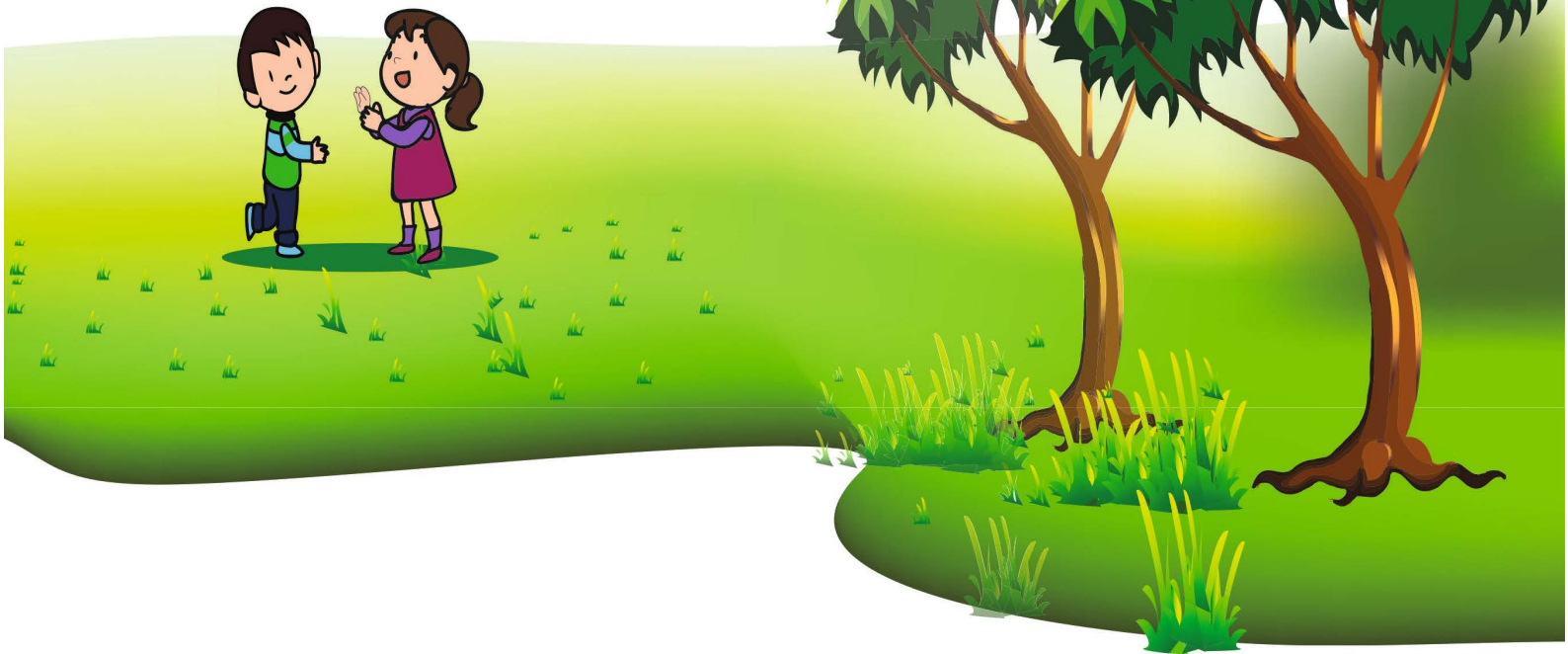


COMPONENT 6

Nature Interpretation and Education for Biodiversity Conservation of Ganga River



भारतीय वन्यजीव संस्थान
Wildlife Institute of India

NAMAMI
GANGE



रोगं शोकं तापं पापं हरमे भगवति कुमतिकलापम् ।
त्रिभुवनसारे वसुधाहारे त्वमसि गतिर्मम खलु संसारे ॥

—गंगा स्त्रोतम्

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National Mission for Clean Ganga and Ministry of Jal Shakti

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Executive Summary

One of the greatest challenges that Ganga faces is changing its image from a polluted river to a river that is appreciated for its natural resources and aesthetic value. Education and outreach with community involvement helps to reconnect people to the river and help them value the diverse natural resources, recreational and economic opportunities available. This helped us in gaining support for the protection of the biodiversity in the Ganga River Basin.

It is crucial to raise awareness and educate the stakeholders for sustainable river conservation and management. Therefore, it is very important to clearly identify the types of stakeholders and the level at which they are expected to be involved. The stakeholders identified were Ganga gram villages, where residents include fishermen and boatmen, tourists, pilgrims, guides, schools/college students and the hotels.

