz-Mallén and Corbera, 2013). LEK forms an integral part of coastal conservation through active conservation measures (i.e. conservation without compromising human activities in the landscape) and continuation of the flow of ecosystem services. Recreational services are related closely linked with LEK both directly and indirectly. LEK is directly linked with recreational services, as local knowledge is needed, as for example, for recreational fishing or hunting (Azzurro, Moschella, & Maynou, 2011); and such knowledge is typically transferred through intergenerational and societal exchange of information (e.g., information on fishing and hunting grounds, or information of how to fish or hunt). LEK is indirectly related to recreational services too. For example, livelihood practices through the application of LEK can provide health, nutrition, safety and security on which local recreation may be related.

Several papers argue the importance of recreation in landscape and seascape management (De Salvo & Signorello, 2015; Pena, Casado-Arzuaga, & Onaindia, 2015; Sherrouse, Semmens, Ancona, & Brunner, 2017). Studies show that different stakeholders at different spatial scales attach different values to ecosystem services (Hein, Koppen, de Groot, & van Ierland, 2006). This difference in valuing ecosystems by different stakeholder groups makes it worthwhile to look at the case of recreational services and their contact points with different stakeholder groups. However, the bulk of recreational service-related publications revolve around tourism in the designated areas such as national parks or attractive touristic places (Erfurt-Cooper, 2014; Pergams & Zaradic, 2007; Yamagi & Shoji, 2004), particular types of recreation seekers (Honey et al., 2016; Pegas, Coghlan, Stronza, & Rocha, 2013; Ninoyama & Kikuchi, 2004; Mau, 2008; Belhassen, Rousseau, Tynyakov, & Shashar, 2017; Sarker, Roskaft, Suza, Abdullah Al-Mamun, & Nobi, 2017; Khanom & Buckley, 2015; Uddin et al. 2013), health-related benefits associated with recreational activities (Lankia, Kopperoinen, Pouta, & Neuvonen, 2015; Nishino, Chino, Yoshioka, & Gabriella, 2007), or particular goals such as rural revitalization (Woo & Son, 2014).

Local perception related studies on tourism are mainly concerned with communities' views of tourism interventions (Andereck, Valentine, Anshell, Knopf, & Vogt, 2005; Kim, 2016; Sakata & Prideaux, 2013). Studies that link recreation related ecosystem services to the wellbeing of the local people are scarce. Existing research therefore only weakly captures the coupled nature of recreational services with the local ecosystems. Some sources offer information on the link between recreation and human wellbeing proxies, such as quality of life (Onishi et al., 2006; Phaneuf, Smith, Palmquist, & Pope, 2008; Rupprecht, Byrne, Ueda, & Lo, 2015), and psychological recovery from cataclysmic disasters (Kono & Sinew, 2015). These offer a (rare) window to look at the relationship between recreation and local people (and their culture). However,

despite linkages between recreation and LEK, the information in general on local communities and their perceptions on recreation from local environments generally remains sparse, including its potential to be applied in community-based tourism (Islam, Rahman, Iftekar, & Rakibu, 2013). The skewedness of studying recreational ecosystem services through tourism related activities can be reduced by capturing diverse viewpoints of the local resource users, either independently or in combination with tourism related stakeholders (local and regional actors who are involved in tourism governance), and tourists (who are regarded as external actors). Such pluralistic approaches for capturing diverse values of ecosystems is an essential aspect of understanding the many different ways through which nature is viewed (Pascual et al., 2017). These different viewpoints may differ from conventional approaches through which science works (Tengö, Brondizio, Elmqvist, Malmer, & Spiereburg, 2014). Understanding and conserving these values can lead to nature's contribution to a diverse group of people and thus ground the concept of coupled SES at the landscape/seascape level. Furthermore, as recreation-based activities such as ecotourism are projected to increase (Fennell & Weaver, 2008; Balmford, 2009), we should look at a more holistic approach to tourism with recreational services enjoyed by locals to have wider opportunity to conserve tourism-dominated environments. In order to capture these diverse viewpoints, we discuss the different perceptions of nature and cultural practices among the locals and tourists (section 3.2, 3.3). Based on the information obtained, we recommend the management implications where key stakeholders (the Bangladesh Forest Department, tourism operators, and the local resource users), together with the tourists, can build a consensus on how to carry out tourism with minimum pressure to the Sundarbans ecosystem (section 3.3 and 4).

Based on the review of literature the research explores the following two types of questions (see interview topic guide in Appendix 1):

1. What is the nature of the association of recreational experiences with the surrounding environments (forest niches, rivers, and swamps) that the local resource users and tourism-related stakeholders and tourists enjoy and perceive important (i.e., what these recreational experiences mean to people)?
2. How are these recreational experiences related to other ecosystem services? How do the local society and the tourism related stakeholders and tourists perceive the degradation of the recreational ecosystem services associated with the surrounding landscapes?

Accordingly, this paper aims to identify locals' perceptions and opinions about landscapes and seascapes through the lens of recreational experiences they enjoy. We include study sites in Bangladesh that represent coastal areas where a combination of recreation-based tourism and livelihoods based on local resource harvesting is present. This combination allows us to examine the cases of recreation with deeper 'cultural' attachment (through the narratives of local resource users) together with nature-based recreational practices (i.e., through the narratives of tourism experts, tourism operators, and tourists). The study provides the importance of LEK in recreational services, which can serve as a great potential for ecotourism, and community-based tourism in the study areas. The contact points of (local ecological) knowledge and landscapes are a vital parameter for any sustainable tourism intervention and ES framework can work as a viable tool to understand this interaction.

In the following parts, section 2 introduces the study area and methodology while explaining the contexts and the approach the research takes. Section 3 presents the results of the study and discussions, depicted through perceptions and opinions of the local resource users, tourists and tourism experts, while capturing the recreational services that are associated with the LEK pool. It is argued in the discussion section that recreations that are related to LEK play an essential part in recreation-based ecosystem management, based on which the main conclusions and management implications are drawn (section 4).

