

REPORT ON THE INITIATIVES TO INVOLVE THE MAJOR STAKEHOLDERS OF ASSAM IN THE CONSERVATION OF GANGETIC DOLPHIN



Prepared and submitted by:

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REPORT ON THE INITIATIVES TO INVOLVE THE MAJOR STAKEHOLDERS OF ASSAM IN THE CONSERVATION OF GANGETIC DOLPHIN

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Preface

During our 2004-05 survey in the entire Brahmaputra river system we recorded altogether 250 dolphins in 101 locations of the Brahmaputra river system with a minimum of 14 death records. Through this survey we confirmed that the species has been declining very rapidly from the entire river system for various anthropogenic pressures viz., accidental killing, poaching, over-fishing, habitat degradation, dam construction etc. Conveying this situation to the concerned stakeholders and prepare conservation strategies in collaboration with all of them are the best approaches for the long term conservation of the species, for which it was recommended in Wakid (2005).

As an attempt to that we have started this project entitled "An initiative to involve the major stakeholders of Assam in the conservation of endangered Gangetic dolphin in Brahmaputra river system". The concept was to convey the conservation status of the species in Assam to the concerned stakeholders, aware them and initiate conservation efforts in collaboration with all of them through organizing regional "Dolphin Conservation Training Camps" for the communities (details are reported in Part-I of this Report) and organizing one central "Dolphin Conservation Workshop" for the managers, researchers and conservationists (details are reported in Part-I of this Report) of Assam. Altogether 42 informal awareness campaigns were made in 30 different areas of 12 districts of Brahmaputra Valley, from where a total of 70 community youths were trained up for the monitoring of dolphins through two 3-days training camps. In the Dolphin Conservation Workshop altogether 35 participants from 15 different organizations were actively participated and forwarded important recommendations for the long term conservation of the species in Assam.

We hope that these recommendations will be the guidelines for the future conservation action plans and the trained community youths will be the assets for the future conservation of the Gangetic dolphin in Assam.

Dr. Abdul Wakid

Project Leader

Dolphin Stakeholder Involvement Project

Aaranyak, Guwahati

Dated: 8th January, 2007

PART-I

AWARENESS RAISING AND CAPACITY BUILDING PROGRAMME AT COMMUNITY LEVEL FOR THE CONSERVATION OF GANGETIC DOLPHIN OF ASSAM



Acknowledgement

Without the financial support from the Rufford Small Grant for Nature Conservation, this project wouldn't be possible. Therefore, I am expressing my sincere thanks to RSG for providing the financial support to conduct the work.

Under this "Awareness raising and capacity building programme at community level" altogether 2 training camps cum community meetings were organized – one at Nimatighat and another at Jugighopa. For Nimati Dolphin Conservation Training Camp, I would like to thank to the District administration of Jorhat district for providing administrative support to us; the Superintendent of Police for providing security measures to us; the Conservator of Forest Mr. S. K. Shrivastav (IFS), the Divisional Forest Officer Mr. R. K. Das and Assistant Conservator of Forest Mr. Gunin Saikia for providing departmental help and for their kind presence in the training camp; the management authority of the Nimati Namkokila High School for providing lodging facility; the villagers of Nimati Village for community support; Dr. John Goold, Director, Marine Mammal Science, University of Wales, UK & IUCN Cetacean Specialist and Mrs. Lynda Goold for their presence and active participation in the training camp and Sanjay Das & Dhruva Chetry for their active organization efforts.

For Jogighopa Dolphin Conservation Training Camp, I am grateful to the district administration of Bongaigaon district for their administrative support; Mr. Giasuddin Borbhuyan, the Divisional Forest Officer of Bongaigaon district for his active participation and encouraging the training camp participants; Mrs. Purabi Borkakoti, the Principal of jogoghopa M.E. School for providing the camp sites; Dr. Hlojyuti Sinha & Dr. Shahjamal Sheikh for their advice, help and guidance to the participants; Mr. Ashok Das, Sanjay Das, Dhruva Chetry, Chatrapati Das and Dipak Das for their active organizational effort to make the training camp successful.

Abdul Wakid, Ph. D.

Gangetic Dolphin Research and Conservation Programme
Aaranyak

Guwahati, Assam

Dated: 8th January, 2007

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1. Introduction

Gangetic dolphin (*Platanista gangetica*) is one of the four species of river dolphins in the world. The Ganges river system of Northern India and the Brahmaputra river system within Assam of North Eastern India are the major habitats of this endangered river dolphin species. Due to less pollution level and no dams and barrages in the mainstream, the Brahmaputra river system within India and its downstream within Bangladesh have been recognizing the last refuge of the species in the world.

The first ever population survey in this major habitats was conducted in 1993 (Mohan *et al.* 1997). After 12 years we made extensive population status survey in the 1031 km dolphin habitats in Brahmaputra river system in 2004-2005 with the financial help from Rufford Small Grant and BP Conservation Programme (Wakid, 2005). During that survey we recoded altogether 250 dolphins in 101 habitats and found that various man-made pressures are responsible for the declining of the species within last 12 years at a rate of 26% (Wakid, 2005). From these field experiences we feel that unless involving the local communities residing near the dolphin habitats through increasing awareness level and capacity building for monitoring of dolphins and their habitats, no conservation steps will be successful.

For this aim, based on our field experiences in 2004-05 we found that motivating the targeted communities towards dolphin conservation through organizing "Informal Awareness Meeting" at village level and capacity building some of the youths from these communities through organizing "Dolphin Conservation Training Camps" at regional level will be the best strategy for involving the communities in dolphin conservation of Assam. As an attempt to that we organized altogether 40 informal awareness meeting among the communities of 30 different areas of Brahmaputra Valley and two Dolphin Conservation Training Camps under this Project.

2. Objectives

- a. Conveying the survey findings of 2004-05 to the local communities residing near the identified important dolphin habitats.
- b. Motivating these community youths for dolphin conservation.
- c. Capacity building of the selected community youths of the identified area for the long term conservation of their dolphins.

3. Methodology

3.1. Awareness Camps:

For fulfilling the abovementioned objectives first we marked out the important dolphin habitats of Brahmaputra river system based on our 2004-05 survey. The communities residing near these important dolphin habitats were identified. The team members were engaged in the linkage development among these communities. Due to the latest political conditions of Assam, mainly for extremist problem establish linkage to these communities and developing networking among them was not so easy. Therefore, we spent lots of time to convince these communities about our motives. Organizing informal meeting with the community and fishermen leaders, we developed our network among these communities and finally we conveyed them about the dolphins, its status and conservation needs. Since these villagers are so informal that organizing formal awareness meeting would create lots of confusion among them, since some of them are involved in dolphin accidental as well as intentional killing for its oil. Therefore, based on the field conditions and respecting their traditional cultures, we preferred informal awareness campaign. Throughout the project period, we conducted altogether 42 such informal awareness campaign among the communities of 30 different localities of 12 districts of Brahmaputra Valley, which are as follows:

1. Saikhowaghat (Tinsukia district)
2. Dighaltarang (Tinsukia district)
3. Guijan (Tinsukia district)
4. Padumoni (Tinsukia district)
5. Balijan (Tinsukia district)
6. Nagaghuli (Dibrugarh district)
7. Dihingmukh (Dibrugarh district)
8. Disangmukh (Sivsagar district)
9. Dikhowmukh (Sivsagar district)
10. Jhanjimukh (Jorhat district)
11. Nimatighat (Jorhat district)
12. Kokilamukh (Jorhat district)
13. Dhansirimukh (Golaghat district)
14. Siring Chapori (Mongoldoi district)
15. Kalangmukh (Morigaon district)
16. Kukurmara (Kamrup district)
17. Amtola (Kamrup district)
18. Nagarbera (Kamrup district)
19. Moinbori (Borpeta district)
20. Nakhanda (Borpeta district)
21. Pahumara (Borpeta district)
22. Bohori (Borpeta district)
23. Baghbor (Tinsukia district)
24. Chapor (Bongaigaon district)
25. Abhoyapuri (Bongaigaon district)
26. Balapara (Bongaigaon district)
27. Jugighopa (Bongaigaon district)
28. Nayaralga (Dhubri district)
29. Golakata char (Golapara district)
30. Gulukganj (Dhubri district)

3.2. Capacity Building through Dolphin Conservation Training Camps:

From the abovementioned areas of Brahmaputra Valley altogether 70 youths were selected for two Dolphin Conservation Training Camps. One training camp was organized at Nimatighat (Jorhat district) of Eastern Assam from 25th to 27th February, 2006, where altogether 30 community youths from 12 different areas of 5 different districts were participated. Dr. John Goold, Director, Marine Mammal Science, University of Wales, Bangor, UK and IUCN-Cetacean Specialist and Mrs. Lynda Goold were the observers and honorary resource persons in this training camp. Conservator of Forest (Eastern Assam Circle, Jorhat) Mr. S. K. Shrivastav, IFS and Divisional Forest Officer of Jorhat Division Mr. R. K. Das were the Chief Guests and resource persons in this training camp.

The second camp was organized at Jugighopa of Bongaigaon district of Western Assam (Jogighopa, Bongaigaon district) on 18th – 20th March, 2006. Altogether 40 participants from 15 different areas from 5 different districts of Brahmaputra Valley were participated in this workshop. Dr. Hilloljyuti Singa, Lecturer, Department of Zoology, Birjhara College, Bongaigaon and Dr. Shahjamal Sheikh, Lecturer, Department of Zoology, Kolgachiya College, Borpeta were the resource persons and Mr. Giasuddin Borbhuyan, Divisional Forest Officer of Bongaigaon Division were the another resource persons as well as the guest of honour.

4. The courses conducted during the training camp in a brief:

Following topics were taught to the participants during the training camps:

Class-I: Basic concept of wildlife conservation

Definition of wildlife and its conservation
Concept of biodiversity with special reference to aquatic diversity

Class-II: Basic concept and structure of aquatic ecosystem with special reference to river ecosystem:

Abiotic and biotic components
Climatic and edaphic regimes
Nutrients and minerals
Producers, consumers and decomposers
Communities, populations, groups and individuals
Functioning of ecosystem
Energy flow and nutrient cycles
Food chains, food webs, trophic levels

Class-III: Introduction to Gangetic dolphin

Gangetic dolphin in Indian mythology
Gangetic dolphin in ancient India
Scientific discovery of Gangetic dolphin

General morphology and anatomy of Gangetic dolphin
Current distribution and status of Gangetic dolphin

Class-IV: Gangetic dolphins of Assam

Status survey in 1993, 1997, 2002 and 2005
Identified threats

Class-V: Gangetic dolphin and its behavioural ecology

Favourable microhabitats of dolphins
Dolphin and fish relationship
Important fish habitats
Ecology of fish
Feeding, resting, socializing and playing behaviour of dolphins
Activity budgeting of dolphin

Class-VI: Gangetic dolphin survey methodology (following Smith & Reeves, 2000)

Survey design
Survey of absolute abundance
Survey of relative abundance
Line transect and strip transect methods
Estimating group size
Narrow and wide channel survey
Habitat mapping
Transforming sighting data into scientific data

Class-VII: Awareness raising among communities and management authorities

Basic concept of conservation education
Development of conservation education materials
Interaction with community and managers
Motivate the target groups into dolphin conservation

5. Camp schedules:

Below is the brief summary of the activities conducted during these two training camps.

5.1. Camp-I: Nimatighat (25th -27th February, 2006)

25th February, 2006:

9-00 am to 12-00 am:	Gathering of the participants.
12-00 am to 1-00 pm:	Lunch of the participants.

1-00 pm to 4-00 pm:	Inauguration session with the presence of Conservator of Forest, DFO, teachers, community leaders, media persons and villagers Discussed topic: Overview of the status and conservation of Gangetic dolphin in Assam.
4-00 pm to 5-00 pm:	Tea break
5-00 pm to 7-00 pm:	Ice breaking of participants with participant introduction.
7-00 pm to 8-00 pm:	Group formation of the participants and rule & regulation of the camp information to the participants.
8-00 pm to 9-00 pm:	Class-I: Basic concept of wildlife conservation.
9-00 pm to 10-00 pm:	Dinner
10-00 pm:	Bed
<u>26th February, 2006:</u>	
7-00 am:	Tea
7-00 am to 8-00 am:	Class-II: Basic concept and structure of aquatic ecosystem with special reference to riverine ecosystem.
8-00 am to 9-00 am:	Breakfast
8-00 am to 9-00 am:	Class-III: Introduction to Gangetic dolphin Class-IV: Gangetic dolphins of Assam
9-00 to 10-00 am:	Reached Brahmaputra River.
10-00 to 11-00 am:	Class-V: Gangetic dolphin and its ecology Class-VI: Gangetic dolphin survey methodology (following Smith & Reeves, 2000)
11-00 am 3-00 pm:	Field survey as groups using motor-boat in Brahmaputra River and interaction with fishermen guided by Dr. Abdul Wakid and Dr. John Goold.

3-00 pm to 5-00 pm:	Returned to camp site, took rest and had lunch.
5-00 pm to 7-00 pm:	Group discussions and presentations on each groups survey findings by participants.
7-00 pm to 9-00 pm:	Group discussions on dolphin threats and their mitigation measures by participants.
9-00 pm to 10-00 pm:	Diner.
10-00 pm:	Bed.
<u>27th February, 2006:</u>	
7-00 am:	Tea
7-00 am to 9-00 am:	Class-VII: Awareness raising among communities and management authorities
9-00 am to 10-00 am:	Breakfast
10-00 am to 12-00 am:	Discussions on the threats facing by the dolphins of the participant's area and possible mitigation measures involving community.
12-00 am:	Remarks, feedbacks and camp disbursement.