In order to achieve our aim, we revived an existing building which was a residence for a forest officer, renovated it and named it *Ganga Darpan*. It had a total footfall of around 1800 people till November 2019. A floating exhibition was established in Varanasi named *Ganga Tarini* which had a total footfall of 3000 people by November 2019 and another interpretation centre was established at Kanpur Zoological Park. These centres are acting as a place to conduct regular awareness activities and a platform to conduct regular dialogue. Documentaries and movies developed by WII-NMCG and other organisations regarding aquatic biodiversity of Ganga River and cleanliness issues are showcased to the students and the local communities.

Conservation education workshops were held at villages, towns and cities targeting students, teachers and representatives from other stakeholder groups to create awareness. A total of 21 schools in both Uttarakhand and Uttar Pradesh were covered out of which 11 were from rural and 7 from urban areas. Total number of students sensitized was 1928.

Sensitization and orientation of teachers on activities pertaining to Ganga conservation and cleanliness were conducted on a total of 84 teachers.

In order to build a relationship with the stakeholders, it is important to reach out to the community and involve them in conservation. It helped us to connect the communities with

the ongoing programs and activities and helped us to gain support in conservation initiatives. Outreach programs helped us to sensitize people from different backgrounds so that they are able to relate themselves with Ganga and understand how their actions are degrading the holy river and what they can do on their part to keep the river clean.

Introduction

River Ganga is one of the longest rivers in Asia, with a population of over 500 million. It flows through India and Bangladesh. The River supports more than 2500 floral and faunal species. In India, Ganga is not just a river, but is a symbol of faith, spirituality, culture, and national integrity. It has also been designated the National River. Traversing through three distinct biogeographic zones viz., the Himalayas, the Gangetic Plains, and the East Coast, River Ganga comprises a unique assemblage of biodiversity and is a source of livelihood to millions of people residing along its banks. Human population around the river basin is dependent on the river for a large number of activities like fishing, agriculture, industry, tourism, hydropower, and religious purpose. Low income, poor sanitation and low education levels of the population living in the Ganga River Basin are some of the factors that affect the aquatic biodiversity in this basin. The many complex issues within the region cannot be fully resolved by managing species or pollutants on an individual basis, thus the involvement of the community as a whole is essential. The Ganga River Basin is an excellent area for advancing goals for environmental sustainability with sustainable economic growth, heritage protection, and development.

One of the greatest challenges that Ganga faces is in changing its image from a polluted river to a river that is appreciated for its natural resources and aesthetic value. Education and outreach with community involvement will help to reconnect people to the river and help them value the diverse natural resources, recreational and economic opportunities available. This will lead to support for the protection of the biodiversity in the Ganga River Basin.

Objectives

The objectives of the programme are:

1. Communicating to the community about the value of aquatic biodiversity and natural processes through the establishment of interpretation centre at three sites.
2. Educate and involve the public in the Ganga basin's natural systems by creating a network of community-based environmental education programs.
3. Foster public awareness of the river ecosystem, its conditions and resources.

When we discuss a large river like Ganga which travels a distance of 2,525 km in five states of Northern India, feeding a population of over 500 million people, we can't just focus on one aspect. As such an interdisciplinary approach is must for conserving both the water as well as its biodiversity. In order to achieve this we need to talk with people who are directly or indirectly dependent on the waters of this holy river. They build a class that has to be considered as the key stakeholders in the process of initiating any kind of change.

When we specifically talk about "Nature Interpretation and Education for Biodiversity Conservation of Ganga River" the key stakeholders are the people who are directly or indirectly dependent on the river for livelihood and as a source of water. It is very important to clearly identify the types of stakeholders and the level at which they are expected to be involved. The stakeholders identified were Ganga gram villages, where residents include fishermen and boatmen, tourists, pilgrims, guides, schools/college students and the hotels. It is crucial to raise awareness and educate the stakeholders for sustainable river conservation and management. This would be the key condition for success in accomplishing the project objectives.

CHAPTER 1

Interpretive Facilities

1.1 Introduction

The word interpretation was first used in 1871 by Sir John Muir who had lived and worked near Yosemite National Park in USA. Interpretation centre is an institution for dissemination of knowledge of natural or cultural heritage through provocation and revelation of the relationships and meanings of the natural environment (Orams, 1997), interpretation stimulates, facilities and extends people's understanding so that empathy and concern towards conservation and landscapes can be developed, prompting more responsible behavior (Bramwell and Lane, 1993; Stewart *et al.*, 1998). Local people can benefit from an interpretation programme, if for instance, it increases their understanding of how they can contribute to the protection of an area's natural resources upon which they depend for subsistence or some form of income.

As the knowledge of people about our National River is very limited and constrained to just being holy and pious, there was a dire need for interpretation of Ganga. Varanasi and Kanpur being the oldest and most popular city became an ideal location to house the interpretation centres on Ganga River.

1.2 Objective

- To change the image of the river for visitors
- To disseminate knowledge about the biodiversity of the river so as to appreciate the natural resource and aesthetic value.