## 2. Study area and methods

### 2.1. Study area

Coastal communities in Bangladesh have depended on their coastal ecosystems since historical times through cultural interactions, carving out livelihood benefits from the surrounding landscapes. While the coastal ecosystems in Bangladesh have undergone phases of degradation, many of the interactions for resource extractions such as artisanal fisheries, selective logging practices, and sustainable extraction of non-timber forest products (NTFP) exemplify sustainable use of ecosystems informed by LEK (Datta, Chattopadhyay, & Guha, 2012; Walters et al., 2008).

Batiaghata and Dacope subdistricts (in Khulna District) - where we carried out the case studies (Fig. 1) - are characterized by low income, rural subsistence harvesters who use the forest resources in limited extraction methods (a characteristic of sustainable extraction from mangroves). The researchers' acquaintance with the members of the local societies (including languages) was a major factor in choosing the FGD participants and for analyzing socio-ecological landscapes. The Sundarbans' terrain makes it difficult to access villages and the local resource users, who do not always stay in the villages as they venture into the forests to harvest forest and fisheries resources. Authors' acquaintances were a vital factor for gathering meaningful data from

mangrove resource users (e.g., regarding willingness to talk, and gaining trust for gaining knowledge on their livelihoods and personal opinions). We believe that the personal acquaintances boosted deeper engagement with the resource harvesters during the fieldwork. The main categories of resource harvesters are honey collectors (mouali), nipa palm collectors (bawali), and fishermen (jele). The subsistence harvesters extract resources at the buffer areas as well as the reserve forest areas of the Sundarbans. The subsistence resource harvesters often supplement their income with small scale farming in the villages.

Being part of the Sundarbans mangroves, the study area represents one of the last refuges of the Royal Bengal Tiger (*Panthera tigris*) that is highly vulnerable due to habitat loss and poaching. The mangroves also house other important, endangered, and keystone species such as the salt-water crocodile (*Crocodylus palustris*), Gangetic river dolphin (*Platanista gangetica*), river terrapin (*Batagur baska*), and hawksbill sea turtle (*Eretmochelys imbricata*). The ecosystem represents a socio-ecological system due to the deep cultural attachments of people with wild mangroves (Walters et al., 2008). The mangroves provide diverse ecosystem goods and services, on which rural people rely on for their livelihoods. These services include acquisition of food, fuel and fiber, coastal protection (through erosion prevention which includes protection of coastal villages from storm surges), and nursery habitats for a diverse range of species, supporting marine productivity (FAO, 1997; Walters et al., 2008). The vast 6017 sq. km. mangrove forest areas are managed by Bangladesh Forest Department and represent protected zones in the sense that those who enter without a government pass become illegal harvesters. Tigers and bandits are the two most widespread dangers in the forest area, requiring expert tourism operators, forest guards and trackers to enter the forests. Due to outstanding biodiversity values, the Sundarbans was designated a UNESCO World Heritage Site in 1997 the laws of the World Heritage Site together with Bangladesh Forest Department regulate all types of activities including tourism.

### 2.2. Data analysis and data interpretation

A qualitative framework was used to elicit information from multiple sources (Gillham, 2000) through a range of data collection procedures (Taylor, 2016). Face-to-face interviews (including expert interviews), and focus group discussions were the main tools used to collect data. A case study approach was applied using Harling's definition of case study as "... a holistic inquiry that investigates a contemporary phenomenon within its natural setting" (Harling, 2012). The contemporary phenomenon has been taken as recreational experiences obtained from the mangrove ecosystems, experienced by local resource harvesters and tourists. We used the definition of tourist after Oxford Learner's Dictionary as "a person who is traveling or visiting a place for pleasure", in combination with UNWTO definition of tourists as "A visitor (domestic, inbound or outbound) is classified as a tourist (or overnight visitor) if his/her trip includes an overnight stay, or as a same-day visitor (or excursionist) otherwise" (United Nations Statistical Division, 2010, p. 10).

Open and axial coding was used in a Grounded Theory approach to make meaning from the gathered data (Strauss & Corbin, 1998). Open codes involved extracting chunks of meaningful quotes from the interviews and FGDs, while axial codes involved relating these open codes together through their links with different ES and their degradation (see Appendix 2). The information was then compared with relevant literature together with the interpretation and synthesis of information by the authors relating to the two main research questions.

Data were collected through interviews with local tourism experts (4 respondents), tourists (6 respondents) and informal discussions with 12 forest resource harvesters of Batiaghata (Debitala Village and Katianangla Village) and Dacope (Dangmari Village) sub-districts, in Khulna district (Table 1). Multiple field visits were carried out at various times from August 2016 to June 2017. The tourists were mainly teachers, students (visiting with friends), government employees, and business

