

**Status of, and conservation approach to, the Ganges
River dolphin (*Platanista gangetica* Roxburgh, 1801) in
Narayani River, Chitwan National Park, Nepal**



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Acronyms

CNP = Chitwan National Park

DNPWC = Department of National Park and Wildlife Conservation

UNESCO = The United Nations Educational, Scientific and Cultural
Organization

CITES = Convention on International Trade in Endangered Species

IUCN = International Union for Conservation of Nature

NRDB = National Red Data Book

NPWC = National Park and Wildlife Conservation

GPS = Geographic Positioning System

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Abstract

This project has been focused on the investigations such as the status, distribution, threats and local perception towards conservation of Ganges River dolphin in Narayani River, within the Chitwan National Park. For estimation of status and distribution of dolphin, the direct count method through boat survey was conducted from Tribeni to Baguban in monsoon and post monsoon season. It revealed that, there are two dolphins are in Narayani River. And Dolphin sighting area is Tribeni to Baguban covered nearly 20km; almost regularly found in Bhim-bandh (27.513237, 83.933803) area. The distributional map was prepared on the basis of the direct study and local sighting. The threats, perception and attitudes towards dolphin conservation were estimated through key informant, questionnaire, and field survey. Altogether 264 respondents were involved in questionnaire survey and analyzed their response by different statistical tools. The main threats for conservation of dolphin in Narayani River have found construction of barrage, over exploitation of dolphin diet (Fishing), pollution and lack of policy implementation. Perception and attitude of the dolphin conservation in local level was analyzed by using Likert Scale format and explored the majority of local peoples are unknown about endangered dolphin conservation and important of dolphin. For the long-term existence of dolphin in Narayani River, conservation initiatives are required, this report wants to aware towards the related body.

Introduction

a. Background

Dolphins are aquatic mammals. There are 43 different species of dolphin were identified through different research. Thirty-nine of them are found in marine water and four species are found in fresh water. The Ganges River dolphin is one of freshwater dolphin.

The Ganges River dolphin (*Platanista gangetica* Roxburgh, 1801) also known as “shos or Su-Su” in Nepali. It is a freshwater dolphin species distributed throughout the Ganges Brahmaputra-Meghna river systems in India, Bangladesh, and Nepal (Bashir, *et al.* 2010). The Ganges River dolphin categorized as “CITES (Convention on International Trade in Endangered) - appendix I, IUCN (International Union for Conservation of Nature) - Endangered, NRDB (National Red Data Book) - Critically endangered and National Park and Wildlife Conservation Act 1973 - protected mammals (CNP, 2015b).

In Nepal the dolphins were distributed in the Karnali, Narayani, Mahakali and Koshi River. But now days no dolphin has been recorded in Mahakali River and occasional sighting in Narayani River (Jnawali and Bhaju, 2000). According to the recent survey, 28 dolphins counted from three major River systems (Karnali, Sapta Koshi, and Narayani) and two recorded from Narayani River of Nepal (Poudel *et al.*, 2015). In Narayani River seven dolphins were recorded in 1980 but none in 1990s (CNP, 2015b). In 1993, a survey recorded 21 to 30 Ganges River dolphins in Karnali and only one dolphin in Narayani River (smith *et al.* 1994). In 2010, two dolphins were sighted in Narayani River near Bhelauji (CNP, 2015b). In 2014, January 23 also sighted two dolphins in Narayani River (CNP, 2015a). Different anthropogenic activities, dam and other water development projects, intensive fishing and pollution have enhanced the decline Ganges River dolphin (Paudel *et al.*, 2015). For this fluctuate dolphin population, this project will be explored the exact population status of this endangered species in every aspect.

b. Objectives

The main purpose of this project is to determine the existing information of dolphins in Narayani River and strengthen conservation and awareness programs towards Ganges River dolphin among people at the local level through different activities.

