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Dolphin Conservation: A study on the people's perception (A case study from Sundarbans Reserve Forest)

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Declaration

I, **Manish Datta**, hereby declare that this thesis paper is the result of my own effort and extensive work and this work has not previously been accepted in substance for any degree and it must not be approached to any other University or Institution to achieve any other degree whether it is excepted by the Board of Examiner or not.

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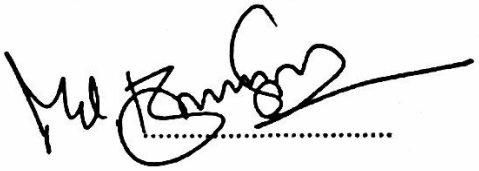
Signature of the Supervisor



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Dedicated

To

My beloved mother.

Acknowledgement

At the very outset, I would like to express my gratitude to almighty God for His benevolent glance upon me for the successful completion of this thesis paper.

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Abstract

Among the 10 cetacean species found in the waters of Bangladesh, one is river dolphin. In 2012, there declared three sanctuaries in the eastern Sundarbans for the for the fresh water dependant dolphins out of which two are very near proximity to local community. For the successful conservation implementation, it is necessary to get informed about the perception of the community people about the conservation status of *Platanista gangetica*. Therefore, the basic knowledge about the species and attitude towards the dolphin entanglements was tried to reveal in this study. 89% (n=150) people participated in this study liked the species into their nearby waters while 53% respondents from the rest who dislike the species because of knowing the fact that it takes fish form their fishing gears. Though 43% of the respondents believe that dolphin oil has some sort of medicinal healing ability regarding pain related issues only 20% of them used at least once in their lifetime. But at the same time 3% admit that they will sell the dolphin meat if they caught dolphin in their fishing gears and 1% will extract oil from the blubber. Even though the number is very low this is very alarming news if this attitude spread among the rest other community members.

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INTRODUCTION

1.1 Background of the Study

Freshwater cetaceans are the most threatened group of mammals (Richman, 2014). Among the all 80 species of the cetaceans, three are freshwater dolphins. The Ganges river dolphin is one of them and this species of river dolphin (*Platanista gangetica*) is classified as "Endangered" in the IUCN Red List of Threatened Species (Smith et al., 2008). Moreover, Ganges river dolphin is one of the 23 endangered species found in Sundarbans (Sarker, 1993). It has been identified as among the top 100 mammals contributing to global phylogenetic diversity (Isaac et al., 2007). Like many other evolutionary distinct species, the Ganges river dolphin has a decreasing population trend (Smith et al., 2008). Obligate freshwater cetaceans including the Ganges river dolphins are currently under threat by a combination of environmental degradation, overfishing and bycatch. Entanglement in different fishing gear is one of the major causes of dolphin mortality in the Sundarbans mangrove forest (Datta, unpublished). As the fishermen are from the near-by communities of the Sundarbans and the dolphin sanctuaries, it becomes important to know their perception about the dolphin conservation.

1.2 Problem statement

In the wildlife conservation sector understanding of the community people about the importance of conservation is not so simple, as there is no direct earning by saving the particular species. In the Sundarbans area, focuses on the wildlife conservation were given from several decades. But from the last decade the conservation related or human wildlife conflict news got better focus of the national and international media than the previous times. Among the wildlife species focus conservation approach in this region, dolphin or cetacean focus conservation is relatively new. It started with the Wildlife Conservation Society (WCS)'s activity in 2006 and there were no scientific studies on the dolphins before this very organization. In fact, no literature claims the presence of 10 species of cetaceans in the waters of Bangladesh before 2006. However, in 2012 Bangladesh forest department declared three sanctuaries for the fresh water dependent dolphins in

the eastern Sundarbans area. First two of them (Dhangmari and Chandpai sanctuary) is situated in the periphery of the forest and the other one (Dudmukhi sanctuary) is deep inside the forest. These peripheral water bodies of Sundarbans are considered one of the most productive areas of the country and are being heavily fished by the local community for the livelihood purposes. Moreover, fishing or fish fry collecting in these water bodies are one of the major sources of their income and some cases it is the only one. Considering the fact that, the basic dependency of the community on the water bodies that is equally credited as safest place of the of the freshwater dependent dolphins of their whole range gives the clue that people are the key to dolphin conservation in this area.

It is often important to understand the local people's perception about biodiversity concerned activities as they live in the very field. The perceptions of the conservation differ from the institution to institution based on their objective. Sadath et al. 2013 have shown framing even news of species conservation of same content can differ in presentation depending on the media of national or international level. The idea of framing the perception of local people is a bit complex than that of framing an institution. Justifying the knowledge of the elementary information about the species, importance of the conservation of this species can be a way of assessing the perception of local people on conservation. In wildlife focused conservation approach, knowledge of the local people about the very species is important. In the later stage, this knowledge helps develop a positive attitude toward the species and often determines the success of the species conservation implementation. Therefore, like any other conservation approach, people's perception is a vital element of dolphin conservation in this densely populated region and focus have been given to understand it better way in this study.

1.3 Objectives of the Study

The objectives of the study are to characterize the knowledge of the people living in the fringe villages based on the basic information of dolphins and their response towards the event when the dolphin in distress. Therefore, the objectives are-

1. To assess the perception of the community members on dolphin conservation.
2. To establish socio-demographic factors that influence community perceptions of wildlife conservation.