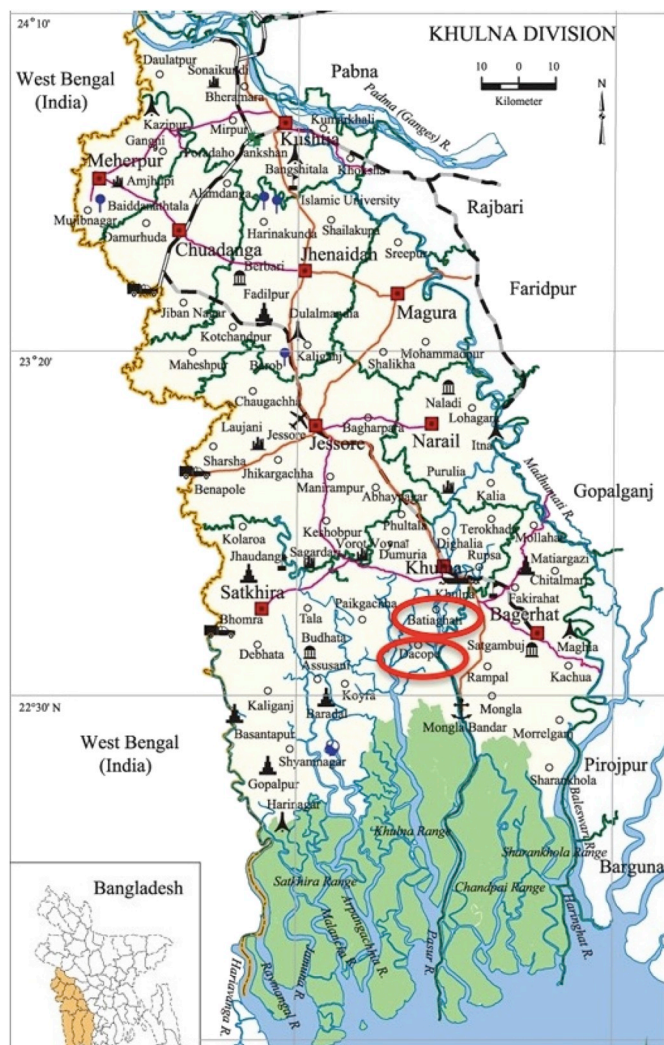


Fig. 1. Location of the study areas, Batiaghata and dacope in Khulna division, Bangladesh (Source Banglapedia, 2014).

professions from Dhaka and Khulna areas (Table 2). Inquiries about the tourism-based recreations were based on questions about the tourism package available in the area to the local experts (e.g., tourism demand in the areas, infrastructure, and main recreational criteria looked for by the tourists). The authors own opinions were also included for analyzing data due to their long-term involvement (about 4 years) with these landscapes through research.

To answer research question 1, we asked key questions such as: “What kind of recreational benefits do you obtain from natural environments of the mangroves? What kind of recreation you enjoy in your life?” To answer research question 2, we asked tourism managers about connections of tourism related recreational experiences with other ecosystem services (e.g., habitat protection, education among others) obtained from the mangrove ecosystems. We also asked local resource harvesters questions such as “Why do you like the mangrove forests?” “Can you give some examples of recreational experiences obtained from the mangrove forests that are important to you?” to relate their experiences to research question 2 (See the list of interview questions in Appendix 1, Supplementary material). These questions made the local resource harvesters narrate their real-life experiences. We then compared their opinions and real-life experiences with secondary literature and expert opinions on the link of recreational ecosystem services with natural ecosystems, including their restoration and conservation.

A narrative approach was the main thread used to bind the data together. We explored recreational connections of locals to their environments by asking respondents to explain their (recreational) experiences (after Riessman, 2008). Personal memories (accumulated through experiences)- which have been argued as the main pillar of a narrative approach (Hinchman & Hinchman, 1997) - were used as the most important tool for assessment. The memories regarding forest-related recreation in our cases were extracted through open-ended questions on how people use the coastal landscapes and seascapes at present as well as what kinds of activities they (older generation) used to perform. In the informal discussions and interviews, both young and old generations participated which helped to capture an insight into the inter-generational change in recreational ecosystem services.

### 3. Results and discussion

We argue in this paper that un-assessed recreational services that are especially connected to the local resource users are imperative to the management and conservation of ecosystems as (1) these recreational services bring new (non-economic) values to the geographical spaces (e.g., different niches of the mangrove forests and coastal seas) with which they are attached, and (2) are connected with different types of provisioning, regulating, supporting, and cultural ecosystem services through their interactions with LEK.

The recreational services experienced originate in two different

**Table 1**  
Methods used for fieldworks.

Study areas	Modes of collecting data	Location	Major goals
Batiaghata and Dacope sub-districts in Khulna district, Bangladesh: Coastal mangrove ecosystem	Expert interviews (tourism expert, local guide, wildlife film maker) in depth interviews (local resource users, e.g. fishermen, honey collectors and nipa palm collectors, and tourists, tourism operators)	Forest fringe villages, local open tea shops where people often gather for storytelling, and information exchange, tourist offices	Capturing different recreational services from the coastal areas Connections with other (e.g., provisioning, regulating and supporting) ecosystem services

worldviews: ‘nature out there’ perception of the tourists versus livelihood-based (instrumental value-laden) perception of the locals who have a strong spiritual connection and greater diversity of place attachment (see Appendix 2). The interviews and informal discussions suggest that for the locals, recreation is a more spontaneous activity and not always associated with recreation seeking behaviors such as planning and spending money to acquire recreational services. On the other hand, for the tourists, recreation is not spontaneous and needs the planning and use of social (human resource) and built capital (tourist vessels port, hotels, offices), as seen by other researchers (e.g., Boyd & Banzhaf, 2007). This often leads to the explanation of recreational services mainly through market-based, economic methods, which cannot capture recreational services perceived by the local resource users applicable throughout a wider area of the ecosystem.

In our case study, tourism-based recreational services are associated with direct services available from the coastal environments. These come out across different recreation-related activities, which are: enjoying and experiencing the local and wild nature, health and learning experiences associated with local environments (at a monetary cost). Recreational experiences associated with feelings such as happiness of enjoying freshly caught fish, sense of purity, and safety when venturing into wild areas were observed to be specialized experiences, related only to people who must carve out a living from nature (i.e. where wild nature is more related to subsistence-based livelihoods). These recreational experiences are related to local subsistence level resource extraction with different provisioning services such as honey, nipa palm collections, and artisanal fisheries. It is here that the recreational experiences are bundled together with provisioning services. We stress that these recreational experiences are scarce to find, need a qualitative framework of questioning to comprehend, and are at risk from decreasing cultural interactions with unaltered coastal landscapes. Fig. 2 shows the relationships these different cultural interactions have with other ecosystem service benefits and losses.