Specific activities are:

- To determine the population status of Ganges River dolphin in Narayani River.
- To prepare the current distributional map of Ganges River dolphin in Narayani River.
- To estimate the conservation threats for Ganges River dolphin in Narayani River.
- To understand the perception and attitude towards Ganges River dolphin conservation.
- To generate awareness and educational programs for conservation of Ganges River dolphin in Narayani River.

c. Rational

Ganges River dolphin is endangered cetacean mammals. It is important not only because it is endangered, but perhaps more so because it is a reliable indicator of the health of the Narayani River, in fact the whole river system. Therefore, its status and distribution should be known and conserved as natural assets. As a flagship species, conservation of dolphin is conservation of other aquatic species. For this, project has been focused on the investigations such as the status, distribution,

threats and local perception towards conservation of dolphin in Narayani River. It has explored the population status with distribution GIS mapping of this species and conservation threats. The perception and attitudes towards dolphins were investigated through questionnaire survey. Furthermore, the national researcher, conservationist, decision maker, and local people were determined to protection of dolphin in river system. In conclusion, this report will be tried to enhance other responsible group for further research and investigation towards dolphin and conservation.

d. Status of dolphin

English Name- Ganges River dolphin Nepali local Name- Shos or Su-Su Scientific Name- *Platanista gangetica*

CITES (Convention on International Trade in Endangered Species) - appendix I IUCN (International Union for Conservation of Nature) – Endangered

NRDB (National Red Data Book) - Critically endangered

NPWC (National Park and Wildlife Conservation) Act 1973 – legally protected endangered Mammals

Material and Method

a. Study area

The project was carried out in Narayani River of Chitwan National Park including the buffer zone from northern boundary of park (Sikrauli) to Tribeni barrage at international border with India. The National Park situated in Southern Central Nepal was established in 1973 as a Nepal's first protected area, covering 932 km² and designated a UNESCO World Heritage Site since 1984. The geographical location of the National Park is between N 27° 20' 19" to 27° 43' 16" longitude and E 83° 44' 50" to 84° 45' 03" latitude whereas the geographical location of buffer zone is between N 27° 28' 23" and 27° 40' 38" longitude and E 83° 43' 08" and 84° 47' 38" latitude (CNP, 2015). The Chitwan National Park is especially for its protection of One Horned Rhinoceros, Royal Bengal Tiger and Gharial Crocodile, Ganges River dolphin, Asian Elephant, Gaur, Otter and sloth bear in their natural habitat (CNP, 2015b).

The Narayani River is also called the Sapta Gandaki River in local level. It is a snow fed river formed by confluence of Kaligandaki and Trishuli River and occupy nearly 80 km length (source: Google map) from Devghat to Tribeni barrage at Nepal/India border (Rajbhandari and Acharya, 2015). It is the deepest river of Nepal. The monthly average value of river discharge for 31 years (1963- 1993) reveals that the flow of river remains minimum in March (283 m³/sec) and maximum in August (5,100 m³/sec) (Yogacharya and Shrestha, 1998).

b. Method

Based on the secondary data and consultation with key informant, study area was selected for field visit and primary data collection.

Reconnaissance survey

A preliminary survey was carried out and all potential sites of dolphin were pointed out in topographic map. Also, the level of awareness among local people, fisherman and problems associated in dolphin conservation were assessed during survey.

Questionnaire survey

In questionnaire survey, respondents living within near village from the river were selected randomly in order to achieve the threats, perception and attitude towards dolphin conservation in Narayani River.

Key informants' interview

Informal interview has been conducted with CNP office staffs, Buffer Zone Committee, Biologist, Naturalist and Village Development Committee Chairperson in order to achieve information of dolphin and conservation threats at local level.

Field survey

Based on secondary data and information gathered through local consultations, the main dolphin sighting area was identified which is from Baguban to Tribeni ghat around 20km. Due to the low population reported and following the recommendation of Smith and Reeves (2000) a direct count method through boat based survey was conducted for estimation of status and distribution of dolphin in Narayani River. The upstream and downstream surveys were conducted in two seasons (monsoon and post monsoon), from Baguban to Tribeni.

In boating survey, maintained boat speed 5km/h, and 2 primarily and 2 rear observers were prepared.

The primarily observers were searched at the front of the boat and right or left side (respective side) using binocular and occasionally with unaided eyes. The rear observers were responsible for observing missed by primary observers.

Individual dolphin was classified as adult or sub-adult based on size, structure and colour. The position of sighted dolphin were recorded with a Geographic Positioning System (GPS) and information such as date, time period, habitat condition, distance from the nearest riverbank, size and colour of dolphin, were recorded in data sheet of Smith and Reeves (2000). Position of observer was changed to minimize perception bias at an interval of 2 hours. To reduce the chances of double counting, the size, structure and colour of dolphin were closely scrutinized through observed nature of the data.