1.4 Research questions

1. How affirmatively or negatively community members whether take the issues related to dolphin conservation?

2. Are they socio –economic factors influence their attitude dolphin in distress?

LITERATURE REVIEW

2.1 Dolphin species in Sundarbans

Mangrove is one of the four major forest types that found in Bangladesh. It is a complex ecosystem where usually terrestrial organisms share habitat and other resources with the aquatic one. Therefore, the term mangrove wildlife covers animal both from the land and the water. Cetaceans are the one of the mentionable animals that inhabits our Sundarbans mangrove forest and ignored by the researcher until 2006. There found three species of cetaceans in the Sundarban mangrove forest which are South Asian river dolphin (*Platanista gangetica*), Irrawaddy dolphin (*Orcaella brevirostris*), and Finless porpoise (*Neophocaena phocaenoides*) (Smith et. al., 2008). In rivers and mangrove channels, the species is most often observed at channel confluences and divergences and downstream of sharp meanders. They have been seen in the same area as finless porpoises in coastal waters of Bangladesh and Myanmar (Smith *et al*., 2005), and in the waterways of the Sundarbans mangrove forest (Smith *et al*. 2006).

Figure: Finless porpoise

Finless porpoise and Irrawaddy dolphins have a discontinuous distribution in the tropical and subtropical Indo-Pacific, almost exclusively in estuarine and fresh waters (Stacey and Arnold 1999; Arnold 2002). Finless porpoise mostly occur most in the eastern Asian regions and in Bangladesh this species occasionally seen in the downstream of Sundarbans. Irrawaddy dolphins occur from Borneo and the central islands of the Indonesian Archipelago north to Palawan,

Figure: Irawaddy dolphin

Philippines, and west to the Bay of Bengal. There are freshwater subpopulations in three large rivers Irrawaddy dolphins prefer coastal areas associated with the muddy, brackish waters at river mouths, ranging offshore as far as the extent of the freshwater plume – often only a few km but more than 60 km at the Meghna River mouth in Bangladesh (Smith *et al*. 2005). In rivers and mangrove channels, the species is most often observed at channel confluences and divergences and downstream of sharp meanders. They have been seen in the same area as finless porpoises in coastal waters of Bangladesh (Smith *et al*. 2005), and Ganges River dolphins in the waterways of the Sundarbans mangrove forest (Smith *et al*. 2006). As this species seen occasionally in the Sundarbans and the Ganges river dolphin seen more frequently in the Sundarbans and all over the Bangladesh this study will focus on the Ganges river dolphin.

2.2 Ganges River Dolphin

A stocky freshwater dolphin, characterized by a long beak containing large, visible teeth. Like most river dolphins, this species has little need for vision in the muddy waters it inhabits, and as a result has tiny, non-functional eyes that lack lenses. Individuals use echolocation to detect food and navigate, and – to a very small extent – for communication. The species lives in one of the most densely populated areas of the world. It is threatened primarily by the damming of rivers for irrigation and electricity generation, which degrades habitat, isolates populations and prevents seasonal migration. Concerted conservation action is needed if this species is to survive.

Figure: Ganges river dolphin

Taxonomy

Kingdom: Animalia
Phylum: Chordata
Class: Mammalia
Order: Cetartiodactyla
Family: Platanistidae
Scientific Name: Platanista gangetica
Species Authority: (Roxburgh, 1801)
Infra-specific Taxa Assessed: *Platanista gangetica* ssp. *gangetica*

Common Name(s): Ganges River Dolphin, Indus River Dolphin, Blind River Dolphin, Ganges Susu, Ganges Dolphin, South Asian River Dolphin

Habitat and Ecology: Ganges River Dolphins are generally concentrated in counter-current pools below channel convergences and sharp meanders (Smith et al. 1998) and above and below mid-channel islands, bridge pilings, and other engineering structures that cause scouring (Smith, unpublished data). Their fidelity to counter-current pools is probably greatest in fast-flowing channels (Smith et al., 1998). Annual monsoon-driven floods cause great variability in the dolphins' access to large parts of their range. Isolation in seasonal lakes sometimes occurs (especially in the Brahmaputra basin), as does "escapement" from the river channels into artificial water bodies such as canals and reservoirs. Deltaic (brackish) waters are a major component of the total range, but Ganges River Dolphins are not generally known to occur in salinities greater than 10ppt, although they have been recorded in waters as saline as 23ppt (Smith 2011).

2.3 Major Threats: There are several threats to Ganges river dolphin population, the four are considered major threats for dolphin population. These are mentioned below-

Embankments and Dams: Dams and barrages degrade downstream habitat and create reservoirs (known as head ponds (or pondage in India) in the case of barrages) with high sedimentation and altered assemblages of fish and invertebrate species. For example, luxuriant growth of macrophytes and excessive siltation have eliminated suitable habitat immediately above Farakka Barrage. Moreover, the insufficiency of water released downstream of this barrage has eliminated dry-season habitat for more than 300 km, or until the Ganges (Padma)-Brahmaputra confluence (Smith et al. 1998). It has also allowed salt water to intrude an additional 160 km into the Sundarbans Delta (Rahman 1986), further decreasing the amount of suitable habitat for this obligate freshwater dolphin (Reeves et al. 1993).

Toxic Contaminants: Organochlorine and butyltin concentrations in samples from the tissues of Ganges dolphins were high enough to cause concern about effects (Smith, 1998). Pollutant loads can be expected to increase with industrialization and the spread of intensive agricultural practices facilitated by water diversion. River dolphins may be particularly vulnerable to industrial pollution because their habitat in counter-current pools downstream of confluences and sharp meanders often places them in close proximity to point sources in major urban areas (e.g., Dhaka). Furthermore, the capacity of rivers to dilute pollutants (e.g., arsenic, DDT) and salts has been drastically reduced in many areas because of upstream water abstraction, diversion, and impoundment. Again, this problem is bound to worsen as more development takes place.