#### 3.1. Recreational experiences by local communities

In the case of Batiaghata and Dacope villages in the Sundarbans, recreational activities most often mentioned by the local resource harvesters were: (1) storytelling of one’s experiences in the forests, (2) looking at the beauty of the mangrove forests, (3) local folk theatre, and (4) experiencing rural festivals such as *Rashmela*.<sup>1</sup>

In Batiaghata and Dacope, recreational experiences are also linked to multiple provisioning services (Fig. 2). Storytelling attracts young harvesters to choose a master harvester (by socializing with forest resource harvesters) and a group with which he will go to the forest for resource harvesting. It is, therefore, a unique recreational activity that also helps maintain the LEK pool for acquiring food and raw materials from the mangroves, while also distributing important information (e.g., presence of tiger, good fishing grounds), and conveying rules inside the forest (e.g., not to overharvest forest resource). The tiger’s presence takes a special place in storytelling. Storytelling asks the forest goers to respect *bonobibi*, the protector of human souls, from *dakshinray* the tiger god. The taboo and belief systems storytelling brings support habitats indirectly through low input traditional harvesting and establish a spiritual connection with the mangroves. For example, there is a belief that everything inside the mangroves is sacred (including the tiger) and one has to take the permission of *bonobibi* and *dakshinray* for extracting resources from the mangroves. Therefore the forests (including tigers) should not be harmed in any way; particularly, one should not take more from the forests than what is needed and should be available for helping others inside the forests. Forgetting “lobh” (greediness) and maintaining “manobota” (humanity) are the two key values that everyone vows to

<sup>1</sup> *Rashmela* is a festival centered on Hindu pilgrimage, which seeks the mercy of *Bonobibi*, the forest goddess.

**Table 2**  
Socio-economic overview of the participants.

	No.	Origin	Age	Gender	Educational level	Occupation	Approx. monthly income (BDT <sup>a</sup> )
Tourism experts	1	Non-local	55	M	Post-graduation	Tourism manager	80,000
	2	Non-local	38	M	Graduation		Not mentioned
	3	Non-local	39	M	Graduation		Not mentioned
Tourists	4	Non-local	35	M	Post-graduation	Teacher	60,000
	5	Non-local	33	F	Graduation	Govt. employee	70,000
	6	Non-local	40	F	Graduation	Govt. employee	60,000
	7	Non-local	36	M	Graduation	Businessman	90,000
	8	Non-local	45	M	Graduation	Govt. employee	60,000
	9	Non-local	24	M		Student	N/A
Forest resource harvesters	10	Local	64	M	Middle school	Honey collector	4000
	11	Local	67	M	Intermediate	Honey collector	3000
	12	Local	42	M	Intermediate	Honey collector	2000
	13	Local	49	M	Middle school	Honey collector, farmer	5000
	14	Local	41	M	Middle school	Fisher, farmer	4000
	15	Local	52	M	Middle school	Fisher, farmer	3000
	16	Local	48	M	Middle school	Fisher, farmer	2000
	17	Local	22	M	Middle school	Fisher, farmer	1000
	18	Local	28	M	Middle school	Fisher, farmer	2000
	19	Local	24	M	Middle school	Farmer	4000
	20	Local	49	M	Primary school	Golpata collector, farmer	2000
	21	Local	51	M	Middle school	Golpata collector, farmer	3000
	22	Local	32	M	Primary school	Golpata collector, farmer	2000

<sup>a</sup> 1 BDT = 0.012 USD (approx.).

protect inside the forest as well as in their life in general. Local folk theatres (known as *bonobibir jatra*) are another recreational activity that plays a role in persuading people to believe in the power of *bonobibi*, thus giving them the courage to enter the forests. This courage, supported by the faith in *bonobibi* is essential in providing the recreational opportunity for the villagers to appreciate the aesthetic beauty of the mangroves. The quote below shows that LEK is embedded through particular beliefs such as the cult of *bonobibi*.

*"We feel very good when going to the forest, there is a tranquility, serenity, beautiful scenery, I like seeing the deer and the monkeys, looking at the different assemblages of plants in different parts of the forest gives a sacred feeling that makes us feel pure."*

*"... A person should not do any wrongdoing or lose the trust of others in the forest, for that means offending bonobibi and thus putting oneself and his team in great danger of tiger attack."*

Local fisherman, Age 41, Interviewed June 2017

Tiger is not in the list of the local resource users, as seeing it probably means death. Tigers, the locals say, show themselves in the Sundarbans only after a successful stalking. However, the local resource harvesters opined that the tiger's presence is necessary for the beauty and richness of the forest. This opinion can be asserted as a unique socio-ecological relation between large predators and humans that can be found in the lower Gangetic mangrove forests in India and Bangladesh. This view includes tigers that kill and/or eat humans. Man-eater tigers are not killed in the Sundarbans, unlike in other parts of Asia such as Himalayan foothill forests in India.

Other culturally-rooted recreational experiences include enjoying the vista of wild mangroves, which, in addition to their attachment with the continuous availability of forest products, makes local harvesters interested in maintaining these forests. The villagers have to stay in these forests for several days with activities that closely link these forests with their livelihoods. The following quote can be raised in this relation:

*"The forest is like our second home, we bring things we need (rice, freshwater, cooking stoves, and medicines) from the villages to stay for more than a week in the forest, we catch fish and crabs from the rivers and creeks in the forest and eat with rice."*

Local fisherman, Age 48, Interviewed June 2017

Awareness of the beauty and tranquility of the forests through direct experiences makes mangrove resource harvesters aware of the changes of the forest. The local resource harvesters, in fact, are quite concerned about the health of these forests, which in their perception cannot be protected with tourism generated conservation efforts only. For example, the following quote can be raised here:

*"... the tourists never get a chance to see the real forest that we experience when we go deep inside it to collect honey. The tourist boats only go to the selected areas. Inside, of the forest is degraded, which the tourists do not get to see; at places, the valuable Sundari trees are cut down, and the stands of different trees are not dense anymore, the loss of forests is not good for acquiring different types of honey."*

(Honey collector, age: 42. Interviewed June 2017)

The quotation above was a notable response from a honey collector (honey collectors are the group who venture deepest into the core areas of the mangroves). The LEK of the honey collectors is unique, as they harvest honey from bees that specialize in collecting nectar from flowers of particular tree colonies inside the forest (e.g., *Sonneratia apetala* (Keora), *Cerropes decandra/Ceripoes tagal* (Goran), *Avicennia marina/Avicennia alba/Avicennia officinalis* (Baen)). LEK-based honey collecting involves maintaining bee colonies by keeping a portion of the honeycomb for bees to repopulate, not killing young bees, and minimum use of machinery for collecting honey. These exemplify some factors for the continuous availability of diverse forms of forest honey. LEK-based logging and nipa palm gathering involve extracting wood from branches and stems that have become old, leaving at least one stem after cutting and harvesting, leaving the central leaf of the nipa palm, cutting only big (9 ft long) leaves and harvesting on a cyclic basis. This type of selective extraction is argued to have a lower impact on the forest trees compared to clear-cutting practices and may favor the regeneration of species that re-sprout from the surviving stems (Walters, 2005). Likewise, LEK-based artisanal fisheries tend to avoid catching fish fry, avoiding fishing during spawning seasons, and using special types of nets across tidal creeks such as bag nets and stake nets (Titumir & Afrin, 2018). The LEK can have a unique understanding of the specific niches of the forest that can be used for conservation. This potential in LEK based resource use has not been well utilized in Sundarbans of both India and Bangladesh.