1.3 Site Selection

One of the factors for the choice of site was that the Interpretation Centre has to be housed in an existing building. Search for a suitable existing building to house the interpretation centres led us to a residential quarter inside the Turtle Rescue

and Rehabilitation Centre at Sarnath and to the Allen building inside Kanpur Zoological Park. The buildings were not in a good shape and dilapidated. Since no suitable building was found near the ghats of Varanasi therefore it was decided to develop a floating exhibition on a houseboat in the river.



1.3 Ganga Darpan Interpretation Centre at Sarnath

The building in which the interpretation centre was to be housed was an old abandoned residence for a forest officer within the Turtle Rescue and Rehabilitation centre at Sarnath, Uttar Pradesh. No architectural plan of the building was available and therefore a layout had to be manually prepared at site keeping in mind the visitor flow. The 3 BHK residence was to be transformed into exhibition halls. Since the building was abandoned for a very long time, the electrical fittings and the wood work were in bad shape. The building was surrounded by unwanted vegetation and the floors were covered with layers of mud and sediments. The renovation work had to be done one room at a time to avoid any collapse. New electric wiring and fittings were installed. The residence was converted into three exhibition halls, one children's activity room, one room accommodation for the Education Officer and an office room. Once the restructuring and installation of doors and windows was done, the building was given a new colour theme.

Simultaneously along with the renovation, process of identification of resources, preparation of message media matrix, identification of themes, compiling information from archives and literature was being undertaken.

Based on the research the overall topic of River Ganga and its biodiversity was decided. Identification of the possible visitors to the centre was done through discussion with the officials and staff of the rescue centre, tourist guides of Sarnath and the hoteliers at Sarnath.

Principal themes and messages for the exhibits were then decided. The centre was divided into three halls and a children corner. Themes for each hall were identified followed by decision on exhibits. The themes for the 3 halls are as follows –

Hall 1 - Glorious Past

Hall 1 has the theme of Glorious Past to Unsure Future displaying the origin of Ganga and its importance since the ancient times.

Hall 2 - Biodiversity Rich River

Hall 2 is Biodiversity of Ganga River displaying information and models of priority species living in and around Ganga, livelihood that the river provides how different species living in it is helping their bit to eliminate the pollutants in the river.

Hall 3 - Initiatives for a Nirmal and Aviral river

Hall 3 is problems and initiatives taken up to clean the river displaying initiatives taken up by the Government and how in day to day life people can do their bit. The centre also houses an activity area for visiting school children.

Besides panels, a diorama depicting the biodiversity of the river and *Ganga Avtaran* has been placed. A 3D map of the river showing important cities attracts visitors. An interactive kiosk has been placed for visitors to learn more facts about the river and its biodiversity. All the exhibits in *Ganga Darpan* are QR based web enabled. Visitors can obtain information by scanning the QR codes.

(Table 1.3.1)

Table 1.3.1: Panels in Ganga Darpan Interpretation Centre

S.No.	Panels	Dimensions (ft)	Descriptions	Panel Codes
Outside				
1	Ganga Avatara Mural			GD (M) 1
2	3D - Advertising fan		3D advertising fan showcasing logos.	GD (AF) 1
Hall 1				
3	Panel: the sacred lifeline of India	6*3	Panel describes river Ganga as ecologically and spiritually important.	GD(P)1
4	Panel: Ashoka's legacy	6*3		GD (P)2
5	Panel: Varanasi Ghat's photo	6*3		GD (P)3
6	Panel: Royal love for Ganga	6*3	This panel depicts the mention of River Ganga in older times by different kings.	GD (P) 4
7	Panel: Glorious Past to Unsure Future	6*3	This panel brings in notice how Ganga has changed overtime.	GD (P)5
8	Panel: Map: Origin to Destination	6*3	3D Map which shows the map of Ganga and has cities lying on its banks marked.	GD(P)6
9	Panel : Kashi	6*3		GD (P)7
10	Ganga Avatara Diorama		Diorama showing how river Ganga was brought to earth.	GD (D)1
11	Gharial Diorama		Diorama of gharial showing physical features.	GD (D)2
12	Panel : Descent of Ganga	6*3	The panel contains the story of descent of river Ganga from heaven to earth.	GD (P)8
13	Panel : Hunters of Ganga	6*3	Panel contains information about the Gharial found in river Ganga	GD (P)9
14	Aquarium			GD (A)1
15	LFD Screen		Placed to play various movies and shows for visitors.	GD (LFD) 1
Hall 2				
16	Panel: wildlife wealth	6*3	This panel depicts the biodiversity of river Ganga.	GD (P) 10
17	Panel : Ambassador of River	6*3	Panel contains information about the otters found in river Ganga.	GD (P) 11
18	Panel : Tiger of Ganga	6*3	This panel is about Gangetic Dolphin.	GD (P) 12
19	Panel : Shelled Protectors	6*3		GD (P)13
20	Panel: Feathered Friends	6*3	This panel contains information about all the birds found in and around Ganga.	GD (P)14
21	Panel : India's Tallest Bird	6*3	This panel describes briefly about Sarus Crane.	GD (P)15
22	Sarus Diorama		Diorama of Sarus in its habitat	GD (D) 3
23	Panel : Resident with Dual Adaptations	6*3	Panel describes about the amphibians found in river Ganga.	GD (P) 16
24	Biodiversity Diorama : Otters, Indian Skimmers, Dolphin, Turtle		The diorama showing biodiversity of Ganga.	GD (D)4
Hall 3				
25	Panel: Threats of Ganga	6*3	This panel describes Threats to the river and solutions to overcome the threat.	GD (P)17
26	Panel: Ganga- The Provider	6*3	This panel describes about all the ecosystem services provided by river Ganga.	GD (P)18
27	Panel: Aquatic Abundance	6*3	This panel is about various species of fishes found in Ganges.	GD(P)19
28	Panel: Namami Ganga Initiatives	6*3	Panel contains information about the initiatives taken by government under NMCG.	GD (P)20
29	Panel: Good Deeds	6*3	Panel involves the visitors to take pledges keeps a track of the pledges taken.	GD (P)21
30	Kiosk		A Kiosk is placed which is accessible for visitors to get information about river Ganga.	GD (K) 1