Hunting: Deliberate killing of river dolphins is believed to have declined in most areas but still occurs at least occasionally in the middle Ganges near Patna, India (Smith, 2011), in the Kalni-Kushiyara River of Bangladesh (Smith et al. 1998), and in the upper reaches of the Brahmaputra River in Assam, India (Mohan et al. 1997). Dolphins are killed by tribal people in the upper Brahmaputra for their meat and by fishermen in the middle reaches of the Ganges for their oil, which is used as a fish attractant.

Mortality in Fishing Gear: Mortality in fishing gear, especially gillnets, is a severe problem for Ganges River dolphins throughout most of their range (Smith 2011). They are particularly vulnerable because their preferred habitat is often in the same location as the fishing grounds. In the middle Ganges, although harpooning is now "rare", mortality in fishing nets remains "widespread". A specific problem is that, because dolphin oil is highly valued as a fish attractant, fishermen have a strong incentive to kill any animals found alive in their nets and even to set their nets strategically in the hope of capturing dolphins. Meaningful quantitative data on the magnitude of catches, either deliberate or incidental, are unavailable and unlikely to become available in the absence of a well-organized, adequately funded, and incorruptible fishery/wildlife management system.

Therefore form the above mentioned major threats it is clear that the embankments and toxic content are result of the inter country or intra country policy making process .But the later two major threats are directly related to the perception of the community people about the species. Still in Bangladesh Sundarbans region the species is not deliberately killed but if a fisher men is find animal entangled in his net he is less likely to set the animal free as it has some market value in reality (Smith, 2008). As report of such activities is found so easily as people do not feel comfortable to discuss things as there are legal complications. So it is important to see the community people's perception about this species thus to determine the conservation actions necessary.

METHODOLOGY

3.1 Description of the study site

The Study area is situated in the south-western part of Bangladesh and in the eastern part of the Sundarbans mangrove forest. The Sundarbans is the largest single track of mangrove forest in the world and one of the important biosphere reserves of country's flora and fauna diversity. It is the safe home to many more species including the keystone ones like tigers and dolphins. The Sundarbans in Bangladesh part consist of 60% of its total area of 10,000 square kilometers. Though the east, west and south part of Sundarbans in Bangladesh are protected, the east is considered much more diverse than rest others. In fact the three new sanctuaries declared for the freshwater dependent dolphins are all situated in the eastern part of the Sundarbans forest. Therefore, the study area includes the fishing villages and market towns along the Passur River and adjacent waterways near the edge of the Sundarbans Reserved Forest. It ranges North from Chila (N22.429036 E89.611995) to Chandpai in South, (N22 22 30.6, E89. 39 01.4) and it consist of approximately 25 kilometers path alongside the Passur river.

Figure 3.1: Map of study area

Hence, one major fish landing site and all the major market places were included in this study area. These major fish landing sites are Chila Bazar (N22.429036 E89.611995) and Mongla (N22.470962, E89.604339) are important because of the fish that comes from the nearby rivers, estuaries and the bay area and Often by-catches like dolphins, sharks, turtle etc. comes in this market with the fish.

Other Major market places in this region like Cahndpai bazaar (N22.370536 E89.644160), Chila Bazar (N22.429036 E89.611995), banshtola bazaar (N22.458941 E89.583454), Holldibunia bazaar (N22.536069 E 89.580706), boiddomari bazaar (N22.528876 E 89.569343), Podderganj bazaar (N 22.579300 E 89.514941), Shaheberabad bazaar (N 22.570530 E 89.504222), keyabunia bajar (N 22.602961 E 89.523928), are included in the study. All these market places are important because major fishing villages are around these markets and people from all walks of life living in these areas have to come to these market places to sell and buy their daily necessities. Therefore, any mentionable unusual news like dolphin entanglement and meat sell (there were report that some people try to sell the dolphin meat) can be collected easily and can be justified.

3.2 Sample size

In an attempt to gain a better insight into public perception within Bangladesh, this study considered the community perception of conservation and their attitude and practice in practice. The study area was located in the South West of Bangladesh and was selected due to being in an area near proximity to the Sundarbans reserve forest and particularly two out of the three recently declared dolphin sanctuaries. Chila Union of Mongla Upazila consists of 14 Village (BBS, 2011). Among these villages, villages alongside the Passur River were stratified first and then 4 villages were selected randomly for data collection which represents 25% of the study area. As the population of the study area is uniform, 25% population can represent the total population of the study area (Kothari, 2001). The size of the sample was determined using the following equation: The sample has been estimated as the percent, defective within 4% of the true value with 95% probability (Kothari, 2003).

$$n = \frac{z^2.p.q.N}{e^2(N-1) + z^2.p.q}$$

Where,

n = Sample size

N = Total households in selected 4 Villages

z = 1.96 (as per table of area under normal curve for the given confidence level of 95%)

e = 0.04 (the estimate is considered within 4% of true value)

p = Sample proportion, 0.06

q = 1-p

The total number of households in the selected 4 villages of Chila Union is 1134 (BBS, 2011). Using the above formula, the total sample size for survey worked out at 121.066 which was rounded up to 121. Later 29 more interviews were taken from people who fish in the Chandpai sanctuary area but reside in this area. Therefore, a total of 150 interviews added with sample size in the sanctuary area.