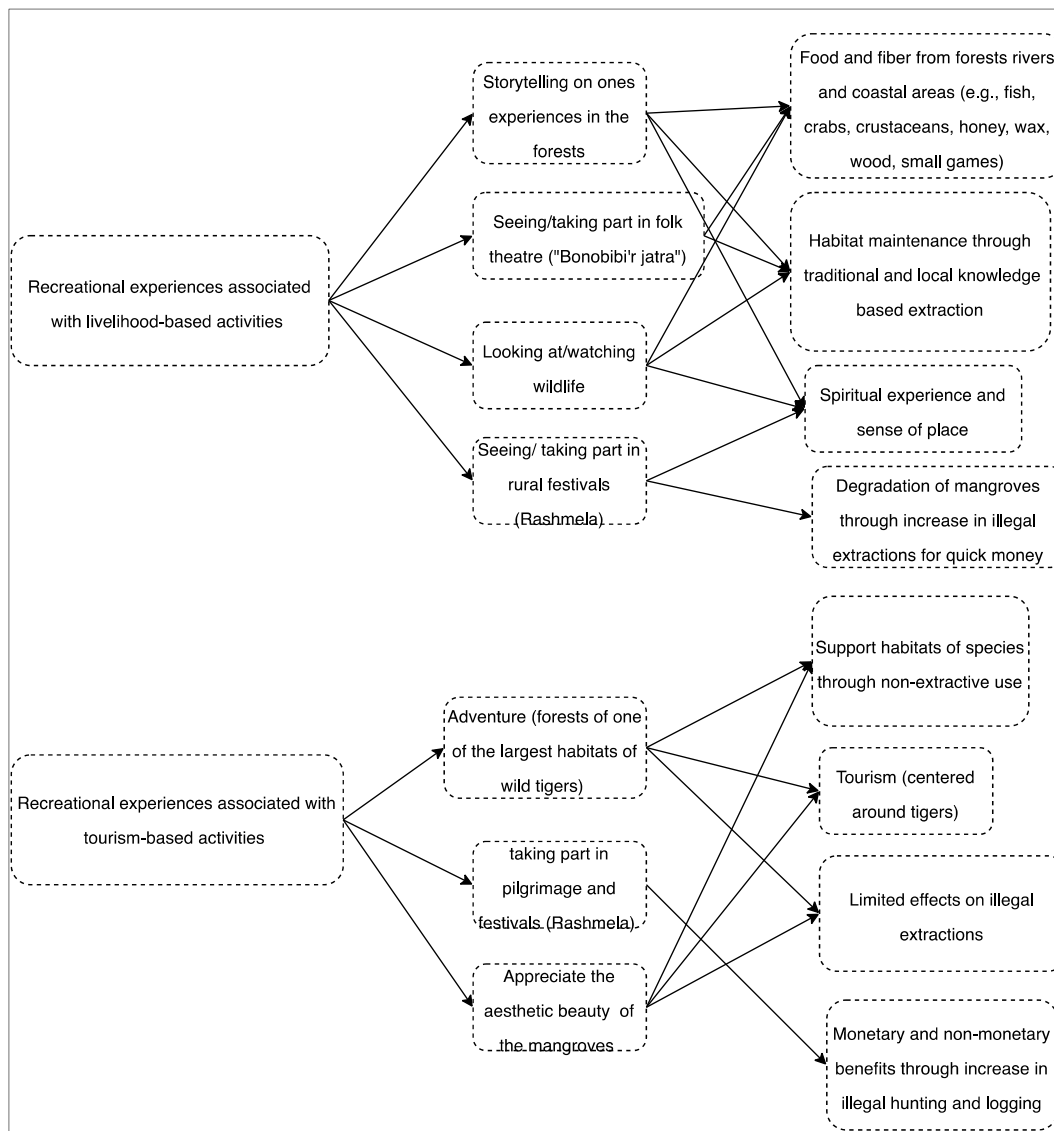


Fig. 2. Types of recreational services and their connection to local environments in Batiaghata and Dacope. Left: Major recreational service seeking behaviors, middle: actual recreational services, right: Connection with multiple ES, including degradation of ES.

3.2. Tourism based recreations

Tourists in the Sundarbans have conscious recreational experience gaining activities that are mainly on acquiring adventurous experiences and education. These are exemplified by (1) active learning experiences such as mangrove forest walk, wildlife watching, and boat cruise with family members and friends, (2) experiencing pilgrimage and festivals (mainly *Rashmela*), and (3) appreciating the aesthetic beauty of the mangroves (Fig. 3).