Data analysis

Based on the observations, dolphin distributional map was prepared using Arc- view GIS software. Based on different categorization, conservation threats of dolphin at the local level were analyzed using simple statistical tools like table, bar diagram and pie chart.

Similarly, perception of the dolphin conservation in local level was analyzed by using Likert Scale format.

Methodology for conservation program

After data collection and analysis of data, appropriate conservation educational and awareness program were conducted in public area and schools for sustainable progression the level of education to dolphin conservation.

Results and Discussion

a. Population status and Distributional map

The survey was conducted during monsoon and post monsoon season. The route of survey was Tribeni to Baguban area of Narayani River, covered around 20km. This project work recorded that there are two dolphins in Narayani River.

Table 1: Population status of Dolphin in Narayani River

<u>Season</u>	<u>Dolphin Recorded</u>	<u>Date</u>	<u>Population</u>	<u>Location</u>
Pre-monsoon	According to the Chairperson of Tribeni Buffer Zone Committee; During patrolling	April 2018	2	Velauji / Kathauna area (27.524369 83.962151)
Monsoon	According to fishermen and villagers	June 2018	2 (one adult and other one baby)	Tribeni Ghat 27.452192
	Our team	July 2018	1 (adult)	83.934300
Post monsoon	Our team	October 2018	2 adults (black and reddish brown)	Bhim-bandh 27.513237 83.933803

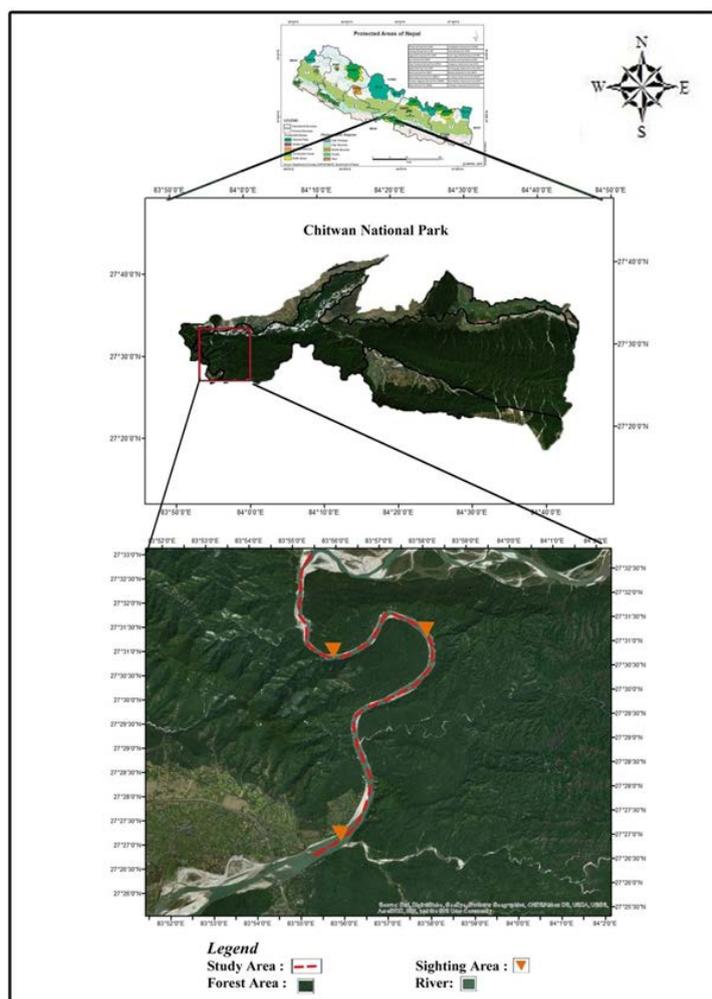


Figure 1: Distributional map of Ganges River dolphin in Narayani River

b. Status of respondents; and Perception and attitude towards Ganges River dolphin

Status of respondents

The study involved 264 respondents, of which 90 were brahamin and chhetri, and 174 were other (Magar, Manjhi, Chaudhary and Madhesiya). In 264 respondents, 192 male and 72 female respondents were participated. The age of respondent was 18 years to above.