3.3 Entanglement Assessment by interview survey

Survey Background and Procedure: From its' beginning, Wildlife Conservation Society's Mortality Monitoring Network response to the news of dolphin mortality got through its' widespread network in the Sundarbans area. Besides the collection of biological data and physical measurement, MMN team members also identify the possible cause of the death. Therefore, over the last several years the identified cause of dolphin death in most cases was entangling in the fishing gears. As it is thought that, only a portion of the mortality reports is got through the MMN hotline number, it became important to get the idea of real scenario of annual mortality of the dolphins in a year in the sanctuary and adjacent area. As there is no baseline studies on the dolphin mortalities in this area, a study on this issue become inevitable.

3.3.1 Questionnaire

At the beginning of the study, a survey was piloted to test the study area and the method. A semi-structure questionnaire consists of 19 questions focusing on general information of the interviewee and information on the dolphin entanglement and the consumption of the dolphin products. The general part of the questionnaire focus to get the answer of the social, financial and educational information of the interviewee, his/her knowledge about the dolphins, the species' presence in the adjacent waters, his occupation and his area of work, where does he fish (if a fisher) with what type of fishing gear he use, where he fish. In the entanglement part of the questionnaire, it was designed with a set of questions for dolphin entanglement in fishers own net and another set with slightly different questions were to collect the information of entanglement in others people's fishing gear where the interviewee was not involved.

Lastly, the consumption part, as it is comparatively sensitive and tough to get the answers than the rest two parts, a set of questions was deliberately set to get the answer without making the respondent feel uncomfortable or less uncomfortable. Sometimes several questions were set to get same information from the different perspective, as in practical experience, it was seen that people do not want to answer these sort of question as they feel there might be some sort of legal complication .

150 interviews were taken in total that survey and covered four fish landing sites, several villages and other half portion the Passur River adjacent to a sanctuary. The sampling method was random (non-probability sampling method) designed to choose respondents from the nearby fishing community. The questionnaire for the consumption part was designed for the people from all walks of life but entanglement part designed for the people who are living by the side of the rivers and preferably work as a fisher for all the year round or a major portion of the year.

The pilot survey was conducted along with two-native speaking assistant who were informed the purpose of the study, trained earlier and monitored frequently to reduce the study error. The final approved version of the questionnaire was also translated into locally appropriate Bangla for the same purpose. A protocol was also prepared to describe how to choose the interviewee, tackle possible situation may appear in the field and to avoid other hurdles. For first few days, survey was conducted around the sanctuary and on the sanctuary areas where report of the dead dolphin

come more frequently, then it was conducted in the areas of close proximity from the sanctuaries and lastly it was conducted in the distant areas from the sanctuaries but nearby to the confluences and tributaries where dolphin sighting were still frequent.

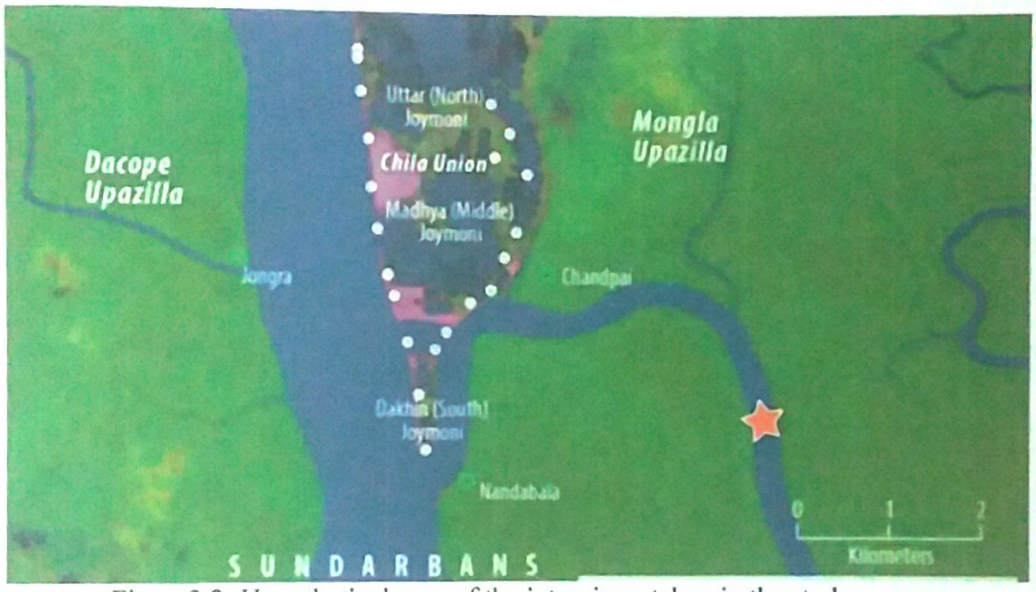

Figure3.2: Hypothetical map of the interviews taken in the study area

3.3.2 Questionnaire modification: As some questions in the pilot questionnaire did not worked well some questions from both part were subtracted. Several questions were added in the questionnaire as felt might useful in necessary information collection while some questions were just modified a little. The questions number increased from 19 to 23 (Appendix-1) in the core survey. The prominent modification done in the consumption part as the response on this part was very little. In the general part, focuses were given more in the fisher's fishing practice. A table was added to see respondent's fishing pattern in different season. This table formed question was also added to involve fisher in discussion and make him/her easy before going to the sensitive questions.

RESULT and DISCUSSION

4.1 The demographic feature of the respondents

The demographic features of the respondents in the study area are shown in Table 1. As the survey conducted among the fishing communities alongside the Passur river and its major tributaries; almost all the respondents were fishers. (97.8%) out of the 150 respondent reported fishing is their main source of income while a few of them (2.2%) reported fish business. Formal educational achievement of the major portion (34.6%) of respondents lies within the primary level. Furthermore, a significant portion of the respondents (32.8%) have no educational background. A few of the respondents have higher secondary (2%) and higher educational (1.6%) background.