Tourist recreations in the Sundarbans are primarily based on actually seeing a tiger in its natural environment, and adventure regarding the existence of the tiger. The presence of even the unseen tiger (see quotes below) is the most appreciated characteristic among the tourists; the chance of seeing the tiger remains below 1% (a rough and subjective estimate by an interviewee, who operate tours). The tourists yearn for a real-life experience of nature, serenity, and segregation from city environments, and the enjoyment of rurality and local food. These adventure-seeking recreational experiences can be exemplified with the following quote:

*Sundarbans is an adventurous destination, close to nature, away from the hustle and bustle of the city. It offers tourists 3 days relaxation in complete*

*isolation, no mobile network, there is almost no human activity inside the forest and experiencing the walking trail is a fascinating and thrilling experience, but no tiger attacks have taken place on tourists so far. In weekends too much people visit the mangroves and weekdays remain totally empty, we saw the tiger and her cubs, we see tiger pug marks frequently, feeding deer by hand is very exciting.*

Tourist, Age 35, Interviewed July 2017

Tourism based recreations are noted for the learning experiences they offer. According to a tourism expert:

*There are a lot of things about nature to learn from, not only seeing but also listening without making noise is also a way to learn. ... The forest involves all kinds of good values, the tourists' are interested because it (the Sundarbans) is such a special place, it is the largest mangrove forest, most biodiverse, with fresh water flow that supports the ecosystem, and it is the dwelling place for the amazing tiger.*

Tourism expert, Age 38, Interviewed July 2017

However, this learning experience has serious flaws. Another tourism expert notes that the problem with tourism also lies in the lack



**Fig. 3.** A: silt and mud have left a mark of high tide beside a creek inside the Sundarbans mangrove forest. Interplay of tides is a key pulse of the Sundarbans ecosystem. B: A degraded part of the forest in the Sundarbans. These areas, when intact, can produce outstanding beauty while also providing valuable provisioning such as nipa palms (see to the right background) or fish from the shallow pools, C: a red-faces macaque with thrown out plastic water bottles inside SRF (red arrows), people have to carry drinking water and basic necessities from the villages and cities which increases the impacts of littering D: Tourism with large groups is a very common site in the weekends in the Sundarbans.

(Source: Photographs by ASM Niaz Morshed).

of effort to bring a holistic vision for mangrove tourism by giving the tourists a vision of details of plants and animals and their habitats. In his opinion, tourism should not only be based on packages, such as tigers, beaches and good food. The following quote is an excerpt from his opinions:

*The mudskipper, the tide, different fruits, flowers, and animals of the mangroves and their signs; all is there to be experienced. But the experience one can have in a day trip depends on the guide, whose job is to explain these things and create the connection for understanding the beauty, harmony, and complexity of the mangroves. That does not happen. I haven't seen anybody doing it in the last 15 years.*

Tourism expert, Age 55, Interviewed July 2017

Unfortunately, much of the tourism takes place on a wide scale and ends up with large groups going to specific parts of the mangrove forests mainly to, as one respondent noted, “enjoy good food and come back”. There are other problems with excessive tourist pressure, such as an increase in plastic pollution from tourists (see Fig. 3). One tour operator expressed his concern for the increasing plastic pollution, which is very difficult to control despite tourism related stakeholders’ interest to keep the environments clean.

*... They (the tourism operators) have a vision. This is their business. They take tourists to Kotka creek for a boat trip. Their best interest is not to pollute the creek because their tourists will be happy to experience an intact and unpolluted area. But more and more it can be seen they (the tourism operators) are not being able to keep up with that. The last two trips produced a large number of plastic bottles that could be seen on the beach. That's crazy and unbelievable. The growth of tourism at Kotka with overnight trips and speedboats bringing in hundreds of people is high. The impact of tourism is quite overwhelming.*

Tourism expert, Age 55, Interviewed July 2017

According to a tourism operator and nature guide, after the 1990s tourism from Bangladeshi people started to increase. This increase in tourists took place due to the increase in accessibility as during the post-90s, luxurious boats with staying facilities made access to the forest much easier to attract the involvement of outsiders. In these tourism activities, people searched for the awe and beauty of raw nature in “... rich biodiversity, dynamic estuarine system, and the ‘amazing’ tiger ...”. However, it should also be noted that tourism only increased once the

tiger population decreased to a significant level, and the biodiversity of the mangrove ecosystem was on the decline. Tourism thus flourished when nature was in a degraded state and therefore perpetuates our familiarity with this (degraded) state. So, ironically, the degraded and endangered nature of the Sundarbans is a major booster of tourism. At present, the tours take place in some particular locations in the forest; other parts of the forest, particularly the core area (where any human action is prohibited) remain vulnerable to illegal logging, poaching, and illegal prawn cultivations, evidently occurring according to the reports of the local resource users, environmental activists, and research-based literature. Although these areas remain policed by forest patrol, widespread corruption within the command and control system has been a familiar refrain in the interviews and informal discussions.

There is no doubt that tourism expansion has definite conservation benefits at Batiaghata and Dacope. Tourism has changed the recreation-related interests and consciousness of the locals by spreading a conservation-oriented approach among the general people. This awareness for conservation has seen the non-use values to come out as a conservation pathway in addition to the (subsistence level) use values of the mangroves. Tourism-based recreation can be linked to the conservation of supporting services of the mangroves, through intrinsic values of nature and creating alternative job opportunities for the locals that are related to the non-extractive use of the forest. Little academic research has been done so far to link local socio-ecology to the conservation of mangroves in Bangladesh. Our study suggests that LEK becomes a factor pushed to the background by the new tourism-based interventions, so the livelihood-based relation of people with the ‘wild’ nature of the Sundarbans mangroves near Batiaghata and Dacope gets negatively affected. The interviews and discussions suggest that the tourism-based conservation efforts in its present form cannot reduce the unsustainable practices in the Sundarbans. This opinion is in line with the arguments by Islam and Wahab (2005) that the three sanctuaries created in 1997 are small and fragmented to allow long-term wildlife conservation in the Sundarbans, due to different factors of degradation. Efforts are needed to maintain the LEK that helps in protecting the forests, and it is here that understanding a single ecosystem service such as recreation can unravel unique local worldviews that help maintain forest resources and put un-assessed values into conservation efforts.

3.3. Main findings

Based on the foregoing the findings of this paper are: first, that the local resource users show a fundamentally different understanding of the ecosystem and recreation. The local perception of recreation came from a deeper attachment to the surrounding environments and is influenced by livelihood acquisition. Locals are also aware of the changes in the ecosystem based on their first-hand experiences with local nature.