Table 2: Respondent's educational status

		Brahamin and chhetri	Other (M, M, C, and M)	Illiterate	Literate
Male	192	72	120	102 (53.12%)	90 (46.8%)
Female	72	18	54	42 (58.33%)	30 (41.46%)
Total	264	90	174	144 (54.54%)	120 (45.45%)

Table 3: Brahamin & chhetri, and other's educational status

Cast	Respondents	Illiterate	Literate
Brahamin and chhetri	90	24 (26.66%)	66 (73.33%)
Other	174	120 (68.96%)	54 (31.03%)
Total	264	144	120

Among the 264 respondents only 174 have access in agricultural land. 4.68% (8) respondents use chemical fertilizer, 20.68% (36) use organic manure as a fertilizer and 72.4% (126) use both chemical and organic manure in agricultural land for crop production. Out of the 264 respondents, only 78 have involved in fishing activity where 66 are Manjhi and 12 are Chaudhary. For fishing activities 62 use net and 6 use hooks. The entire fishing households are unknown dolphin as endangered.

164 (62.12%) out of the total respondent, have seen dolphin in Narayani River. According to them 78 (29.5%) have known about it but have not seen yet. And 12 (4.54%) respondents are unknown dolphin presence in Narayani River. According to report, 72 (27.27%) know the Ganges River dolphins are endangered aquatic mammals and 192 (72.72%) are unaware about it.

Table 4: Shows the purpose of going to river besides fishing

Firewood collection	42 (15.9%)	24 (9.09%)	12 (4.54%)
Bathing and swimming	48 (18.18%)		
Scenic view	138 (52.27%)		
Occasionally just visit	60 (22.72%)		
Total 204 and remaining 60 were occasionally visit in Narayani River			