5.2. Nimati Camp activities at a glance



Fig-1: Managers and local communities are being informed about the status of the species in Assam during the inaugural session



Fig-2: Participants towards Brahmaputra River for field experience



Fig-3: Riverine ecology class in a river island of Brahmaputra River



Fig-4: Group discussions on riverine habitats and its conservation



Fig-5: Project Leader Dr. Abdul Wakid describing the distribution pattern of the species to Dr. John Goold and Mrs. Lynda Goold (UK)



Fig-6: Dr. John Goold and Mrs. Lynda Goold are discussing about the survey methodology before the technical session on dolphin survey



Fig-7: Getting the idea of using satellite images in identifying dolphin habitats and determining survey routes



Fig-8: Participants are being trained up on how to record dolphin sighting and its habitat conditions



Fig-9: Group formation before the survey



Fig-10: The leaders in dolphin survey



Fig-11: Participants are trying to dolphin population survey from boat



Fig-12: Getting idea about the threats of dolphins

5.3. Camp-II: Jogighopa Camp (18th to 20th March, 2006)

18th March, 2006:

9-00 am to 12-00 am:	Gathering of the participants.
12-00 am to 1-00 pm:	Lunch of the participants.
1-00 pm to 4-00 pm:	Inauguration session with the presence of Divisional Forest Officer of Bongaigaon district Mr. Giasuddin Borbhuyan, teachers of G. M. H. S. School, media people, local villagers and camp participants at G. M. H. S. School, Jogighopa. Discussed topic: Overview of the status and conservation of Gangetic dolphin in Assam
4-00 pm to 5-00 pm:	Tea break
5-00 pm to 7-00 pm:	Ice breaking of participants with participant introduction.
7-00 pm to 8-00 pm:	Group formation of the participants and information about rule & regulations of camp
8-00 pm to 9-00 pm:	Class-I: Basic concept of wildlife conservation
9-00 pm to 10-00 pm:	Dinner
10-00 pm:	Bed

19th March, 2006:

7-00 am:	Tea
7-00 am to 8-00 am:	Class-II: Basic concept and structure of aquatic ecosystem with special reference to riverine ecosystem.
8-00 am to 9-00 am:	Breakfast.
8-00 am to 9-00 am:	Reached Goalpara through boat.
9-00 to 10-00 am:	Class-III: Introduction to Gangetic dolphin Class-IV: Status, distribution, threats and conservation of Gangetic dolphins of Assam

10-00 to 11-00 am:	Class-V: Gangetic dolphin and its behavioural ecology Class-VI: Gangetic dolphin survey methodology (following Smith & Reeves, 2000)
11-00 am 3-00 pm:	Field survey as groups using motor-boat in Brahmaputra River and interaction with fishermen lead by Dr. Abdul Wakid, Dr. Hilloljyuti Singha and Dr. Shahjamal Sheikh.
3-00 pm to 5-00 pm:	Returned to camp site, took rest and had lunch.
5-00 pm to 7-00 pm:	Meeting with local villagers about the dolphins of their area and their threats.
7-00 pm to 8-00 pm:	Presentations of participants about their field observations.
8-00 pm to 9-00 pm:	Group discussions on dolphin threats and their mitigation measures.
9-00 pm to 10-00 pm:	Diner.
10-00 pm:	Bed.
<u>20th March, 2006:</u>	
7-00 am:	Tea
7-00 am to 9-00 am:	Class-VII: Awareness raising among communities and management authorities
9-00 am to 10-00 am:	Breakfast
10-00 am to 12-00 am:	Discussions on the threats and their mitigation measures at their area by the participants itself.
12-00 am:	Remarks, feedback and camp disbursement

5.4. Activities in the Jogihopa camp at a glance

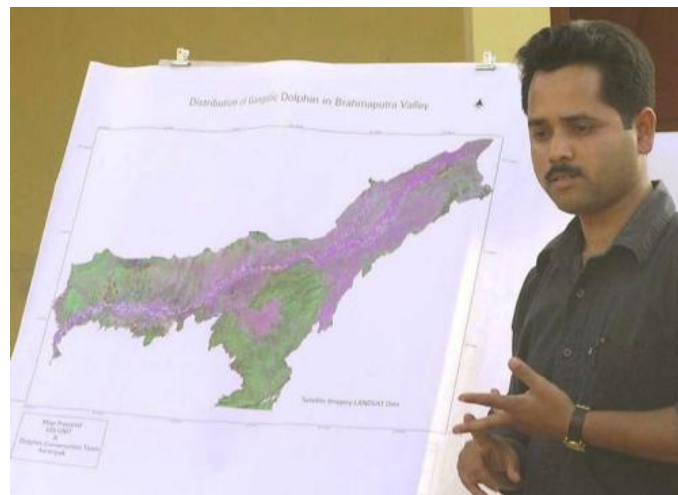


Fig-13: Describing the distribution pattern of dolphins in the inauguration session



Fig-14: Interaction with local communities



Fig-15: Forest officials interacting with participants



Fig-16: Group activities



Fig-17: Moving to the field



Fig-18: Class in the bank of Brahmaputra



Fig-19: Dolphins are there.



Fig-20: Where dolphins had gone?



Fig-21: Just relaxing



Fig-22: One Gangetic dolphin (blind) and a single prey (fish).
Learning to conserve the species through game



Fig-23: The hard life of fishermen, fish and dolphin



Fig-24: How over-fishing can affect on dolphin food source.
Participants are getting the idea through field visit.

6. List of participants

6.1. Camp-I: Nimati (Jorhat district)

Resource persons:

- | | |
|---|--|
| 1. Dr. John Goold Director
Marine Mammal Science & IUCN-Cetacean
Specialist
University of Wales
Bangor UK | 8. Mr. Rupjyuti Hazarika
Jhanjimukh
Jorhat |
| 2. Dr. Abdul Wakid
Dolphin Biologist & Programme Leader
Gangetic Dolphin Research &
Conservation Programme
Aaranyak
Guwahati | 9. Mr. Bijit Das
Goriabhoga
Jorhat |
| 3. Mr. G. M. Shrivastava
Conservator of Forest Eastern Assam
Circle, Jorhat
Govt. of Assam. | 10. Mr. Ritesh Sharma
Bokakhat
Golaghat |
| 4. Mr. M. C. Das
Divisional Forest Officer
Jorhat Division
Jorhat | 11. Mr. Bikash Dutta
Nimatighat
Jorhat |

List of participants:

- | | | |
|---|--|--|
| 1. Mr. Nirmal Chetry
Saikhowaghat
Tinsukia | 12. Mr. Bishal Das
Nimatighat
Jorhat | 13. Mr. Simanta Sharma
Nimatighat
Jorhat |
| 2. Mr. Hiren Dutta
Dikhowmukh
Sivsagar | 14. Mr. Abinash Das
Nimatighat
Jorhat | 15. Mr. Deepak Das
Kokilagaon
Jorhat |
| 3. Hemanta Borah
Dikhowmukh
Sivsagar | 16. Mr. Debajit Das
Nimatighat
Jorhat | 17. Mr. Jagannath Bora
Nimatighat
Jorhat |
| 4. Nilamoni Borah
Dikhowmukh
Sivsagar | 18. Mr. Nilim Kalita
Nimatighat
Jorhat | 19. Mr. Jitu Bora
Nimatighat
Jorhat |
| 5. Mr. Baneshwar Chinte
Polashguri, Dhansirimukh
Bokakhat
Golaghat | | |
| 6. Diganta Borah
Jhanjimukh Bhakat Gaon
Jorhat | | |
| 7. Mr. Nasir Ali
Jhanjimukh
Jorhat | | |