Second, the local's interactions with the surrounding environments show the connection between recreation and livelihood practices (Fig. 2) that are coupled with LEK of the surrounding ecosystem. This concurrence of recreational experiences and acquisition of food and other materials helps to maintain the LEK. The recreational services to which locals are connected also can be seen associated with coastal ecosystems through intrinsic, instrumental, material and non-material values (Fig. 4).

Third, the differences in perceptions (denoting the differences in worldviews of the local resource users and outsiders), and concurrence of recreational services with provisioning are poorly perceived and inadequately prioritized in the stakeholders related to sustainable tourism and ecotourism activities in the study area. The stakeholders are quite concerned with the health and beauty of the coastal ecosystems because these are also vital economic assets for their income and livelihoods. The stakeholders related to sustainable tourism and ecotourism raise their concern about the pollution problem from unplanned tourism, which remains poorly represented, and there is little effort to connect them to conserve the ecosystem integrity of the coastal areas. The locals, on the other hand, are concerned about the thinning of the forest from the inside, especially in the zones that lay outside the places

where tourism takes place.

3.4. Factors of degradation of local recreational spaces that are related with local ecological knowledge and livelihood

The recreational landscapes of the case study are affected by land-use conversion to prawn-based aquaculture, abandonment of agriculture and fisheries-based livelihood, and outmigration of the indigenous and local people to urban areas in search of greater and better-paid job opportunities. Being an estuarine ecosystem, the study area is affected by several natural and anthropogenic factors. The natural factors are: sea-level rise due to climate change, salinity intrusions in the agricultural field and freshwater ponds that degrade the village level agriculture and aquaculture. The major anthropogenic factors are: unsustainable land use such as the damming of rivers that cuts the freshwater flow off in the agricultural fields and the mangroves (facilitating salinity intrusion further), pollution from cities, industries and increasing tourism activities, illegal logging, poaching (mainly tigers), and the expansion of cultured shrimp and fisheries. These factors were mentioned in the interviews and FGDs in our case study, and their condition does not show a big departure from the literature that study the factors of degradation of the Sundarbans (see Cornforth, Fatoyinbo, Freemantle, & Pettorelli, 2013; Gopal & Chauhan, 2006; Iftekhar & Islam, 2004; Rahman, Rahman, & Islam, 2010; Roy, Alam, & Gow, 2013). These factors have been the significant causes of outmigrations of the indigenous and local communities (a major factor that came out through our case study). Another major anthropogenic factor of degradation that came out from the focus group discussions was the vicious system of loans handed to the local resource users coupled with bribery and corruption that persist even in the protected area-based management system. The informal

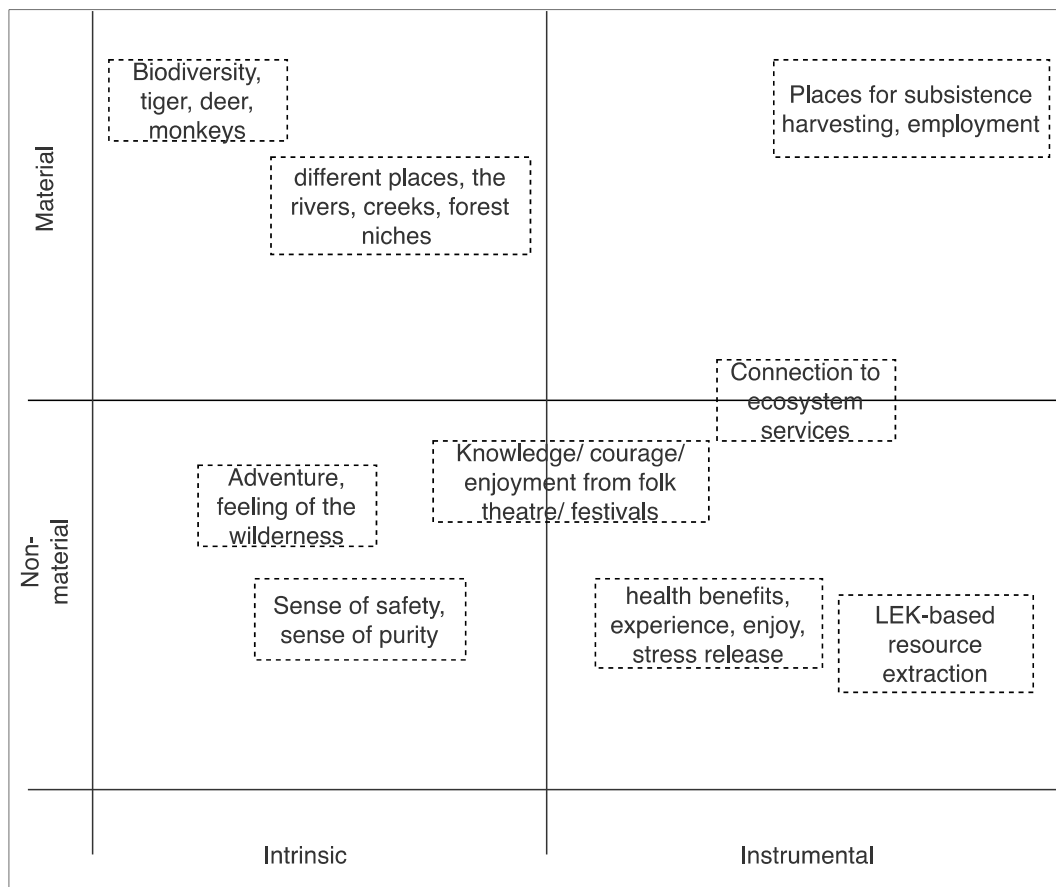


Fig. 4. Relationship of different cultural interactions with the coastal environments of the case study; their connection to recreational services with material, non-material, intrinsic and instrumental values (Source: Serdeczny, Waters, & Chan, 2016; Morrissey & Oliver-Smith, 2013).



discussions also suggest that LEK pool gets degraded due to this vicious cycle, and the local forest resource harvesters tend to extract mangrove products unsustainably, decreasing the health of the forest. We find these drivers of change to be commonly discussed in other literature as well (see Khanom, Shah, & Chaudhury, 2011; Rahman et al., 2010, 2009).