Perception and attitude towards Ganges River dolphin

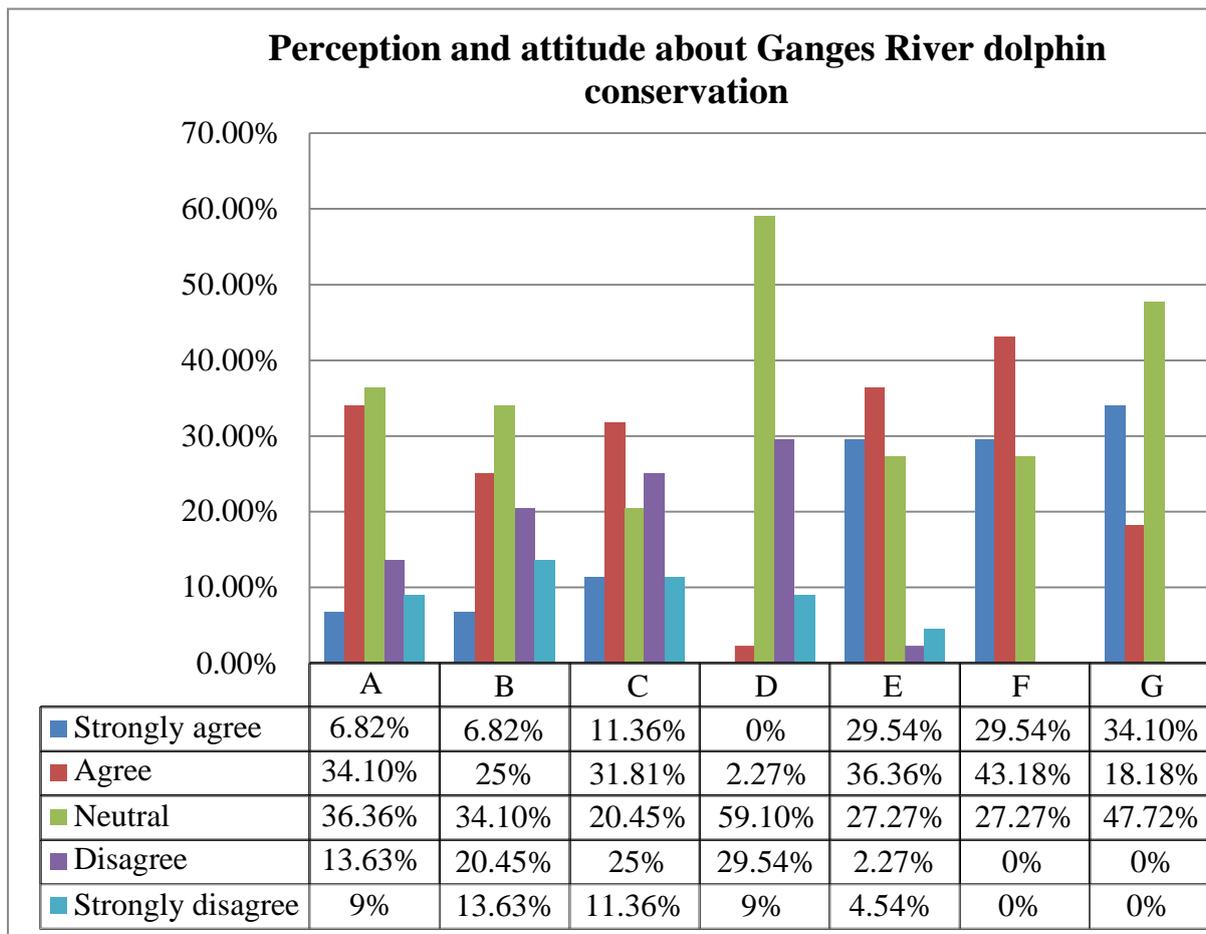


Figure 2: Shows the Perception and attitude about dolphin conservation in Narayani River.

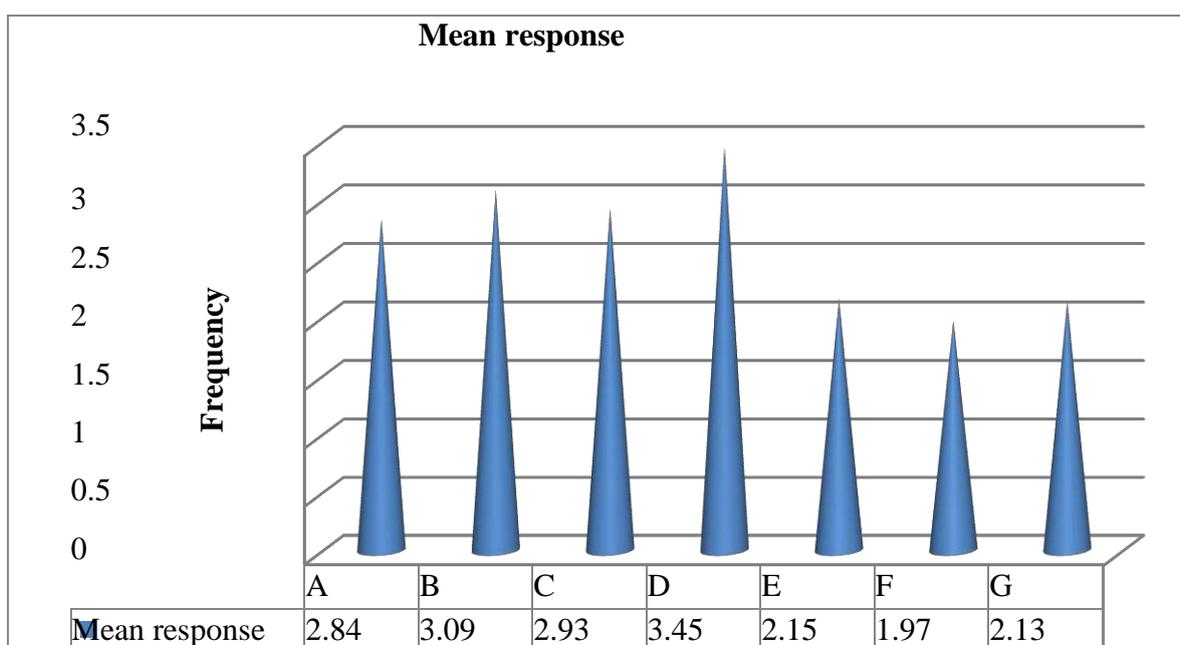


Figure 3: Shows the mean response of statements

Index for statements

A= Dolphins are affected by fishing, boating and damming.

B= Intensive fishing activity causes depletion of prey availability of dolphin. C= Dolphins are affected by water pollution.

D= Dolphin kills is good for human.

E= People (public) participation is significant in dolphin conservation.