For the fabrications of the exhibits an agency was hired through tendering process. The agency started work with the in the supervision of the project team. The first step was to measure the exhibit space and decide on panels and dioramas. The project team and fabricators worked in close collaboration for designing the layout. A tentative exhibit flow was decided upon the availability space and exhibits visitor flow.

Content writing for individual panel and selection of relevant photographs was done. The texts were based on the research material collected from literature and archives. Photographs were sourced from various sources. The text was written in English and was sent to various people for checking on facts and its reliability. After several rounds of editing, the text of individual panels were finalised as per theme of the halls.

Keeping in view that the visitors to the centre would be rural Hindi speaking as well as international visitors visiting the Buddhist temples at Sarnath, the panels were designed with photographs and text in English and Hindi.

It was also decided that to increase the attraction power of the exhibits some of the themes would be depicted through diorama and display of life size models.

Finally a walkthrough of the centre was created with placement of panels, dioramas and exhibits. Once finalised the implementation was undertaken.

Ganga Darpan aims to improve the image of the river Ganga from a highly polluted river to a river that is appreciated for its aesthetic values and natural beauty. The thought of giving the Interpretation centre a name was discussed by the component team members after going through the suggestions it was finally narrowed down to “*Ganga Darpan*”. *Darpan* means mirror and the centre is a reflection of the river and its biodiversity.

1.3.1 Open to Public

Ganga Darpan, was formally inaugurated on February 27, 2019 by Late Shri Arun Jaitley, Hon'ble Union Minister for Finance and Corporate Affairs; Mr Nitin Gadkari, Hon'ble Union Minister for Water Resources, River Development and Ganga Rejuvenation, Road Transport, Highways and Shipping; and Mr Dharmendra Pradhan, Hon'ble Union Minister for Petroleum & Natural Gas and Skill Development & Entrepreneurship at DRDO Bhawan in New Delhi in the presence of Shri Arjun Ram Meghwal, Dr Satyapal Singh, Smt Hema Malini, Smt C. Mary Kom Hnangte, Shri U.P. Singh, Shri Srikrishna Mohan, Shri Ramkumar Mohan, Shri Prasoon Joshi and Shri Rajeev Khandelwal.

1.3.2 Bringing the visitors

Getting visitors to the centre was also a challenge as the location is inside a lane and the approach road too is not good. To overcome this obstacle, guides of Varanasi and Sarnath were exposed to the centre its objectives and the displays installed all over Sarnath and leaflets about the centre were distributed to the public and placed in hotels and guest houses in Sarnath. Schools are invited to visit with the students. A wall near the entrance gate of the rescue and rehabilitation centre was painted to attract passersby to visit the centre.

Slowly school students, local people and tourists started visiting the centre alike. Children enjoy the activity area and the informative kiosk. It has witnessed a footfall of around 1800 people till November 2019. Fig 2.1 describes the number of visitors month-wise in *Ganga Darpan* (Pg 24). The centre is being appreciated by one and all.

1.3.3 Evaluation and Monitoring

“Excellently done exhibition. Depicts the Ganga, its rich biodiversity and species richness very well and effectively”, Mr Rozy Agarwal, ED Finance, NMCG.

“Visited the interpretation centre and was really awe struck by the way all the events were depicted in a visual and real time perspective”, Mr Sunil Chaudhary APCCF/CCF, Wildlife Warden, Kanpur.