20. Siranjib Barua
Nimatighat
Jorhat

21. Mr. Jogendra Nath Bora
Forest Department
Jorhat

22. Mr. Sujit Saikia
Forest Department
Jorhat

23. Dr. Jayanta Barua
Beltola
Guwahati

24. Mr. Manjit Gogoi
Soladhora
Jorhat

25. Miss Binu Kalita
Nimatighat
Jorhat

26. Miss Mamoni Devi
Nimatighat
Jorhat

27. Miss Apornita Devi
Nimatighat
Jorhat

28. Miss Gitanjali Das
Nimatighat
Jorhat

29. Miss Parinita Das
Nimatighat
Jorhat

30. Mr. Dipu Das
Nimatighat
Jorhat

6.2. Camp-II: Jogighopa (Bongaigaon district)

Resource persons:

1. Dr. Hilloljyuti Singha
Lecturer, Department of Zoology
Birjhora College, Bongaigaon & Executive
Member Aaranyak

2. Dr. Shahjamal Sheikh
Lecturer, Department of Zoology
Kolgashiya College
Borpeta

3. Dr. Abdul Wakid
Dolphin Biologist & Programme Leader
Gangetic Dolphin Research &
Conservation Programme
Aaranyak
Guwahati

4. Mr. M. C. Das
Divisional Forest Officer
Jorhat Division
Jorhat

List of participants:

1. Mr. Bakhudev Das
Kukurmara
Kamrup
2. Krishna Das
Kukurmara
Kamrup

8. Abdul Baten Sheikh
Na-Satra
Bongaigaon

9. Sibul Malla
Jugighopa
Bongaigaon

10. Bhakti Das
Jugighopa
Bongaigaon

11. Muttakin Hussain
Chalantapara
Bongaigaon

12. Sanjib Chetia
Jugighopa
Bongaigaon

13. Arup Borman
Jugighopa
Bongaigaon

14. Mr. Manik Borman
Deohati, Abhoyapuri
Bongaigaon

3. Dipak Das
Kukurmara
Kamrup
4. Lokomanakh Adhikari
Kalayahati
Borpeta
5. Dilbar Khan
Panimorisha
Borpeta
6. Abbas Ali
Chotpara
Bongaigaon
7. Mofidul Islam
Sotpara
Bongaigaon
20. Jiaul Haque
Nayaralga
Dhubri
21. Miss Alolika Sinha
Department of Zoology
Birjhora College
Bongaigaon
22. Miss Anjana Roy
Department of Zoology
Birjhora College
Bongaigaon
23. Miss. Barnali Das
Department of Zoology
Birjhora College
Bongaigaon
24. Miss Jharna Brahma
Department of Zoology
Birjhora College
Bongaigaon
25. Miss Samima Haque
Department of Zoology
Birjhora College
Bongaigaon
26. Miss Tapashri Roy
Jogighopa
Bongaigaon
27. Mr. Ashok Das
Aboyapuri
Bongaigaon
28. Chatrapati Das
Borpeta Town
Borpeta
29. Dhruba Chetry
Aaranyak
Guwahati
30. Sanjay Das
Aaranyak
Guwahati
31. Abdul Malique Mandal
Goalpara
15. Rahul Roy
Baladmari
Goalpara
16. Pranjal Chakrabarti
Golakganj
Dhubri
17. Subrata Chakrabarti
Jhaskal
Dhubri
18. Moynul Haque
Nimatighat
Jorhat
19. Ibrahim Ali
Suapata
Dhubri
32. Ashraful Jaman
Jugighopa
Bongaigaon
33. Miss Dimpi Das
Jugighopa
Bongaigaon
34. Sitra Das
Jugighopa
Bongaigaon
35. Sahabul Haque
Jugighopa
Bongaigaon
36. Miss Bandana Handique
Jogighopa
Bongaigaon
37. Aminur Islam
Jogighopa
Bongaigaon
38. Dibyajyuti Singha
Jogighopa
Bongaigaon
39. Niva Roy
Jogighopa
Bongaigaon
40. Ratul Roy
Jogighopa
Bongaigaon

PART-II

INITIATIVES TO INVOLVE THE MANAGERS, BIOLOGIST, CONSERVATIONISTS AND MEDIA OF ASSAM IN THE CONSERVATION OF ENDANGERED GANGETIC DOLPHIN



REPORT OF THE WORKSHOP ON GANGETIC DOLPHIN OF ASSAM: AN APPROACH FOR ITS FUTURE CONSERVATION STRATEGIES

8th December, 2006
Guwahati, Assam



Report prepared by: Abdul Wakid, Ph. D.



Assam Forest
Department



Acknowledgement

For this workshop I am expressing my sincere thanks to the Department of Environment and Forest, Govt. of Assam for its kind collaboration for this workshop. Especial thanks to Chief Wildlife Warden of Assam, who personally took all the initiative to make the workshop successful. Thanks are also to Mr. D. Mathur, IFS, Chief Conservator of Forest (research & development) and Mr. O. P. Pandey, IFS, Chief Conservator of Forest (biodiversity), Mr. R. D. S. Tanwar, IFS, Conservator of Forest (Central Assam Circle) of Department of Environment & Forest, Govt. of Assam for their kind presence in the workshop and for putting valuable comments and suggestions.

Without the financial support from Rufford Small Grant for Nature Conservation, UK organizing this workshop would be impossible. I, therefore, hereby expressing my sincere acknowledgement to RSG. During the workshop, we also inaugurated one sticker, one poster, one booklet and a report, which was a part of the ongoing project on ecology and conservation of residential populations of Gangetic dolphin of Assam, funded by BP Conservation Programme. I am thankful to the BPCP.

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Project Leader

Dolphin Stakeholder Involvement Project

Aaranyak, Guwahati

Dated: 8th January, 2007

Executive Summery

The Gangetic dolphin of Assam has been facing different anthropogenic threats for which the species has been declining very rapidly from the entire region within last two decades. Initiating conservation efforts in collaboration with all the concerned stakeholders is the best approach to stop this declining process. As an attempt to that an one-day “Dolphin Conservation Workshop” was organized in Guwahati, the capital city of Assam, involving all the concerned stakeholders.

In the workshop, altogether 35 participants from 15 different organizations were actively participated. Department of Environment & Forest (also called as Assam Forest Department), Govt. of Assam who is the principal management authority of the species was the main collaborator of this workshop. During the status review session, altogether 5 papers were presented in the workshop, which reviewed the status of the species from 1993 to 2005, including one paper on the global status of the species by Prof. R. K. Sinha, IUCN-Cetacean Specialist.

During the threat discussion session, various threats of the dolphins of Assam including accidental killing, poaching, habitat degradation, over-fishing, dam construction and seismic survey were discussed in details. The participants put forwarded valuable recommendations for future conservation of the species in Assam.

