



Social Factors Affecting the Conservation of Tigers in the Samsheer Nagar Area of Sunderbans

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Author's contribution

The sole author designed, analyzed, interpreted and prepared the manuscript.

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ABSTRACT

Increased human populations and the resulting encroachment of related lands with poaching of tigers and their key prey threaten the survival of tigers across their range. Mere collection of huge data on ecology does not promote the protection of carnivores but it mainly depends on public co-operation and awareness. The public attitude towards carnivores (*Panthera tigris tigris*) is vital because fear pervades among the local inhabitants. Our target population consisted of all adults inhabitants. We sampled arbitrarily founded on geographic area. We guessed that the best data collection method would involve sampling at home of the residents by personal interview with the questionnaires due to huge illiteracy of the inhabitants. Proceeding this way was time-consuming but proved to increase the quality of responses. We studied villagers' mind-set and collected information on public awareness, feelings and frequency of sightings related to the tigers. They were conscious of its existence and aware of its ecological values to conserve Sunderbans also. To better understand the social factors affecting large carnivore conservation, we surveyed the tiger-affected people, the relatives of the people killed by tigers and the common villagers in the village of Samsheer nagar of Sunderbans, West Bengal, in India. People living in this area are heavily dependent on forest for their livelihood. They collect honey and catch crabs and fish seedlings from the jungle. Nowadays, many tourists came to see flora and fauna and the eternal beauty of Sunderbans. Many people depend their livelihood on tourism. These social factors make them to think to save Sunderbans. If Sunderbans is destroyed in near future, then they will suffer economically. A financial constraint of the inhabitants to protect the human lives and cattle from the attack of tigers was

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revealed by choosing the category willing to conserve but not afforded to pay. This study was the first assessment of public responsiveness and exposed the basic data for understanding Bengal tigers in the area of Samsher nagar of Sunderbans.

Keywords: Carnivore conservation; human-tiger conflicts; *Panthera tigris tigris*; public attitude; social survey.

1. INTRODUCTION

To study the conflicts between human and wildlife, environmental attitude [1,2] plays an important role to implement policies [3,4] in the fields of conservation biology and wildlife management [5,6]. Kellert [7] relied on economic valuations as a principal merits evaluating the public perceptions in the case of conservation of large predators and estimating the budget allocations in the conservation program. Different variables (Awareness, Knowledge etc. of a certain species) are intertwined with socio-cultural and economic issues and the understanding of these variables may indicate a new path of the conservation policies.

In our case we used to survey public awareness and other important variables in the case of tigers of Samsher nagar area which is adjacent to the Sunderbans of India. Our another recommendation was to start a management program for this species before the situation worsens and also ecological research projects are urgently needed to confirm its exact threat level. Of the many questions that we asked them, one of the important ones was, 'Do you think the tiger must be protected?' When the question was posed to the tiger-attacked persons and the nearest relatives of the people killed by tigers, the poor, illiterate villagers' opinion was that if the tiger survives, then the Sunderbans will live, which made us understand their sensitivity towards nature. Respondents always expressed a relatively higher interest in protecting their lives and cattle than simply preserving tigers. Therefore, it is mandatory to clarify and tackle this issue to gain public support for a management project.

To fulfill our methodological objectives we set a questionnaire and visited the villager's home to collect their opinion.

This questionnaire was consisted of Governmental actions on protections, awareness of tigers, feeling towards tigers and trust in institutions. Our target population consisted of all adults residents. We collected data of the

questionnaires by personal conversation with the villagers. Here other methods will not be effective because most of them were illiterate. This process was useful and also proved to increase the quality of responses for illiterate persons.

Our research objects were to collect information of inhabitants' reaction about tigers and Sunderbans. The first research object was to find out whether it was necessary to start an environmental educational program among the villagers immediately by focusing the importance of the utilitarian value of ecology of Sunderbans and tigers for wildlife conservation.

Our second research objective was to find out the social factors to conserve the large carnivores and Sunderbans and whether it was needed to start a management program to reduce the human-tiger conflict. To this end we collected and analyzed field data on human-tiger conflict and the views of tiger-affected people and local residents to preserve tigers and Sunderbans. We hope that our findings would be useful in developing the future eco-management program by the concerned authorities.