“It is indeed a moment of great ecstasy that U.P. got such an amazing centre of excellent on Ganga with the collaboration of WII”, Mr Pawan Kumar, HOFF & PCCF, U.P.

“Visit Ganga Darpan today accompanied by Addl. PCCF (W) Mr P.K. Sharma. Indeed an awesome Interpretation Centre, furnishing lot of useful and meaningful information. I’m benefitted totally by visiting it. Thanks for the motivation and inspiration” Mr Deepak Trivedi, Chairman, Board of Revenue, U.P.

“It is very good and very informative for all people. People can pledge to clean Ganga” Mr Khursheed Alam, student.

“We have got many information about the biodiversity” Harshita Dubey, student.

“It is very beautiful place. It was a pleasure to be here” Pooja Bharti, tourist.

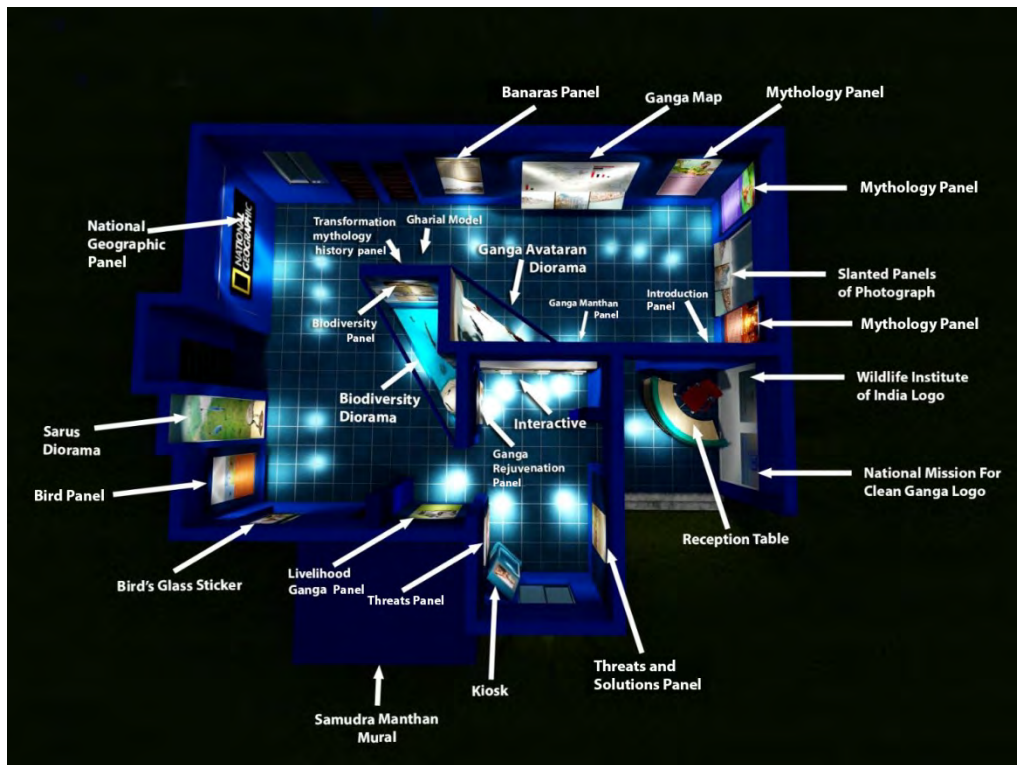
“Outstanding and I got lots of information. Thank you” Nidhi Chaubey, localite.



Interpretation Centre building in Sarnath before renovation



Interpretation centre building in Sarnath after renovation



3D visualization of *Ganga Darpan*



Renovation work in *Ganga Darpan*





Interpretation centre after the completion of fabrication work





Ganga Darpan after renovation and fabrication

Visitors in Ganga Darpan, Sarnath



Visitors in Ganga Darpan, Sarnath

1.4 Ganga Tarini - Varanasi

Lakhs of pilgrims and tourists visit the ghats of Varanasi. To create awareness on site, search for a suitable building at any one of the 84 ghats was made but no such building was identified. Therefore, it was decided to house the exhibition on a house boat locally known as *bajra*. A houseboat was hired after following the tender procedure. In order to see the acceptability of the exhibition amongst different stakeholders, a temporary exhibition was set-up on the *bajra* where students, tourists and pilgrims came on board to see the exhibits displayed. The temporary exhibition was moved from one ghat to another. Students and their teachers showed great interest in the exhibition on the *bajra*.

Alongside, a survey was also conducted to know what people think of this idea and will they be willing to visit such exhibitions on ghats. A survey was done with the hotels, schools, teachers, students, and local people whether they will be interested to visit such exhibition or may be a part of it through sponsorship and let other people and guests in their hotels know about it (chapter 1 pg 9-10). Results of the survey showed that 50% of schools were interested in the concept of *bajra* and 40% of schools said they were interested only when they see the actual product. Similarly, 60% of the hotels in Varanasi said they would inform their guests about the exhibition on *bajra*.