Criteria	**Specification (%)**			
Gender	Male (90.5)	Female (9.5)		
Occupation	Fishing (97.8)	Fish business (2.2)		
Religion	Christian (4.5)	Hindu (50)	Muslim (45.5)	
Education	No education (32.8)	Primary (34.6)	Secondary (2)	Higher (1.6)

Table 4.1: Demographic information of the respondents

There were only 9.5% female and 90.5% male participants among the respondents which might be for women's less participation in the in the fishing related activity. The religion of the respondents were Christian (4.5%), Hindu (50%) and Muslim (45.5%).

33.6% of the respondents depend solely on fishing for their living while rests other (66.4%) need to do other things for their living.

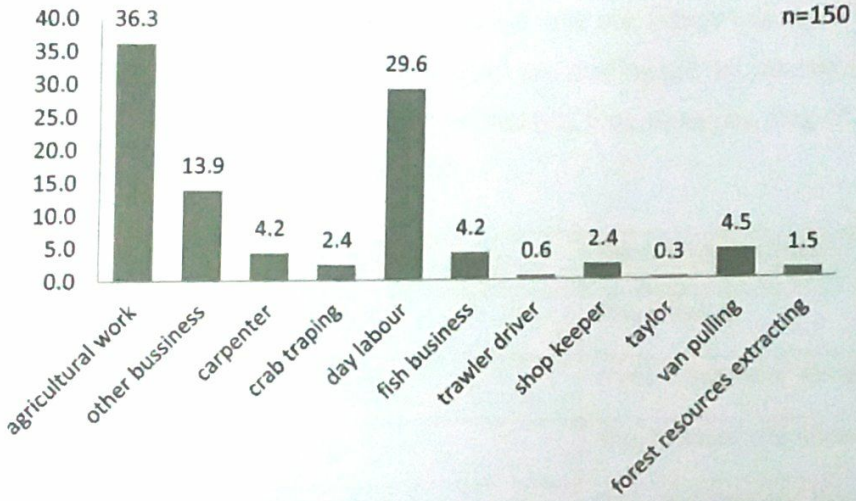

Figure 4.3: Occupation other than main business

A major portion (36.3%) of the respondent dependent on the agricultural work as their alternate sources of income other than fishing while working as a day labor is the second major (29.6%) source of income. Other businesses like vendoring in the village market, selling vegetables' etc. are the third major (13.9%) source of income. Beyond the above mentioned, van pulling (4.5%), carpentry(4.2%), fish business(4.2%), crab trapping (2.4%), shop keeping(2.4%), forest resource extracting (1.5%), trawler driving(0.6%) are other mentionable sources of income other than the fishing.

4.2 Fishing Gears

More than twenty fishing gear practices are found within the Sunderbans area, among them one third is post larvae fishing practice (Table 4.2). Post-larvae fishing gears are the particular versions of some common nets targeting fish fry and made from the mosquito bags. The common post larvae types are post-larvae set bag net, post larvae box net, post larvae hand drag net, post-larvae hand push net, post larvae fish seine net and post larvae drag net. Others common fishing gears that found in the Sunderbans area are fixed floating gill net, drifting gill net, set bag net, cast net, long line with many hooks, crab line, crab trap, hook and rod, long shore net, drag net, etc.

Serial	Gear type	Targets catch	Identifying character
1	Post larvae set bag net	Shrimp fry	Blue in colour
2	Post larvae hand drag net	Shrimp fry	Blue in colour and triangular frame
3	Post larvae box net	Shrimp fry	Blue in colour and rectangular frame
4	Box net	Small fishes	White in colour and dragged along bank line
5	Cast net	All kind of fish	Normally black in colour and conduct from the river bank
6	Crab trap	Crab	Box made of bamboos
7	Drifting gill net	Hilsha fish	White in colour and large in length (1500m)
8	Fixed floating gill net	Bigger sized fish	Large in length and one pole is fixed
9	Hand drag net	Small fish	A patch of net is tied with triangular frame
10	Long shore net	Bigger sized fish	Large in size(800m-1500m) and usually set before the incoming tide along the shore line
11	Set bag net	Shrimp with certain size	Usually set before the outgoing tide
12	Rod and hook	Bigger sized fish	A rod is attached to string with bait in the end

Table 4.2: Major fishing gears found in the study

4.3 Perception regarding the dolphin conservation

Out of the 150 interview 90.4% of the respondents believed that fisheries stock has decreased while 6.4% of them believed it has increased and rest 3.2% believed the stock remained same. 88.8% of the respondents reported they like the Ganges river dolphin while others (11.2%) reported they dislike the animal.