1.1 Background

1.1.1 Target species

There was a time when *Panthera tigris* roamed across Asia. Yet today this magnificent animal has become extinct from an estimated 1, 00,000 to 3500 in just 100 years [8]; [9] and occupies less than 7% of their historic range [9] and are now found in 13 countries only: Bangladesh, Bhutan, Cambodia, China, India, Indonesia, Lao PDR, Malayasia, Myanmar, Nepal, Russia, Thailand and Vietnam [10]; [11]. In spite of continuous and tireless efforts made by international agencies, governments and local conservation groups [10]; [12] tiger conservation program have not achieved remarkable results.

It is an endangered species [13]. The major threats to tiger populations are habitat fragmentation, poaching, diminished prey population and persecution by humans [14]; [15]; [16]; [17]; [18]; [19]; [20]. The number of tigers that an area can support is largely reliant on the

abundance of suitable prey [21]; [22]. Prey depletion is a serious threat to any tiger population and there are signs that it is occurring in the Sunderbans; prey poaching has been detected, with snaring a common practice. Snares can also be damaging to non-target species including tigers. The market for wild meat consumption is thought to be largely local, but the overall scale of the problem is unknown. Prey could also be depleted through disease introduced by domestic animals; in some northern parts of the forest, deer share habitat with cows, goats, and dogs. There have been no signs of disease in the deer or wild boar populations, but this issue has not been investigated.

India now hosts 70% of the world's population which has declined by over 90% in the past fifty years but the status of tigers in India released by the National Tiger Conservation Authority (NTCA) on July 29, 2020 is 2,967 (Report of Government of India, Ministry of Environment, Forests and Climate Change, 2020). There are 50 tiger reserves in India and most of them have shown a substantial increase in tiger population that is about 30% in the past four years.

1.1.2 Information on *Panthera tigris tigris* of Sunderbans, India

The Bengal tiger (*Panthera tigris tigris*) is the largest living felids except Siberian and extinct Caspian subspecies [23]. Records of tiger human conflicts of 1860 in Sunderbans of India show that 4218 people were killed and eaten by the tigers in just six years [24]; [25]. According to Chakrabarti [26], on an average 22 people were killed by tigers annually on the Bangladesh side between 1975 and 1999 whereas an average of 36 humans per year were killed by tigers on the Indian side of Sunderbans with only 28.5 % of victims bodies being recovered. According to P. K. Vyas, chief wildlife warden of West Bengal, "It is mostly fishermen (75 %) who get killed by tigers, followed by honey collectors (17%), wood cutters (6%) and forest staffers (2%). Honey Collectors are very vulnerable because they follow the bees deep into the territory, without inkling of what lies ahead." [27], (Note 1). The data are depicted in Table A.

1.1.3 Public awareness and data on human tiger conflicts

The ecological value of Sunderbans may engender public support for its conservation but this may offset by the potential awareness of ongoing conflicts between the tigers and the

inhabitants of the surrounding area. In addition, the tigers of Sunderbans have historically shown as a man-eater and generally have a poor likeability. Again knowledge and information level could strongly condition the general public opinion.

In our case we used to survey human – tiger conflicts, public awareness and other important variables in the case of tigers of Samsher nagar area which is adjacent to the Sunderbans of India. Our main objective was to collect the reactions of local villagers, tiger affected people and their relatives about the tigers and ecological balances of their area.

2. METHODOLOGY

2.1 Study Area

The Sunderbans has 182 tigers – 106 in Bangladesh and 76 in India (See map 1) according to the modern survey jointly conducted by the two countries across 6,724 sq. km area by using SECR (Spatially explicit capture-recapture) technology [28]. They used 528 camera locations over 422 days of sampling and captured '105' common tigers.