F= Implementing dolphin conservation projects in this area help to conserve dolphins.

G= Conservation of dolphin's benefits people.

The majority of respondents showed to some extent disagree that dolphins are affected by fishing, boating and damming activities through 2.84; dolphins are affected by water pollution through 2.93; Implementing dolphin conservation projects in this area help to conserve dolphins through 2.15 and Conservation of dolphins benefits people through 2.13 mean responses. The majority of respondents showed some extents agree about intensive fishing activity causes depletion of prey availability of dolphin and dolphin kills is good for human with mean responses 3.09 and 3.45 respectively. The majority of the respondents showed his disagree about implementing dolphin conservation projects in this area help to conserve dolphins through 1.97 mean responses.

c. Conservation threats

Some conservation threats have been recorded during study period. They are as follows.

Fishing

Most of the poor and indigenous tharu, manjhi, and madhesiya are live around the Narayani River. Many of them are depend on river. They are use net and hook for fishing.

Pollution

Most people use chemical fertilizer for agricultural production. These agrochemical products harm the dolphin and other aquatic lives indirectly through food chain. In Hindu culture, River is a symbol of God Ganga. Every religious activity is not completed without the river. And Devghat and Tribeni are more popular pilgrim site for many devotees and also lie in beach of river. In this way, they become the main cause of pollution because of their daily used wastage products. Moreover, Hindu community also use river for funeral ceremony which also promote pollution as well.

Lack of education

The Study show most of the people who live near the river are uneducated and are unaware about dolphin is endangered.

Lack of policy implementation

In this area, people make openly larger net and it is being used for fishing without any fear. In Narayani River, they use net and hook for fishing. Although these activities are taken as illegal, fishing activities is going on.

Barrage

A large barrage lies between Nepal and India. It disturbs dolphin and aquatic lives freely moving here and there.

Local People involvement and Awareness Programme

Involvements of local people were done through Individual interview, Questionnaire survey, Awareness programme and Field work. Local people and school's students were directly or indirectly involved through above activities. They were participated in awareness programme, and got knowledge about River system, importance of river, detail information about dolphin, importance of dolphin and other aquatic lives. They have been acknowledged how to conserve nature of river and aquatic animals in their own habitat etc.

Conclusion and Recommendations

Based on the findings of the study, it is concluded that there are only two dolphins are present in Narayani River. Baguban to Tribeni area is found as the dolphin sighting area; covered around 20 km. Frequent sighting area is Bhim Band area.

The Ganges River dolphin is important and reliable indicator of the health of the river ecosystem. It is apparent that the anthropogenic stress like construction of barrage, aquatic pollution, over exploitation of dolphin diet (Fishing), and lack of policy implementation area a major threat to dolphin population. The habitats of dolphin in the Narayani River are not protected as dolphin friendly environment. Majority of local peoples are unknown about dolphin conservation and important of dolphin.

Few initiatives have been identified as essentials for conservation of Ganges River dolphin. They are:

- Dolphin friendly environment should be prepared in Narayani River.
- Very initial level of awareness programme should be launched for conservation of River and aquatic lives.
- Pollution should be controlled.
- Fishing should be regulation.
- Effectiveness of regulation should be monitored and evaluated.
- Alternative way of living (life depends/ income source) should be provided to fisherman for controlling their dependency on river for daily life.

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Annexes

a. Photo plates about study



Left: Ganges River dolphin in Bhim-Bandh, Narayani River. © Pujan Prasad Adhikari. Right: Ganges River dolphin in Bhim-Bandh, Narayani River. © Pradip Subedi.



Boating survey.



Left: Crocodile on beach of Narayani River. Right: Burrow nests of bird on river side.



Left: Pugmark of tiger on river side. Right: About 200 meters long fishing net making for marketing in Tribeni.



Left: Interview and questionnaire with fisherman (Manjhi). Right: Preparing for fishing by net.



Left: Funeral on the beach of Narayani River. Right: Wood collection from river.



Left: Fishing activity by hook. Right: Hindu devotees on the beach of Narayani River.



Left: Banner for awareness programme. Right: Presentation in school.



Left: Awareness programme in village. Right: Distribution of annual calendar.

b. Video link

Video of Ganges River dolphin recorded in this study, available on:
<https://www.youtube.com/watch?v=p9r22pLaNYo&t=14s>