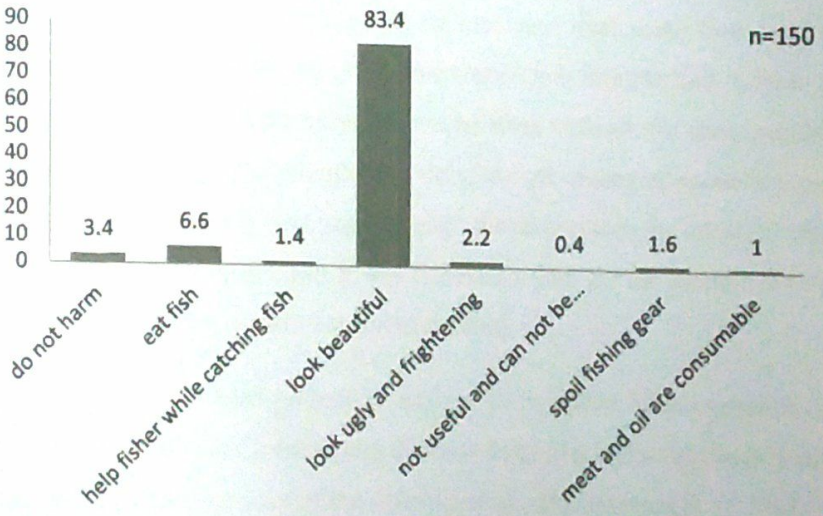

Figure 4.7: Reason for preference

83.4% of the respondents liked the animal as because they look beautiful and 3.4% like as this animal do not harm people. Interestingly, 1% of the respondents like the animal as they can consume meat and extract oil form dead animals. On the other hand, 6.6% of the respondents do not liked the animal as it eat fish, 2.2% for its ugliness and frightening look and 1.6% for spoiling their fishing gears.53.2% of the interviewees out of 150, have seen a Ganges river dolphin take fish from their nets while rest others (46.8%) never seen the animal take fish from their nets. Among 150 respondents, 88.2% have seen more Ganges river dolphin in the river in a specific season. At same time, 11.8% respondents have not experienced more animal in a particular season.

63.5% respondents out of 111 who saw more Ganges river dolphins in the river in monsoon, 15.4% saw more dolphins in autumn, 14.7% in winter, 3.4% in summer and 1.6% in late autumn and 0.7% in spring. Out of the 150 respondent, 58.4% thought that there are a particular time of year when dolphins get entangled more than any other season of the year while 41.6% thought there is no particular time of year when dolphin get entangled more than any other season of the year.

52.1% out of 150 respondents thought that dolphins get entangled more in monsoon because of the increased hilsha fishing gear this time of year, 32.5% also thought that monsoon is the season when dolphin get entangled more but reason was different. They thought dolphin get entangled more in this time because dolphin appear more to eat increased fish in this time of year. Moreover, 7.5% of the respondents also think that monsoon is the season when dolphin get entangle more because come downward from the upstream with the increased fresh water flow and hence it result more entanglement. On the other hand 6.2% of the respondent thought that dolphin get entangle more in the dry season because of the decreased water level with almost same number of fishing gears. Rest few respondents (0.7%) thought that dolphins get entangled more in pre-monsoon as the water temperature increase this time year. Though the response to the question who sells those products was very limited but most cases it was fisherman who got the dolphin entangled his/her net and the local vendors in the weekly hat (local market).

Furthermore, there found no fixed pattern of answer in response of the question who use the dolphin product. People from the Christian and Hindu community and some cases from the Muslim community also is the main consumer of the dolphin meat. But alarmingly 18.5% (n=150) of the participants think meat is the demandable part of the dead dolphin and 20% think blubber for the same.

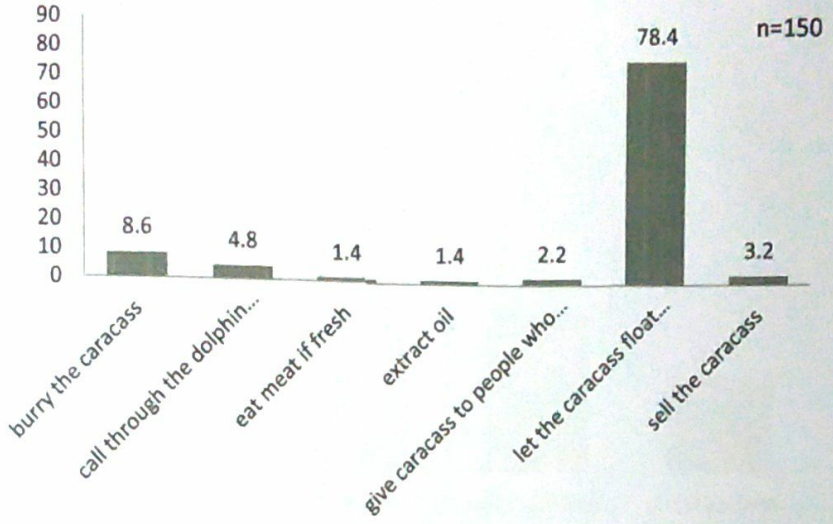

Figure 4.13: Attitude towards dolphin conservation related event

Out of the 150 respondents, 78.4% of them would let the carcass float to the downstream, 8.6% of them would bury the carcass, 4.8% would call through the dolphin hotline, 3.2% would sell the carcass, 2.2% would give the carcass to the people who eat, 1.4% would eat the meat if fresh and rest 1.4% would extract the oil from the carcass.

43.5% of the 150 respondent reported that only hindu people, 15.2% reported that it is the curious people regardless of religion buy the dolphin product, 11.4% reported the Christian, 10.9% reported both the hindu and Christian people, 5.4% reported people suffering from pain, 4.3% reported no one purchase, 3.8% reported hindus and muslims, 2.2% reported traditional healers, 1.6% reported fish businessmen, 1.1% reported muslims and 0.5% reported fishermen buy dolphins and parts thereof. Though 95.4% of the 150 respondent did not use the dolphin product but 4.6% of the respondent informed that they use dolphin product.