#### 4. Conclusion

As nature-based tourism for landscape management has the potential to increase, it is an appropriate time to critically analyze the recreations rooted in the landscape through local cultural interactions. Our study shows that significant recreational experiences can be embedded in consumptive uses (subsistence resource harvesting, fishing activities) that recreation oriented landscape intervention may fail to observe. Also, a non-economic (a qualitative argument that is able to reveal multiple recreations from the locals and tourists) assessment supports the argument that a conventional nature-based tourism approach is not enough for sustainable management of a wild coastal ecosystem such as the Sundarbans. Our findings in this sense are also in line with Sanna and Eja (2017)'s argument of cultural and recreational ecosystem services of different viewpoints of people that cannot be separated, and that a common standard cannot measure them. A greater understanding and awareness of locals' recreational experiences may fuel a wider understanding of the diverse recreational services landscapes are *actually* able to offer. It is here that nature-based tourism/ecotourism approaches can also broaden their scope.

Our study suggests that the recreational experiences enjoyed by the local resource harvesters and tourists give us two different viewpoints of human-nature interactions that are embedded within a larger sphere of cultural ecosystem services. Tourism-related recreation thus produces one part of the story; recreations perceived by the indigenous and local people provide the other part with a different set of values and cultural attachments with the local environment.

These recreational experiences enjoyed by the locals are inseparable from the other concurrent ES (e.g., provisioning in our case). This shows that recreational experiences connected to livelihoods can add another dimension and thus need particular attention for recreation-based ecosystem conservation.

The tourism interventions come at a time when the ecosystem has already been degraded, both regarding biodiversity and cultural diversity (e.g., LEK-based resource management). It is in this relation that recreations related to livelihood practices need particular attention.

Tourism-based recreational benefits disregard the LEK pool. This disregard can make LEK eventually disappear from the coastal ecosystems (for example, through ageing, depopulation, and outmigration in our case studies), weakening the diverse cultural attachments people have with the coastal environments. Disregarding relations of traditional lifestyle to recreational services can thus decrease the resilience of the socio-ecological systems in the study area.

The discussion and findings (section 3.2, 3.3, and 3.4) imply important management implications for authorities and institutions that strive for effective co-management of the Sundarbans mangroves. Our study is especially relevant to the Bangladesh Forest Department, who is in charge of management of local resource harvesters' activities inside the forests (influencing their livelihoods), and the tourism operators who operate guided tours (although with limited contacts with the locals). Our experiences and knowledge on the area, together with the expert interviews suggest that these two key stakeholders remain the most important as far as the management implications of our study is concerned because of their influence on the local resource users' livelihood and associated LEK pool that exists in the Sundarbans ecosystem, and their management of tourism in the area. Through the actions of these key stakeholders, the appreciation of diverse values of the full gamut of recreational services associated with the Sundarbans can be interpreted to wider society, including tourists.

The Bangladesh Forest Department and tourism operators might consider implementing together, an effective and long-term co-management of the Sundarbans mangroves through the following four interlinked recommendations with an integrated management approach (i.e., by bringing local resource users, tourism related stakeholders and tourists together). These recommendations can be implemented at the ground level through (a) working with forestry officers who are in charge of maintaining local resource harvesters' activities inside the forests (e.g., wood and honey collection, fishing), and (b) tourism operators who can link the recreational services related to LEK to present tourism activities with greater involvement of tourists with the locals. We consider that these recommendations can also be effective in maintaining LEK pool in the area in the future.

The first recommendation has to do with raising awareness (through education and training) on the unique local culture and the associated LEK pool that ensures sustainable resource harvesting from the coastal areas that are expected to decrease in the future.

The second recommendation is that non-economic valuation of recreation related to lifestyles of indigenous and local people should be considered seriously for a fuller appreciation of socio-ecological relations in tourism-dominated areas in the Sundarbans (see section 3.2). If possible the above mentioned management authorities should come up with new tools to capture the non-economic values, especially in areas where top-down management fails to conserve nature.

The third recommendation is to increase understanding of ecosystem service trade-offs recreational tourism brings to minimize the recreational service guided conservation at the expense of other (vital) ecosystem service benefits. In our case, this trade-off is about provisioning-based cultural connections to the ecosystems, and associated biodiversity attributes that landscapes and seascapes possess. Such an understanding should not only be based on knowledge gained from the ecosystem but the connections of recreational services to the biophysical world.

The fourth recommendation is to combine local people's recreational values and tourism. This combination can (a) help the tourists get in direct contact with the 'natural' landscapes, and enjoy the full gamut of (eco)tourism options that local nature has to offer (section 3.2, and section 3.3), rather than opting only for particular attractions such as tigers and other animals, and (b) reduce the leakage of money that takes place in the case of tourism in the protected areas (Banerjee, 2007). The approach of engaging local communities can empower them with better livelihood options other than illegal resource harvesting. Our recommendation is towards an increase in tourism options that make people engage profoundly with the environment by connecting with the locals. Their ecological knowledge and worldviews are essential to bringing tourism interventions closer to biodiversity conservation in the coastal areas (i.e., tourism that uses the socio-ecological connections).

#### 5. Limitations of the study

Our research does not fully reveal the contested nature of the cultural relationship with the environment, as in many instances the local harvesters become illegal loggers and poachers (it is also asserted by local people themselves in our case study in Bangladesh). In Bangladesh, we have only captured opinions of the mangrove resource harvesters who are males in general. The opinions of locals' recreations from women's viewpoints are not well captured in our research. While we assume that it does not change the main arguments as women generally do not go to the forests for resource harvesting and thus do not form a significant part of the forest-based local ecological knowledge pool, we acknowledge that it remains a limitation to studying the recreational services among locals in case of Sundarbans villages.

#### Author contributions

Shamik Chakraborty: Conceptualization; Methodology, Formal

analysis, Writing, Original draft preparation, Visualization, Shantanu Kumar Saha: Conceptualization, Data curation, Visualization, Writing-reviewing and editing, Samiya Selim: Conceptualization, Funding acquisition; Data curation, Visualization, Writing-reviewing and editing.

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### Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jort.2020.100279>.

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