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1. Background

Before two decades, the Gangetic dolphin was one of the commonly sighted aquatic mega-fauna in the Brahmaputra river system before two decades. However, due to increasing anthropogenic pressures, the overall population of the species has been declining in such a way that currently most of the major tributaries of Brahmaputra are devoid of any dolphin population and even in Brahmaputra River also, the species is found in certain pockets only. Wakid (2005) recorded a minimum of 250 dolphins in the entire Brahmaputra river system with 197 in the Brahmaputra mainstream, 27 in Kulsi River and 26 in Subansiri River, distributed altogether 101 locations of the valley. A rough comparative assessment of the sighting record to with Mohan *et al.* (1997) record of 1993, it has been found that over the last 12 years duration, the population has been declining at a rate of 26%. Various anthropogenic threats are responsible for this declining. To address these threats, it is highly essential that all the concerned stakeholders of Assam should come together to discuss the issues and formulate future conservation strategies. As an attempt to that an one-day workshop was organized at Guwahati in collaboration with Department of Environment and Forest, Govt. of Assam on the theme "Gangetic dolphin of Assam: an approach for its future conservation strategies" on 8 December, 2006 for discussing the issues critically and formulate conservation strategies to mitigate them.

2. Introduction

Gangetic dolphin is one of the four river dolphin species of the world, which is found in the Ganges-Brahmaputra-Meghna and Karnaphuli-Sangu river system of India, Nepal and Bangladesh (Anderson 1878, Kasuya & Haque 1972, Jones 1982, Mohan 1989, Reeves & Brownell 1989, Shrestha 1989 and Reeves *et al.* 1993, Smith *et al.* 2004). In the nineteenth century, the dolphins were plentiful in the entire distributional range, though no actual data on population is available (Sinha & Sharma 2003). Jones (1982) estimated the aggregate range-wide abundance of the species as around 4000-5000 and Mohan *et al.* (1997) described it as fewer than 2000. Based on the 19th Century distribution map of the species as prepared by Anderson (1879), the range of the species has declined progressively (Smith *et al.* 2004). Smith *et al.* (2004) mentioned that a roughly 100 km distribution range of the species has declined in the Ganges River, since the late 1800s. Due to the declining status of the species, the IUCN revised its threatened status from Vulnerable (Klinowska 1991) to Endangered (IUCN 1996). It has been estimated that at present there are not more than 2500 individuals of this species in the world (Sinha & Sharma 2003).

Besides Ganges river system of Northern India, the Brahmaputra drainage system of Assam is a major habitat of Gangetic dolphin in India. Mohan *et al.* (1997) sighted 266 dolphins in the Brahmaputra mainstream in 1993, whereas two other surveys in 1997 and 2002 WWF-India they sighted only 250 and 225 dolphins respectively (unpublished report). Wakid (2005) recorded altogether 250 dolphins in Brahmaputra river system with 197 in Brahmaputra mainstream, 27 in Kulsi River and 26 Subansiri River with a death record of minimum 14 dolphins in 2004-05. Comparing the 2005 sighting to with 1993's sighting (Mohan *et al.* 1997) Wakid (2005)

commented that roughly 26% population of the species has declined within last 12 years. Various man-made pressures are responsible for this declining and the pressures are increasing. Observing the declining status of the species, it is highly essential that all the concerned stakeholders of Assam sit together, discuss the issues and prepare conservation strategies based on that. Keeping this in mind, the workshop on "Gangetic dolphins of Assam: an initiative for their future conservation strategies" was organized in Guwahati on 8th December, 2006.

2. Objectives

The objectives of the workshop were as follows:

- a. Review of the status of the species from 1993 to 2006 in Brahmaputra and Barak river system.
- b. Review of the threats facing by the species.
- c. Formulate conservation strategies for the long term conservation of the species in Assam.

4. The Workshop Schedule

9-45 am to 10-45 am:	Inagural Session
10-45 am to 11-00 am:	Tea break
11-00 am to 2-00 pm:	Session-II: Status of Gangetic dolphin in India with special reference to Assam.
2-00 pm to 3-00 pm:	Lunch
3-00 pm to 4-45 pm:	Session-III: Strategies for the future conservation of Gangetic dolphin of Assam.
4-45 pm to 5-00 pm:	Conclusion with vote of thanks

5. Workshop Details

5.1. Session-I: Inauguration

- The session started with a brief talk by Dr. Bibhab Talukdar, the Secretary General of Aaranyak, where he gave a brief overview on the current activities of Aaranyak for the conservation of the wildlife of North East India.

- Dr. Abdul Wakid, the Programme Leader of Gangetic Dolphin Research and Conservation Programme (GDRCP) made a brief talk over the initiatives undertaken by the GDRCP since 2004. In his talk he explained about the urgency of initiating the GDRCP for the long term conservation of the species and the development made by the programme over its objectives. Dr. Wakid mentioned that over last two years of duration, the programme has made population status survey, recorded a minimum of 250 dolphins in the entire Brahmaputra river system distributed in 101 locations, trained up more than 70 local youths for dolphin conservation, made more than 80 major media coverage, conducted about 50 awareness campaign among local communities for the conservation of the species.
- In his speech Chief Guest Prof. R. K. Sinha from Department of Zoology, Patna University, who has been considered as one of the international authority on Gangetic dolphin and an IUCN-CSG member, gave a brief overview of the species in Indian mythology. He mentioned about the initiative of the Chief Minister of Bihar Mr. Nitish Kumar who initiated an effort to declare the species as the National Aquatic Animal. Similar effort should also be initiated in Assam, since the Brahmaputra river system has been recognized as one of the last refuge for the species.
- The Guest of Honour Prof. Dulal Goswami of Department of Environmental Sciences, Guwahati University, who is an international hydrology expert and have been conducting extensive research works on the hydrobiology of Brahmaputra Valley for last 25 years, expressed his personnel experience on how the dolphin population has been dramatically declining from Brahmaputra valley. He mentioned the hydrological and geomorphological peculiarities of Brahmaputra river system, where he coined the Gangetic dolphin as the icon of the region and emphasized greater effort for its conservation.
- In his speech, Mr. M. C. Malakar, the Chief Wildlife Warden of Assam highlighted about the steps taken by the Govt. of Assam for the conservation of the species along with the initiative taken by a few NGOs of Assam. He pointed out that only management strictness is not enough for conserving the species; all the concerned stakeholders should be come forward together for it. He mentioned that observing the potentiality of impact of seismic survey on the dolphins and their habitats of Brahmaputra river, the Govt. of India has been taking the seismic survey issue seriously and unless detail investigation by the concerned experts no green signal will be given to Oil India Ltd and the State Forest Department will undertake all the management steps to save the species from the possible impact of seismic survey. He promised to provide all the management help to the concerned researchers and conservationists to undertake initiatives for the long term conservation of the species.

- At the end of the session one poster, one sticker, one booklet (all on dolphin conservation) and a report (on possible impact of seismic survey) were inaugurated by the distinguished guests as an attempt for the awareness raising on the species among the concerned stakeholders.
- Finally, Dr. Bibhab Talukdar, the Secretary General of Aaranyak offered vote of thanks to the participants.