The term Sunderbans is most likely derived from the Bengali for beautiful forest ("sundar bon"), or from the Bengali name for the main hardwood tree of commercial value ("sundri"). The Sunderbans is made up of mangroves, but in earlier periods it would have been contiguous with tracts of other forest types. Economic benefits are related with the forest of Sunderbans. Most importantly, the Sunderbans provides essential ecological services such as (1) land maturation, (2) protection of human habitation from cyclones, (3) oxygen production, (4) waste recycling, (5) food supply, and (6) carbon cycling [29].

Sunderban, the largest delta in the world, consists of approximately 10,200 sq.km of the largest Mangrove forest in the globe, spread over India (approximately 4,200 km of Reserve Forest) and Bangladesh (approximately 6,000 sq.km of Reserve Forest). With this another 5400 sq.km of human inhabited area in India is also known as Sunderbans [30]. The Indian parts of Sunderbans are comprised of two districts 24 Parganas i. e. North and South and the latter includes the larger part [31]. Three wildlife sanctuaries cover 1397 km sq area in the area of Bangladesh Sunderbans. The Indian part of

Sunderbans, declared as ‘Sunderban Biosphere Reserve’ by UNESCO, consists of 2585 km sq of area and also has been further divided into Sunderban National Park, Sajnekhali Wildlife Sanctuary and the Basirhat Buffer Zone.

We selected Samsheer nagar area (See map 2), the remote village of Sunderbans, to serve as our case study. With inhabitants of 4394 of which 2216 are males and 2178 are females from total 1145 families as per population census 2011 for a total area of 682.71 hectares, Samsheer nagar, stretching between 88.24555 and 89.0409953 longitude and 22.2197511 and 22.56546 latitude, a large village located in Hingalganj Block of North Twenty Four Parganas district, West Bengal, India, is situated at the confluence of Ichhamati, Gowreswar and Raimangal. Here one finds a widow in nearly every family of the villages adjacent to the forest originating the concept of Bidhoba Gram (Widow Village). We preferred this area for two major reasons: the first and foremost it is frequently told as the largest residence of tigers in the world and secondly, for the maximum number of human-tiger conflict in the globe.

2.2 Survey Design

I (PPD) set the questionnaire and it began with a section on protection of human and cattle lives from tigers. The survey aimed at assessing the following through discrete choice questions grouped in different sections. It contained:

- A) Necessary steps taken by the Government to protect human and cattle lives.

- B) Awareness of tigers and frequency of contacts.
- C) Feeling towards tigers of tiger – affected people, the relatives of tiger – affected people and the inhabitants of Samsheer nagar.
- D) Trust in institutions.
The questionnaire also contained basic information, conservation status, conflicts with human and Governmental actions such as:
- E) Opinion about Governmental actions.

Section A contains four types of questions (see appendix 1 and 2). The respondents were assumed to represent the household rather than individuals. There were seven questions in section B (See appendix 3)

Only four questions were contained in section C. This section was consisted of the questions to relatives of tiger victims or tiger victims (See appendix 4).

3. RESULTS

3.1 On Protection of Human Lives and Cattle

We started with the question (Q 1. i), “What measures do you think the Government can take to prevent the human and cattle deaths from tiger attacks?”.

65 % voted for wall, 26% gave their verdict in favor of iron-fencing and 4% eagerly expected a long lasting concrete wall. But 5% were satisfied with the current system i.e. cotton-fencing.

Table A. Persons Killed by tigers in the Sunderbans of India since 1998 – 99

Year	Fisherman	Honey Collector	Wood Cutter	Outside Forest	Total
1998 -99	2				2
1999 -00	9	3	1		13
2000 -01	8	8			16
2001 -02	10	2			12
2002 -03	13	3			16
2003 -04	6	5			11
2004 -05	2			1	3
2005 -06					0
2006 -07	1				1
2007-08	8	1			9

[30]

Table1. Different opinions on preventing measures

Wall	Iron -fencing	Concrete Wall	Cotton- fencing
296	119	18	23

The next hypothetical question (Q 1. ii) was asked to respondents, "Please imagine that the government has no choice but to introduce a 2% tax for 2 years levied upon you to implement the aforesaid management plan. Would you pay the tax?".