Equipped with the encouraging results of the survey it was decided to build an exhibition on *bajra*. A 3D visualization of how the boat would look like after fabrication was prepared. In order to house exhibits on the upper deck, a roof was required. Thus the exhibits would be housed on the upper deck and the lower deck would be used as a theatre for showing films on Ganga and also for holding visitors. The lower deck is also used as an activity area with school children.

Since the exhibition space was limited and the target audience different, careful selection of theme was made. The exhibits are more pictorial with little text in English and Hindi. A careful selection of material for fabrication of exhibits was made so that there is no effect of weathering. The boat would be in the water throughout the duration therefore, care had to be taken that the exhibits are not affected by water, moisture or heat.

The upper deck has the following exhibits:

Journey of Ganga through map, Wildlife Wealth in and around Ganga, Livelihood provided by Ganga, How people can contribute in making Ganga pollution free, Threats faced by the river and initiatives taken by *Namami Gange*.

The first floating exhibition of its kind in the country is named “*Ganga Tarini*”. *Tarini* means floating in the water. The *bajra* moves from one ghat to another after a time interval to allow visitors on board.

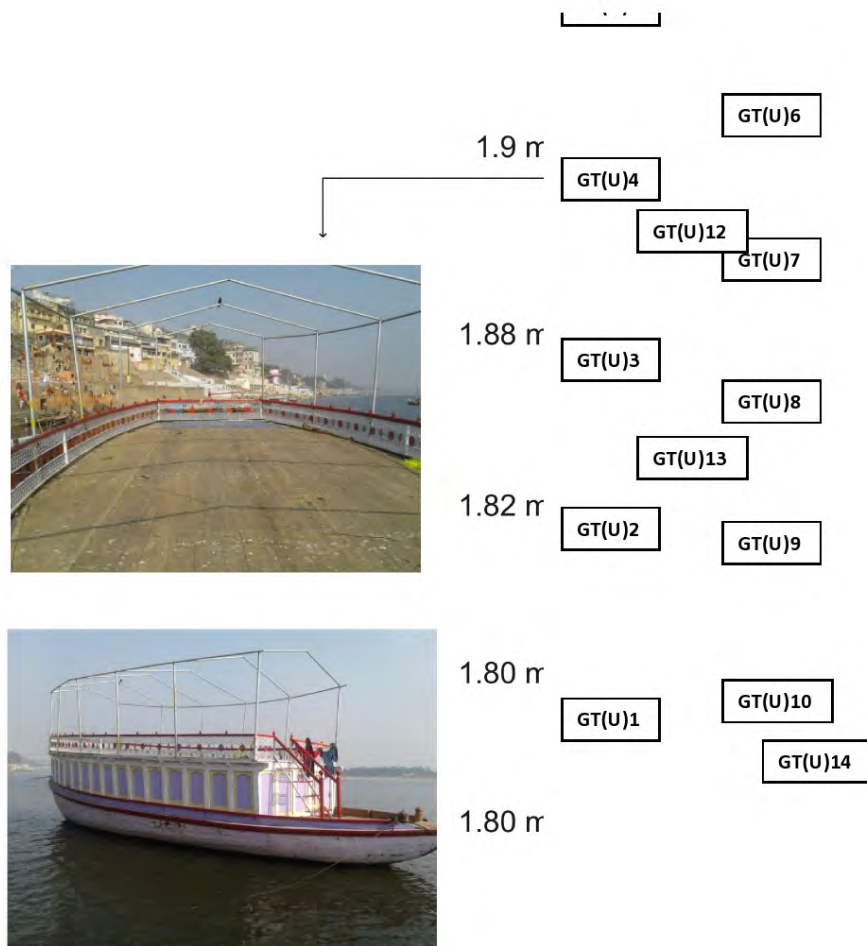
Ganga Tarini was opened to the public on February 27, 2019, along with *Ganga Darpan*. Pilgrims, tourist, and local people are visiting *Ganga Tarini*. It has witnessed a footfall of around 3000 people till November 2019 (month-wise data is given on pg 24). The month of September did not receive any visitors due to the heavy rains and inundation of the ghats. Varanasi has 84 ghats and till date *Ganga Tarini* has been stationed at 12 ghats namely *Gaayghat*, *Assighat*, *Kedarghat*, *Mir ghat*, *Lalitaghat*, *Rajghat*, *Tulsighat*, *Rani ghat*, *Nandeshwarghat*, *Hanuman gadighat*, *Panch ganga* and *Prahladghat* which are prioritized on the basis of tourist footfall. People have poured in words of appreciation in the feedback register for the initiative and the responses have been quite overwhelming. All the exhibits in *Ganga Tarini* are QR based web enabled. Visitors can obtain information by scanning the QR codes. **(Table 1.4.1)**