5.1. Session-II: Status of Gangetic dolphin in India with special reference to Assam

- This session was chaired by Prof. Mrigen Goswami from Department of Zoology, Guwahati university who has been doing extensive research works on the limnology and fishery of Brahmaputra river system for last 25 years.
- In his talk on the Status of Gangetic dolphin in India-Nepal and Bangladesh, Prof. R. K. Sinha stated the overall global population of the species as less Bihar government is now going to declare the species as the State Aquatic Animal. He gave a detail description of the historical distribution of the species through Anderson (1878), present status and distribution of the species in Ganges mainstream from Haridwar to Farakka barrage as well as Ganges drainage system viz., Bhagirathi-Hooghly, Chambal, Sind, Betwa, Ken, Tons, Son, Punpun, Ghaghara, Gandak and Kusi River as described in Sinha et al. (2000); upstream within Nepal, mainly in Karnali, Narayani, Mahakali and Sapta Kosi and within Bangladesh mainly in Meghna, Karnaphuli and Sanghu river system as described in Sinha et al. (2000). He also discussed in details the status report documented by Sinha (1997), Smith (1993), Smith et al. (1994) and Smith et al (2001). Besides, he also explained the gut content of the species based on the report Sinha et al. (1993) and an initiative to minimize the killing of the species through providing alternative oil for the fishermen communities (Sinha 2002). He commented the poaching, accidental killing, dam construction, over-fishing and pollution as the main threats for this species of freshwater dolphin. He recommended mass awareness campaign among different stakeholders, protected area establishment, declaring the species as national aquatic animal, starting Project Dolphin like Project Tiger and Project Elephant, popularising the alternative of dolphin oil among the concerned fishermen communities for the long term conservation of the species in the globe.
- In his presentation on "Status of Gangetic dolphin in Brahmaputra river system from 1993 to 2002", Mr. S. P. Bairagi, the Chairman of Dolphin Foundation discussed the findings of Mohan et al. (1997 & 1998), where he was also a co-author. He commented that in 1993 they sighted altogether 266 dolphins in the Brahmaputra mainstream although they estimated it as around 400. However, in the follow up survey in 1997 and 2002 they sighted only 250 and 225 dolphins respectively. Discussing the Mohan et al. (1998), Mr. Bairagi reported

that in 1992 they recorded altogether 24 dolphins in Kulsri River, which reduced to 17 in 1993, 14 in 1994 and 12 in 1995. Based on Bairagi (1999) he described how the oil bat fishery has been affecting the dolphin population of Brahmaputra mainstream. He described the poaching, accidental killing, over-fishing, habitat degradation and dam construction as the main threats to the dolphins of Brahmaputra Valley.

- The Barak River, the major river of the Southern Assam, is another home of Gangetic dolphin in Assam. Mr. Paulan Singh, a Lecturer of Kachar College, Silchar (Barak Valley) and a Ph. D. scholar on the habitat ecology of Gangetic dolphins of Barak River under Assam University, Silchar talked on the "Status of Gangetic dolphins in Barak River of Southern Assam", where he mentioned that in 2001 there were 12 dolphins in the river, which further reduced to 8 in 2004 and 6 in 2005. He reported the over-fishing, poaching and habitat degradation as the main threats to these dolphins and recommended the strict implementation of fishery laws, restoration of dolphin microhabitats, declaring the species as National Aquatic Animal and providing the alternative livelihood to the fishermen communities for the long term conservation of the species in Barak Valley.
- "Eco-tourism and alternative livelihood: an initiative for the conservation of the Gangetic dolphin" is one of the two projects currently running in Brahmaputra Valley, lead by Centre for North East Studies and Policy Research. On behalf of the Centre, Rahul Roy, a research scholar of the Centre, made a talk on the initiative made by the NGO in 3 different locations of Brahmaputra Valley through providing alternative livelihood to the fishermen communities.
- The last presentation was made by Dr. Abdul Wakid, the Programme Leader of the Gangetic Dolphin research and conservation programme of Aaranyak and the organizer of this workshop. Dr. Wakid described their 2005 dolphin survey in Brahmaputra river system survey, where altogether 250 dolphins with 197 in Brahmaputra mainstream, 27 in Kulsri and 26 in Subansiri River were confirmed. Through statistical analysis he proved that there were no significant differences of numbers of dolphins in different stretches of Brahmaputra River. On the other hand, there are no significant difference of number difference between the calves and sub-adults, but there are significant difference between their numbers of calves and adults as well as sub-adults and adults. Depth and temperature are two determining factors for the distribution pattern of dolphins in Brahmaputra mainstream. A rough comparative analysis of the population status of the species in 1993 and in 2005 indicates a declining of about 26% dolphins in Brahmaputra River. Accidental killing, poaching, habitat degradation, over-fishing and dam construction are the major factors responsible for the declining of the population from the Brahmaputra river system. The proposed seismic survey by Oil India Ltd in the river bed of Brahmaputra is another potential threats for the dolphins of Assam. Collaborative approach among different stakeholders, management strictness, awareness raising, providing alternative to dolphin oil are some recommendations made by Dr. Wakid in his talk.

- In his concluding talk Prof. Mrigen Goswami, the Chairperson of the session emphasized in initiating some long term conservation measures for the better future of the species in Assam. To reduce the accidental killing, poaching, habitat degradation, over-fishing, dam construction he recommended undertaking of collaborative initiatives involving all concerned stakeholders.

5.1. Session-III: Strategies for the future conservation Gangetic dolphin of Assam

The conservation history of Gangetic dolphin in Assam dates back from 1992- 93. With the detail discussions during the first session of the workshop made by Prof. R. K. Sinha with his wide experience on the species in India and Nepal (Sinha et al. 1993, Sinha 1997, Sinha et al. 2000, Sinha 2002, Sinha & Sharma 2003 etc), S. P. Bairagi who was a co-author of Mohan *et al.* (1997 & 1998) and have several survey experience in Brahmaputra river system including Bairagi (1999), Paulan Singh the only researcher on the species from Barak River, Abdul Wakid who has been conducting his research and conservation efforts (Wakid 2005; Wakid et al. 2005a & 2005b, Wakid 2006a & 2006b) on the species from 2000 onwards, following threats were identified for the Gangetic dolphins of Assam.

1. Deliberate and accidental killing
2. Habitat degradation
3. Dam construction
4. Over-fishing
5. Seismic survey

5.3.1. Threat 1: Deliberate and accidental killing

The Problem:

- Mohan et al. (1997) estimated the killing (intentionally as well as accidentally) of 60 dolphins in 1993 in Brahmaputra river system. Wakid (2005) recorded a minimum of 14 dolphins killing in 2004-05 in Brahmaputra river system, out of which 12 were the victim of accidental killing.
- Dolphin oil is being used both as fish bait and medicine for certain rheumatic diseases by fishermen and riverine villagers, for which the oil has a good market value, ranging from Rs. 600/- to Rs. 1000/- per kg. This increases the tendency of the villagers and fishermen to kill the dolphins and even the using of meat of the accidentally killed dolphins for extracting the oil.
- During the time of high water season (monsoon season) dolphins usually make upstream migration through the small channels and tributaries of Brahmaputra River and coming down during the decreasing of the water level. During that time sometimes the

dolphins get entangled for their attempts to passing through the nets, which sometimes block their entire passage.