Table 2. Number of tax-payers

Yes	No
310	146

To this question 68% answered affirmatively. While 32% answered that they would not pay the tax, indicated that the number of people who say "no" was not small.

If the surveyed people voted for no willingness to pay he was asked to choose a reason among the list (Q 1. iii).

Most of the negative answered people i.e. 80% choose the reason "b" whereas 20% selected the reason (d). No one choose the other reasons. This result showed that they were willing to pay tax but their financial condition made a hindrance here.

3.2 On Awareness

We started with the first question on awareness of respondents about tigers in general and the answer was noted as binary (yes / no) option to the question (Q 2. a). The question was, "Have you heard of entering tiger in your locality?"

Table 3. Reason for not tax paying

a	b	c	d	e	f	g	h
0	117	0	29	0	0	0	0

Table 4. Persons hearing entrance of tigers

Yes	No
456	0

Since all of the respondents gave their opinion "yes", then it confirms that tigers enter here frequently and the villagers are aware of it.

Now we moved to the next question of awareness (Q. 2 b). The question was, "Have you seen tiger in your locality?"

Table 5. Persons seeing tigers in their locality

Yes	No
401	55

88 % of the respondents reported having seen tigers in their locality whereas 100 % had heard of entering tiger in their locality.

Next question (Q. 2. c) was, "Have any of your acquaintances fallen prey to tigers?"

Table 6. Total number of acquaintances of the respondents attacked by the tigers

Yes	No
442	14

97% of the villagers answered the question affirmatively. The next question (Q. 2. d) was, "Do you think that the tiger must be protected?"

Table 7. Opinion on tiger protection

Yes	No
424	32

Most of the respondents i.e. 93% told that the tiger must be protected in answer to this question. The set of questions also showed that people's main source of knowledge regarding tigers in general was linked with the presence of tigers in Sunderbans. That vision was reflected in the next question. The question (Q. 2. e) was, "If one preferred the affirmative answer of the fourth question then the fifth question was asked, "What is the reason behind it?"

The most striking feature of the answers collected was the large proportion of respondents (424, i.e. 93 %) answered that if the tiger survives then the Sunderbans will live otherwise the forest will be destroyed by the people in the near future.

We asked the respondents about their opinion on the demographic status and trend of the population of tigers on Sunderbans. The intention behind asking public's vision on this matter was not to get a rigorous ecological estimate, but instead to understand how the threats faced by the population were generally perceived. Here the questions were constructed with multiple choice answers.

The question (Q. 2. f) was, "What is your opinion about the tiger population?" [Too Many/Many/Fine/Less/Too Less].

Table 8. On tiger population

Too Many	Many	Fine	Less	Too Less
0	119	150	178	9

“39%” of the respondents supported their view on “Less”, the population seemed to be judged as rather Many (with 26% answering “Many”, and 33% “Fine”). On the other end of the spectrum, only 2% answered “Too Less” and interestingly, nobody answered “Too Many”, which at the same time indirectly reveals that people are conscious about tigers.

The next question (Q. 2. g) was, “Compared to the past five years, how has your frequency of sightings of tigers progressed?” [Much Increased/Increased/Stable/Decreased/Much Decreased]

This was as an indirect way to query the feeling of demographic trend of the tiger population. Only 5% of the respondents were optimistic who answered that it “Increased”. Only 2% supported their view on “Stable” category. The share of respondents thinking that the population has “Declined” reached to 93% and nobody answered that it “Much increased” and “Much Decreased”. This illustrates that the majority of respondents reported a decreasing trend of the population of the tigers.

Bias was visible in the age distribution and sex of our sample, in which people of male Middle Ages (i.e. from 35 years to 50 years) were not represented. This can be explained by the fact that many male persons of this age went to deep sea to catch fishes we did not access to. We recognized the potential effect of this bias and acknowledged that we could not, with our current data, formally determine its magnitude.

3.3 Feeling towards Tigers

This part of the questionnaire aimed at understanding the traits and psychological effect of respondents linked to tigers and also to set the vulnerable lives of the respondents. The

questions were set for the tiger – attacked people and their relatives and the inhabitants of the Samsher nagar village.