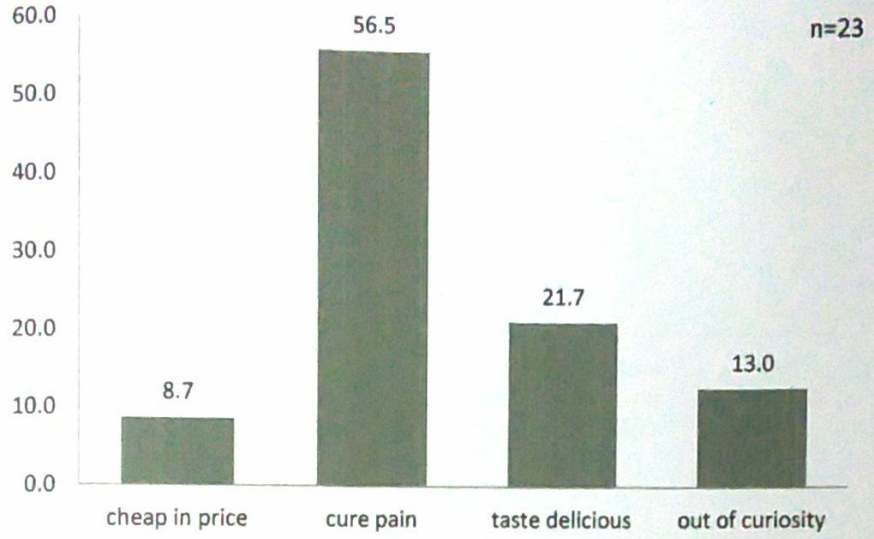

Figure 4.16: Attitude towards dolphin conservation related event

8.7% among the 23 respondents those who bought the dolphin products, bought it because cheap in price, 56.5% because it cure pain, 21.1% because it tastes delicious and 13% bought it out of curiosity. 54% among the 109 respondents who used dolphin body part, used blubber to extract oil, 27% used blubber to extract oil and meat to eat, 18.1% consumed meat, 0.3% used bowel to make medicine and 0.3% consumed fin. Though 74.8% out of the 150 respondent had no idea about the dolphin product, 25.2% of them informed about the price of the dolphin product.

57% of the interviewee of the 150 respondent thought that dolphin products had no medicinal value while 43% thought that dolphin products had medicinal value.

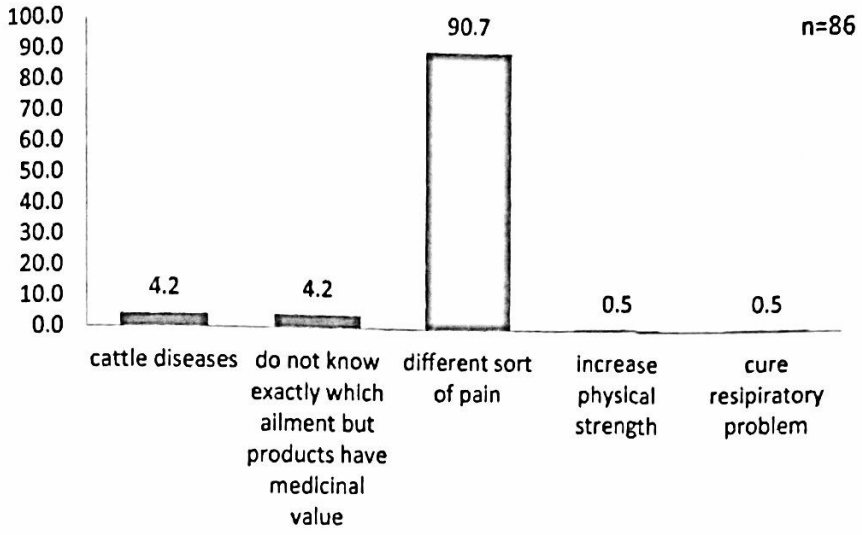

Figure 4.20: Attitude towards dolphin conservation related event

90.7% of 86 respondents who answered this question, believed dolphin product(oil) cure different sort of pain, 4.2% believed it (oil) cure cattle diseases, 4.2% do not which ailment cured by dolphin products but they believed that it(dolphin oil) have medicinal value, 0.5% believed dolphin product (meat) increase physical strength and rest 0.5% believed it cures respiratory problem.5.8 % among the 150 respondents admitted that they personally used the dolphin products while rest others (94.2%) informed they have never used dolphin products in their whole lifetime. Alarmingly 93.1 % of the 29 respondent those who used the dolphin product informed that dolphin product (oil) worked to meet its purpose (i.e. pain relief) while rest 6.9% informed that it did not worked.

4.4 Discussion

More than twenty fishing gear practices are found within the Sunderbans area, among them one third is post larvae fishing practice (Table 4.2). Post-larvae fishing gears are the particular versions of some common nets targeting fish fry and made from the mosquito bags. The common post larvae types are post-larvae set bag net, post larvae box net, post larvae hand drag net, post-larvae hand push net, post larvae fish seine net and post larvae drag net. Others common fishing gears that found in the Sunderbans area are fixed floating gill net, drifting gill net, set bag net, cast net, long line with many hooks, crab line, crab trap, hook and rod, long shore net, drag net, etc. To check whether any of the above mentioned fishing gears are responsible for the dolphin entanglement, it was found drifting gillnet is mostly responsible (22) for all the entanglement in all the year round and most number of dolphin deaths (15) and set bag net is second most responsible net for dolphin entanglements (10) and deaths (7).