Table 1.4.1: Panels in Ganga Tarini

S.No.	All weather panels	Quantity	Dimensions (ft)	Descriptions	Panel codes
1	Journey Of Ganga	1	6*4	This panel describes about the journey of river Ganga from source to sea.	GT (U)1
2	Ganga - The provider	1	6*4	This panel describes about all the ecosystem services provided by river Ganga	GT (U)2
3	Wildlife wealth (Hindi)	1	6*4	This panel depicts the biodiversity of river Ganga in Hindi	GT (U)3
4	wildlife wealth (images)	1	6*4	The panel depicts biodiversity of river Ganga through images	GT (U)4
5	Wildlife wealth (English)			The panel depicts biodiversity of river Ganga in English	GT (U)5
6	Threats to river Ganga	1	6*4	This panel describes Threats to the river and possible solutions to overcome the threat.	GT (U)6
7	Namami Gange (Hindi)	1	6*4	Panel contains information about the initiatives taken by government under NMCG.	GT (U)7
8	Namami Gange (English)	1	6*4	Panel contains information about the initiatives taken by government under NMCG.	GT (U)8
9	How to help (Hindi)			The panel contains the information on how each of us can help in conservation of river Ganga	GT (U)9
10	How to help (English)	1	6*4	The panel contains the information on how each of us can help in conservation of river Ganga	GT (U)10
11	Sarus crane diorama	1	6*4	A life like diorama of Sarus crane is placed on the deck as selfie point.	GT (U)11
12	Gharial Diorama	1	6*4	A gharial diorama is placed on the deck for physical identification.	GT (U)12
13	Otter Diorama	1	6*4	Diorama of Otter is placed on the the deck for physical identification .	GT (U)13
14	Fire Extinguisher	1	6*4	Fire Extinguisher is placed as part of safety measures.	GT (U)14
15	LFD (55 inch)	1	6*4	Placed to play various movies and shows for visitors.	GT (L) 15
16	Fire Extinguisher	1	6*4	Fire Extinguisher is placed as part of safety measures.	GT (L) 16
17	Life jacket	10	6*4	Life jackets as safety measures.	GT (L)17
18	LFD Stand	1	6*4		GT (L)18

Layout of Ganga Tarini

Ganga Tarini – Floating Exhibition on the Ghats of Varanasi



The exhibition is gaining momentum and visitors are coming to see the exhibition. The staff of the boat has been trained as guides and they explain to the visitors about Ganga and its conservation. The guides also appeal to the visitors to not throw plastic or other *puja samagri* in the river but to place it in bins placed on the boat so that they can be disposed at proper place.

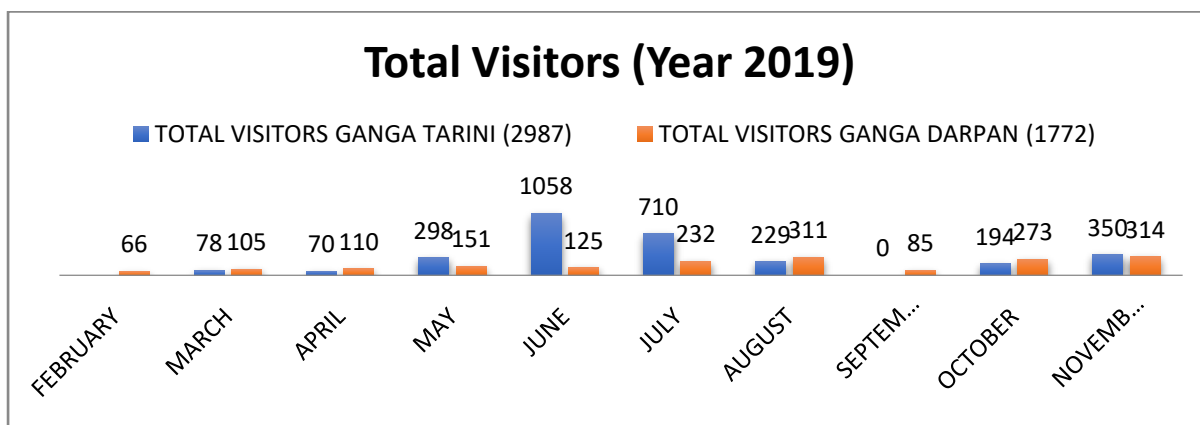


Fig 1.4.1 Total number of visitors in *Ganga Darpan* and *Ganga Tarini* (month-wise)

1.4.1 Feedback

“गंगा संरक्षण एवं जैवविविधता के बारे में संक्षिप्त एवं रचनात्मक तरीके से दर्शाया गया पर एक ‘floating museum’ है जो कि लोगों को गंगा की जानकारी एवं इस संबंध में जागरूकता बढ़ाने में एक महत्वपूर्ण भूमिका निभा रहा है।” Mr Rajiv Ranjan Mishra, DG, NMCG.