The question (Q. 3a) was, “Are you attacked by tigers?” We found five tiger-attacked persons alive and one person narrowly escaped a tiger attack. The next question (Q. 3b) was, “Are you a close relative of tiger affected people?”.

The answers were spontaneous – most of the surveyed people i.e. 81% nodded affirmatively. Based on this situation then came the question of tiger killings.

The most crucial question (Q. 3c) was, “If any organization organizes to kill the tigers to protect the human lives and cattle, then what is your opinion about this happening?”

The object of this question was to understand the attitudes of the villagers of killing the tigers in a planned way to protect the human lives and cattle. But most of the villagers i.e. 95% of the surveyed persons firmly told us that it would be unsupportable and humiliating to kill the tigers. Again they were all agreed to the proposal i.e. the next question (Q. 3d) which stated, “If an organization adopts various measures to save human life without killing tigers, then what is your opinion on this issue?” The responses were equivocal – all the respondents were in favor of such a program.

3.4 Trust in Institutions

We put the question (Q. D. 1), “If a fund as stated in previous question was raised for the conservation of tigers and the reduction of damage on cattle and human lives, which would you like for its administration?” (Multiple choices accepted) This section contains only one question.

Table 9. Opinion on tiger sightings

Much Increased	Increased	Stable	Decreased	Much Decreased
0	23	9	424	0

Table 10. Total number of relatives of the respondents attacked by the tiger

Yes	No
369	87

Table 11. Opinion on tiger-killings

Supportable	I do not mind	Unsupportable
14	9	433

Table 12. Trust in institutions to conserve environment

Government Agencies	N.G. O.	Panchayet	Local Adminstration	Others
310	18	55	73	

This question was asked to judge the trust that respondents had in institutions. It seemed then interesting to see whether the provision entity would be important here. They voted 68% for governmental organization, 4% for N.G.O., 12% for Panchayets, local administration for 16% and did not cast their vote in favor of other organizations. The Government organizations received the largest support.

3.5 Opinion about Governmental Actions

This section (E) contains only two questions. The first question was (Q. E. 1), “According to your past experiences and with the ground of present supplied data what is your opinion about the arrangements made by the authority to conserve the tigers?”

All the points about the human-tiger conflicts and the actions taken by the authorities were discussed with the villagers elaborately. When asked about their opinion on current tiger conservation and inhabitant protection measures, respondents in majority took a stand on both matters. Among clear-cut answers, while current conservation measures of the government actions received a well evaluation, most of the respondents judged it good. 76% selected the option “good” but 8% told us about the “Insufficient” measure of government. 10% gave their verdict for “Bad” and 6 % are “Not known” about the government decisions.

The second question (Q. E. 2) was, “According to your past experiences and with the ground of present supplied data what is your opinion about the arrangements made by the authority to protect the local inhabitants?”

As we discussed earlier with the respondents, we considered that the respondents were well-informed to express their views to this question. No one selected “very good”, but 81% selected the government measures as “good”. 17% of the respondents voted against the government measures. Of whom 7 % of the respondents gave their verdict in favor of “Insufficient” and 10% voted for “bad”. Only 2% told us that they were not aware of the measures taken by the government.

4. DISCUSSION, IMPLICATIONS AND SUGGESTIONS

After Survey we discussed on different propositions with the villagers. They agreed all to save the tigers and keen interested on to save the cattle and human lives also. They told us different measures like to dig a deep canal, to erect a pacca wall and also to make an iron fence between the village area and Sunderbans (Note 2). After discussion with the villagers about the existing nylon net fencing system, we recommended the following proposals: 1) the height of the nylon net fencing should be of 8ft minimum in the case of new fencing and 6 ft in the case of old fencing; 2) height of khal (canal) guard should be at least 5 ft above from the highest tidal level estimated at the time of kotal (flood tide) period; 3) condition of the nylon net should be maintained properly i.e. if the net found brittle then it should be repaired by the concerned authority immediately; 4) condition of the posts of the nylon fencing should be checked in a regular basis i.e. if it found rotting at the base it should be changed without delay; 5) if sagging of canal guard noticed then the authority should repair it at once; 6) the frequency of monitoring the system should be increased.