Status	Fishing Gear				
	Drifting gill net	**Fixed floating gill net**	**Post larvae set bag net**	**Set bag net**	**Total**
Alive	22	3	1	10	36
Dead	15	5	0	7	27
No idea	2	0	0	0	2
Total	39	8	1	17	65

Table 4.3: Season wise dolphin death

Therefore, it was important to see whether season has any influence in entanglement of dolphin. So, cross tabulation was done based on the information of dolphin alive and dead with the different season and found highest number of dolphin death in monsoon (14) and in dry season it is 13 which means that there is no significance difference in dolphin death due to the season. It might be for the size of the sample which need to increase in number in the later study.

Status	Season				
	Dry Season	Pre Monsoon	Monsoon	Post Monsoon	Total
Alive	15	1	18	2	36
Dead	13	0	14	0	27
No idea	1	0	1	0	2
Total	25	5	33	2	65

Table 4.4: Season wise dolphin death

Same process was done to check whether the education has an influence in dolphin death by entanglement. It was found that, people who have had primary education are responsible (12) for the more dolphin death than the people had no education (8). Even though respondents who had secondary education are responsible for the less numbers of dolphin death.

Status	No education	Primary Education	Secondary Education	Total
Alive	11	17	8	36
Dead	8	12	7	27
No idea	0	1	1	2
Total	19	30	16	65

Table 4.5: Literacy wise dolphin death

From the above discussion it is clear that even though dolphin entangled most in the monsoon than any other season the number of death is low compared to other season. This might be for in the

rainy season there are more fish in the water and more number of the fishing nets at the same time. On the other hand it might be for the nature of the fishing in the seasons. Of course in the rainy season people often remain on board to conduct the hilsha fish net which allow them to free a dolphin when entangled. But in the dry season it might the set net bag fishing where the fisherman need not to be on board all the time.

CONCLUSION

The importance of investigating the particular relationships humans have with wildlife has been lately acknowledged and this study joins the research on context-sensitive management plans for implementing conservation. Lack of consideration for the local needs and perceptions of wildlife makes conservation actions in the territory weak and prone to fail. New sanctuaries are declared for this territory, and workshops with local people are essential for them to correctly understand their role and give their opinions on their creation and design. Additionally, these areas are surrounded by these populations and therefore conservation measures that strengthen local conservation capacities are highly recommended. This study finding again proved people's perception about the dolphin conservation still in very preliminary level. It is true the elderly participants though show the compassion about the species and towards its conservation the younger participants has less connection with the species. That might be the cause of the species day by day disappearance from the nature. Therefore, to involve the future generation more with whole process more conservation focused education in this very area or awareness building activity is in need. Here given some recommendations that might be taken into consideration-

Recommendations

- A large scale study is recommended to get the better insight of the situation.
- More conservation focused educational program can be arranged to inform about the current status of the species, long term benefits and give idea about alternative income generated activities to restrain them from using illegal activities.
- Community based dolphin watching tourism can be solution to this problem to involve community save the species by themselves.
- Strict execution of the existing laws in the sanctuaries by the enforcement agencies.

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Appendix-1

For Interviewer Only		
Date	_____ Interview number _____ Interviewer and translators names _____	
Village name	_____ Waypoint of village _____	
Interview location (e.g. at fisher house)	_____ Gender of interviewee _____	
Religious affiliations of village	Hindu Muslim Buddhist Other (*please detail*)_____	
How was the interviewee selected?	Found Volunteered	Comments on the interview:
Start time of interview		

1. How old are you?

2. What is your main source of income?

3. Do you have any other source(s) of income? Y / N

   If Y then,
   a) What is the other source(s) of income?

   b) What proportion of your income comes from fishing?

4. What do you call the animal surface frequently in the river? (a little description of South Asian River Dolphin)

Entanglement

5. When did you last see a dead Dolphin?

6. How many dead dolphins have you seen over the past year?

   a) Season:

   b) Location:

7. Have you caught (or have you seen anyone to catch) any dolphins in the past year? Y / N

   If Y, then:

a) How many have you (or has he) caught?

b) Were they alive or dead?

c) When did you/he catch them?

d) What was the gear type

e) What was the tidal condition then?

f) What was the intensity of fishing there?

g) Where were they caught?

h) How far from the bank?

i) What was the exact geographical location?

j) What water depth?

8. Do you think the rate of entanglement differ with season? Y / N

If Y, then:

a) What season of year do dolphins get killed in fishing gear the most?

b) Is there a particular time of year when people catch more dolphins?

If yes, then ask the following:

c) What season do people catch more dolphins?

d) Why do you think people catch more at this time of year?

9. How many types of fishing gear do you use?

10. Can you name the fishing gear that you use here?

11. Can you name the main fish species that fishers try to catch with a particular gear type

Fish:
Gear:

12. Do you think more animals get caught in fishing gear today than the past? Y / N

If Y, then:

a) Why?

13. In which gear type, entanglement of the dolphins occur most?

Consumption

14. What do you/people do when they found a dead dolphin?

a) burry it b) sell it to the market c) let it go

15. When people want to sell the carcass where do they go?

Name of the market:

16. How much is the normal price for an average size of dolphin?

17. What part of dolphin body is most demandable?

a) Why?

18. Who are the potential customers of the carcass?

19. Have you heard anything about medicinal value of dolphin carcass?

a) What is it?

20. Do you think it (medicinal value of dolphin carcass) is true? Y / N

If Y, then:

a) Have you used any part of dolphin product as medicinal purpose? Y / N

If Y, then:
Do you know from where he brought it?

a) Time :

b) Location:

b) Have you seen someone to use? Y / N

If Y, then:
Do you know from where he brought it?

c) Time :

d) Location:

21. Can you name any other locally sold dolphin product?

22. Rank the products according to demand.

23. Do you know other places where dolphin product is sold?