- Sometimes the dolphin try to collect fish from nets and during that attempts accidentally themselves they get entangled accidentally. Monofilament gill nets are particularly responsible for this.

Recommended measures:

- Investigation of the chemical properties of dolphin oil and find out an alternative of dolphin oil.
- Assessment of the amount of dolphin oil requirement and its utilization in Assam.
- Extension programme of utilization of alternative of dolphin oil among the identified fishermen communities and villagers.
- Awareness raising among the fishermen communities and villagers about the legal status of the species.
- Identification of threatened fishing gears for dolphins and modifications of these gears through intensive research.
- Enforce the legal procedures against any reported killing of the species.

5.3.2. Threat-2: Habitat degradation

The Problem:

- Some industries have been discharging their pollutants to the water of Brahmaputra River through which they have been increasing the pollution level to the Brahmaputra river system and thus to the dolphin habitats.
- Deforestation in the riparian zones and in highlands of Assam and Arunachal Pradesh has been creating siltation in the river bed, which resulting into the lowering of water depth. Since dolphins prefer deeper water, therefore, low water depth through siltation resulting into habitat loss.

Recommended measures:

- Determination of the level of pollution of the dolphin habitats in Brahmaputra river system through intensive research by the research institutes of Assam and formulate conservation strategies based on that.
- Monitoring of the water pollution level of Brahmaputra river system through long term research project.

- Level of deforestation in the riparian zones should be minimized by raising awareness and increasing the management strictness.

5.3.3. Threat-3: Dam construction

The problem:

- Water development projects have been directly affecting the ecology of the river systems throughout the southern Asia and all the three river dolphins in this region are directly affected through interrupted movements and habitat degradation (Reeves *et al.* 1991, Reeves & Leatherwood 1994, Smith *et al.* 1998, Ahmed 2000, Liu & Ding 2000, Sinha *et al.* 2000, Smith & Reeves 2000). At least 42 water development projects in India, 16 in Bangladesh and 8 projects in Nepal have affected the rivers that historically supported or currently support dolphin population (Smith *et al.* 2000).
- There are altogether 168 proposed dams in north east India, which will directly affect the dolphins in Brahmaputra river system.
- According to the Central Electricity Authority's "Preliminary ranking study of hydroelectric schemes" in the Brahmaputra basin published in October 2001 22 schemes (each greater than 25 MW) have been identified in the Subansiri basin with a cumulative installed capacity of 15,191 MW (Vabolikar & Ahmed, 2003). Under this scheme the National Hydro Power Corporation (NHPC) is constructing the 116 m high dam on River Subansiri in Garukamukh area, which is in Assam-Arunachal Pradesh border and about 70 km away from Lakhimpur. The construction of this Dam on the River Subansiri will directly affect the dolphin population of the river through changing the whole ecological system of the river (Bairagi, 2003).
- The Brahmaputra Board is proposing one power project in the upstream of the Kulsu River near Umkiam of Arunachal Pradesh. The Kulsu River is holding about 11% of total dolphins of Assam and 51% of total residential populations of the species in Assam. The major concentration of the species in this river is just about 20 km downstream from the proposed dam site, which not only wipes out this residential population but will also create livelihood problem for about 5000 families depending on the sand mining of the river.

Recommended measures:

- Establish dialogue with National Hydroelectric Power Corporation about the possible downstream impact of the Subansiri dam on the dolphins of the river and find out mitigation measures through collaborative approach.
- Aware the management authority of Brahmaputra Board about the dolphins and their habitats of Kulsu River and find out alternate approach.

- Monitoring the downstream impact of ongoing Subansiri dam on the dolphins of the river through intensive research on their distribution pattern and habitat degradation.

5.3.4. Threat-4: Over-fishing

The problem:

- The food of Gangetic dolphin mainly consists of fish and crustacean (Anderson, 1878). Norman & Fraser (1948) reported that Ganges dolphin mainly feeds on mud-frequenting fishes and freshwater shrimps. Shrestha (1989) also reported that besides the crustaceans and molluscs, fishes especially of catfishes are the main diet of the species. Biswas & Michael (1992) noticed that dolphin severed the head of the prey, especially the cat fish by their teeth. Sinha *et al.* (1993) observed a wide variety of food fishes like *Mastacembelus panculus*, *Puntius sophore*, *Colisa fasciatus*, *Chela laubuca*, *Chanda ranga*, *Glossogobius giuris*, *Nangra punctata* and *Puntius sp.* in the gut content analysis the species.
- Extensive using of various types of gill nets in the entire Brahmaputra Valley over last 15 years resulting into the sharp declining of fish fauna from this region, which has been directly affecting the dolphin population in this region through shortage of food (Mohan *et al.*, 1997; Biswas & Baruah, 2000, Wakid & Biswas, *in press*).
- Although fishing from 1st May to 15th July and using very low mesh-sized gill nets (current jal) are banned in Assam through State Fishery Laws, still both of these two banned activities have been going on in Assam round the year due to lack of proper management attention to this important issue, which has been resulting into severe increasing of anthropogenic pressure on fish fauna in Brahmaputra river system, which in turn affecting the dolphins through food shortage and habitat disturbance.

Recommended measures:

- Strictness of the legal actions against over-fishing and using of banned gears by the State Fishery Department, Govt. of Assam.
- Management strictness against fishing in the fishing prohibited seasons.
- Providing alternative livelihood to fishermen communities during the fishing banned seasons.
- Declaring the identified important dolphin microhabitats as fishing free zones and strict monitoring of these microhabitats by management authorities in collaboration with local communities.

5.3.5. Threat-5: Seismic survey

The problem:

- The Oil India Ltd, a premier petroleum company of India, is going to conduct seismic survey in the river bed of Brahmaputra as an attempt to oil exploration. The seismic survey will be conducted in a total area of 4500 sq. km. of Eastern Assam consisting mainly of river bed & islands of Brahmaputra River with a water depth of 4-15 m. Altogether 4-6 airguns will be used. Each day about 40 shots will be fired with a total 3-4 hrs operation from 6 am to 4 pm. In the seismic operation 2 hovercrafts, 2 big boats, 2 all terrain vehicles, 2 amphibious transports, 6-8 local boats and 375 man-power will be used. In land operations, 2.5 kg seismic gelatin (class ii explosives with about 80% ammonium nitrate) will be used in a shot hole at a depth of about 20 meters. The shot holes will be drilled along the survey lines at an interval of about 50 meters. The signals will be recorded on surface by geophones. In the areas covered under water, pressure (1600 psi) air gun towed with the help of machine boats will be used. The source signal will be transmitted by air guns at a regular interval of about 50 meters along the seismic survey lines. In very shallow water, explosives will be used below the river bed at a depth of 20 meters.
- The Oil India Ltd is proposing to conduct a seismic survey in one of the major habitats of Gangetic dolphin, the Brahmaputra River stretch within Eastern Assam. The proposed seismic survey may impact 25.8% of the dolphins in the Brahmaputra mainstream, where altogether 23 dolphin sub-groups are present.
- There are records of cetaceans being killed, injured and disturbed by seismic surveys worldwide viz., common dolphin in the Irish sea (Goold 1996a), bottlenose dolphins in captivity (Ridgeway et al. 1996), sperm whales in the Southern ocean (Bowles et al. 1994), Grey Whales in California (Malme et al. 1983 & 1984), Bowhead whales in the Beaufort Sea (Ljungblad et al. 1988, Richardson et al. 1986 & 1995), Humpback whale in West Australia (McCauley et al. 1998) and Blue whales in the North Pacific Ocean (Macdonald et al. 1995).
- In comparison to the ocean, the Gangetic dolphin habitat (the Brahmaputra River) is narrow, shallow and confined. Given the very restricted environment of this comparatively small (<2 km water wide in winter season) water body and the large amount of boat activity and disturbance surrounding the proposed works, the explosions and airgun blasts may be difficult if not impossible for the dolphins to avoid.
- River dolphins in the Yangtze River have been killed outright by explosions used along the river banks and in shallow water, and it is possible that the same may occur if explosives are used in the Brahmaputra River. The proposed use of explosives in the Oil India Ltd. seismic work is particularly worrisome because the fast rise time of sound from explosives makes them potentially more dangerous to cetaceans than the use of airguns alone.

- It is possible that the large amount of noise, disturbance and activity around the seismic survey may drive or herd the dolphins ahead of the work and downstream, thereby displacing them from a large part of their feeding and breeding habitat. Research in the Mahakam River in Indonesia showed that slow moving tugboats that produce low frequency noise of high energy changed the migration route of Irrawaddy dolphins which actively avoided the boats.
- The prolonged exposure to underwater noise may cause hearing damage and may interfere with the dolphin's sonar causing stress (Kreb & Rahadi 2004).
- As a blind cetacean species, the Gangetic dolphin depends on echolocation (the production of sound pulse, similar to sonar) to navigate, communicate and to find food. This may be affected by the seismic survey which also involves emission of sound pulses.
- Although much of the noise generated by the seismic pulses may be of a different frequency than that produced by dolphin, without more complete understanding of the proposed survey methods and a subsequent evaluation by a dolphin acoustic specialist, the exact impacts are not known and could be significant.
- There is a possibility that the food sources and feeding grounds of Gangetic dolphin may be negatively impacted by the seismic survey, since there are several records of death, injury or behavioural changes of fishes round the world due to seismic surveys (Enger 1981, McCauley et al. 2003, Matishov 1992, Pearson et al 1992, McCauley 1994, Chapman & Hawkins 1969, Dalen & Raknes 1985, Engas et al. 1993) and Gangetic dolphins are piscivorous in nature.

Recommended measures:

- Observing the world-wide impact of cetacean being killed, injured and disturbed by seismic surveys, the workshop identified that the proposed seismic survey might cause impact on the Gangetic dolphins of Brahmaputra river system. Since there was no dolphin or bio-acoustic expert in the EIA team, therefore, the workshop recommended that OIL should undertake detail investigation on the dolphins of the proposed survey sites and the possible seismic survey impacts on them. Based on that OIL should proceed, so that the impact could be minimized.

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8. Activities in the Workshop at a glance



Fig-25: The participants of the workshop



Fig-26: Prof. R. K. Sinha delivering his talk on the Gangetic dolphin of India-Nepal and Bangladesh



Fig-27: Mr. P. Singh delivering his talk on the dolphins of Barak River



Fig-28: Mr. R. Roy delivering his talk on their initiatives on the alternate livelihood to the fishermen communities



Fig-29: Dr. Abdul Wakid delivering his talk on the status of the species in Brahmaputra river system in 2004-05.



Fig-30: Prof. D. Goswami inaugurating a sticker



Fig-31: Chief Wildlife Warden inaugurating a booklet

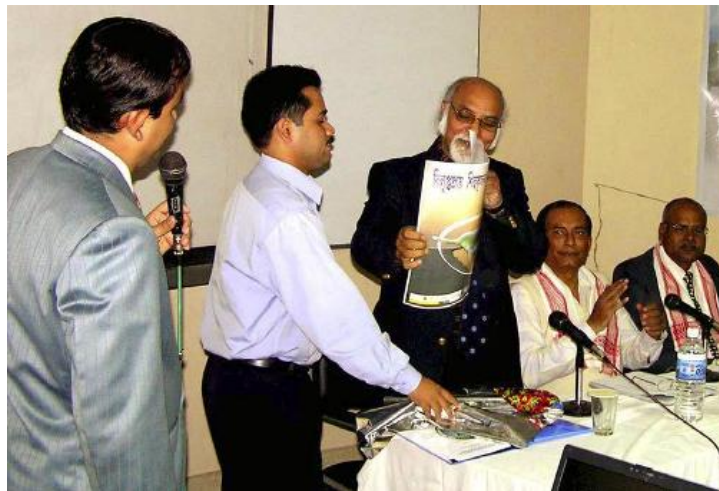


Fig-32: Prof. D. Goswami inaugurating a poster

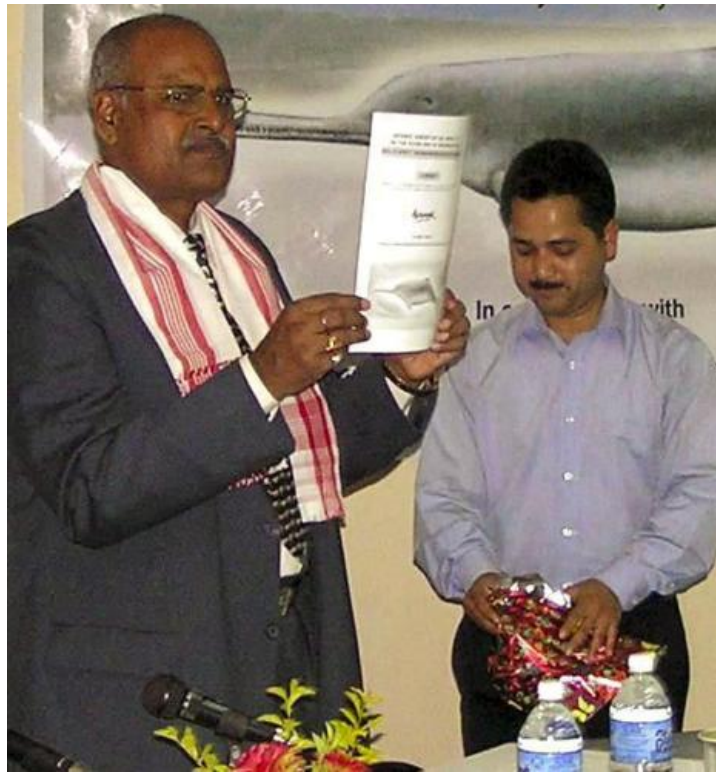


Fig-33: Prof. R. K. Sinha presenting one Report



Fig-34: Technical discussions till having food.