Presently 54 km of forest fringes out of total 70 km has already been fenced and further action also highlighted after discussion between local inhabitants and Forest Department to protect the lives of local people. The Forest Department has strengthened the forest patrolling activities to restrict entry inside the forest illegally. No unauthorized persons are allowed inside the protected area. This reduces chances of possible conflicts and tiger attacks. Discussions among the local inhabitants by our survey team have increased the consciousness of local people. We are also grateful to the Sunderbans Tiger Reserve Department as they have done a careful analysis of the collected data of human-tiger conflicts and tiger straying. After data collection they have started making the nylon net fencing along with the other initiatives to control the conflicts.

The inhabitants were also aware about poaching and habitat destruction of Sunderbans and also

Table 13. Opinion about the authority to conserve tigers

Very Good	Good	Insufficient	Bad	I do not know
0	347	36	46	27

Table 14. Opinion about the authority to protect local residents

Very good	good	Insufficient	Bad	I do not know
0	369	32	46	9



Fig. 1(A &B). Location map of the study region

aware of their illegal entrance in the deep core area of the jungle. Their entrance into the jungle was due to poverty. At the time of survey this was the most dominant factor for which all types of resource extractors were involved in the present jobs of fishing, wood cutting or honey

collection. We also recommended that enforcement of law and creation of alternative livelihood options for the fringe dwellers would contribute to reduction of human death. To minimize the revengeful attitude of the local people, if any, regular awareness campaign is

already in practice which needs further intensification payment of compensation on spot for human & cattle death & treatment of injured negates the chance of revenge killing of tiger. Presently, the compensation for the human death is Rs. 2.00 lakhs & that of cattle death is nominal- which requires further consideration. Payment of actual market price on spot in cattle death can minimize the apathy of local villagers.

Awareness building campaign has been started by N.G. O. and forest Departments. This helps in strengthening the relationship between local people and Forest Departments. 'Khedao' party has been formed with the help of local people by Forest Departments and this organization gives local youths an opportunity to earn money by protecting the lives of villagers. Trained and competent staff has been posted in vulnerable areas so that they can reach place of occurrence in time for action.

5. CONCLUSION

At the time of conversation with the inhabitants of that locality our effort was to find out the social factors behind their eagerness to save Sunderbans. The social factors came after discussions are given below:

5.1 Climate Change

The villages adjacent to Sunderbans are vulnerable to the effects of changing climate such as floods, cyclones, relative sea-level rise, coastline erosion, salinity increase, tidal surges and permanent submergence of land mass. If jungle is destroyed then a drastic change in biodiversity will lead to a critical situation of existence of locality and human being.

5.2 Natural Resources

There are approximately 1100 villages in the Sunderbans region, of which 62 are situated in the border of the jungle. A majority of the inhabitants, who are riddled with poverty, here depends on fuel wood for thermal energy, as biomass in the villages is inadequate to meet their energy demands. They are heavily dependent on forest resources such as fish, crab and honey, as their source of livelihood due to inadequate infrastructure, health-care, education and transport, as well as restricted livelihood options, communities have to struggle for even their basic requirements.

5.3 Economy

Local people are employed in the Forest Department, in the tourism industry and also in different types of N.G.O. working here. Hence the villagers realize the benefit of conservation. The Forest Department and State Government has provided some community services like hospitals and schools in order to reduce the stress between the Forest Department and the local inhabitants. The Forest Department also has developed local intelligence networks to collect information to aid detection and prevention of poaching. These measures have strengthened the economy of that locality and encouraged the conservation of the Sunderbans.

These social factors have made them to understand the importance of ecology of the Sunderbans. But these are not adequate measures also. Both Forest Department and State Government should pay their kind attention to reduce the human-tiger conflicts by implementing more scientific measures. More active steps to address social factors to develop the livelihood of the local people need to be implemented as part of tiger conservation and ecology of Sunderbans.

To our knowledge, this was the first study to investigate public vision of Samserganj on tigers of their area. Thus, no relevant study has been published that could serve as baseline and judge quantitatively of the relative awareness and public perception in the case of our target species. Nonetheless, it seemed that social awareness and general knowledge about tigers in the local population were standard but not sufficient to gain public support for possible conservation programs.

Our first recommendation is therefore to start an environmental education campaign to inform residents about tigers and ecology of Sunderbans. Still, based on the present study, the main efforts in terms of public information should remain focused on advertising the importance of the utilitarian value of ecology of Sunderbans and tigers for wildlife conservation.

Our second recommendation was to start a management program for this species before the situation worsens and also ecological research projects were urgently needed to confirm its exact threat level. Respondents expressed a relatively higher interest in protecting their lives and cattle than simply preserving tigers.

Therefore, it is mandatory to clarify and tackle this issue to gain public support for a management project. A set of eco-development works which include entry point activities and creation of alternative livelihood options have to be done to win the people's confidence in this locality; still, further action is also proposed in budget in a comprehensive manner to strengthen the relation with the concerned authority.

Finally, the results of this study did not reveal any alarming distrust in national authorities or defiance towards governmental actions. Most of the people wanted to save the tigers and Sunderbans and to maintain the ecological balance of that area in spite of their lifelong poverty.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

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Note 1. PradipChatterjee, President of the Dakshin Banga Matsyajibi Samity of South Bengal Fisherfolk's Forum, said, "However, this just a fraction of the actual death toll of the 70,000 – 80,000 people who enter the forest to fish, only around 13,000 – 15,000 hold valid permits and documents. Most of the illegal fishermen do not report tiger attacks, even when somebody is killed. This gives an idea on how many deaths go unreported."

2. According to Subrata Mukherjee, the then Field Director of Sunderbans Tiger Reserve, has said that the Forest Department had since 1998 also been fencing the deltas of the tiger reserve with nylon rope fence erected on embedded wooden poles to stop tigers straying into the villages and also said to the tribune (The Tribune, Sunday, November 29, 2009) reporter, "It is one of the most effective and harmless methods. Tigers stay away from nets in the fear of their nails and claws getting entangled." Total

length of nylon net fencing in the Samsheer nagar area is about approximate 20 km that is Samsheer nagar to Jhingakhali Beat is 13 km and Jhilla compound to opposite of Budhbarer Bazar is about 7 km [30].

COMPETING INTERESTS

Author has declared that no competing interests exist.

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APPENDIX 1

It included 1. i) opinion of the respondent about the necessary steps taken by the Government to protect the human lives and cattle from the attack of the tigers; 1. ii) the respondent was asked to imagine that the government would have no choice but to introduce a 2 % tax to finance a management plan that would guarantee the survival of human live, cattle and tigers for the next century; 1. iii) If the respondent declared no willingness to pay for the provision of the good in the introductory yes / no questions he was asked to choose a reason among the list (See appendix 2)

APPENDIX 2

- 1 iii. a) I do not want to pay for tiger conservation.
b) I intend to do so but I cannot afford to pay.
c) I do not care about cattle and tiger conservation.
d) The government should deal with this with existing funds.
e) I do not have enough information to decide.
f) I object the way the question is asked.
g) Society has more important problems than these.
h) Others

APPENDIX 3

2. a) Have you heard the entrance of tiger in your locality?
b) Have you seen tiger in your locality?
c) Have any of your acquaintances fallen prey to tigers?
d) Do you think that the tiger must be protected?
e) If one preferred the affirmative answer of the fourth question then the fifth question was asked,

“What is the reason behind it?”

- f) What is your opinion about the number of tigers?
g) What is the number of tiger sightings in your area compared to the last five years?

APPENDIX 4

The questions were:

3. a) Are you attacked by tigers?
b) Are you a close relative of tiger affected people?
c) If any organization organizes to kill the tigers to protect the human lives and cattle, then what is your opinion about this happening?
d) If an organization adopts various measures to save human life without killing tigers, then what is your opinion on this issue?

Multiple choices were accepted.

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