“It is so nice boat. Very informative” Mr Santosh Kumar Prajapati, localite.

“This boat is too good to enjoy with your friends and so interesting” Mahima Yadav, tourist.

“यह एक जागरूकता भरा अभियान है, जिस तरह से जैवविविधता को दिखाया गया है वह बहुत अच्छा है।” Dr Bhagirathee, tourist.

“बहुत अच्छा काम है, लोगों को जागरुक करने के लिए।” AkashYadav, tourist.

“Very nice exhibition. Safety protected. Very good and supportive staff” Girish Patil, tourist.

“Amazing experience. Very good initiative”, Sarthak Pandey, localite.

1.5 Interactive Portal

1.5.1 QR code Tag and Web Application Interface

A QR code is a machine-readable optical label that contains information about the item to which it is attached. These codes often contain data for a locator, identifier or tracker that points to a website or application. Earlier, QR codes were used to track vehicles during manufacturing; it was designed to allow high-speed component scanning. Now QR codes are used in a much broader context, including both commercial tracking applications and convenience-oriented applications aimed at mobile phone users. QR codes have become common in consumer advertising. Usually a smart phone is used as a QR code scanner, displaying the code and covering it to some useful form.

To enhance the quality of the exhibition experiences, all the exhibits in *Ganga Darpan* and *Ganga Tarini* have physical QR code tags installed. The web pages of each individual panel are accessible via QR code. Once the visitor reaches to the web application then there are three ways to continue accessing audio: 1) scanning next code; 2) manually typing ID of a panel; 3) switching to previous and next. All audio tracks are hosted a custom designed web page. This application serves as an interactive interface for the people visiting the exhibitions. Visitors visiting the interpretation centre and *bajra* need not be educated or may not be very keen in reading exhibits or information, therefore they can scan the code and gain knowledge about the exhibit at their leisure. This application provides a platform for these people to gain knowledge and know the importance of Ganga River and its biodiversity through this interesting web application.

Attachment B: 1 - Proposed Design for QR Code tag and Web Application Interface



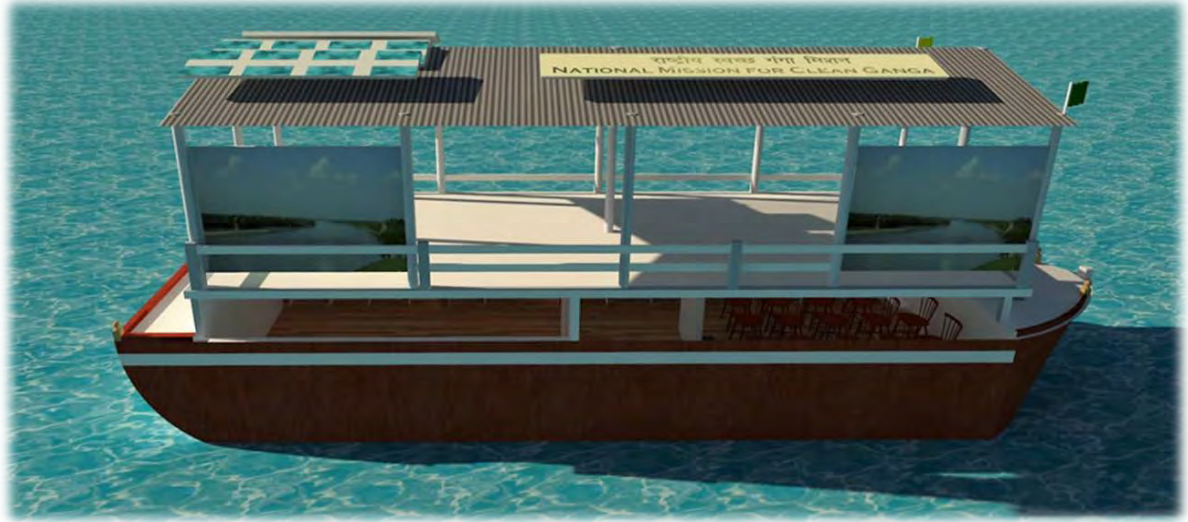
Fig: 1.5.1: QR code installed on all the panels of *Ganga Darpan* and *Ganga Tarini*



Ganga Tarini before fabrication in Varanasi



Ganga Tarini after fabrication in Varanasi



3D model of *bajra* for the exhibition



Fabrication work on *Ganga Tarini*





Ganga Tarini after fabrication



Mr. Pawan Kumar, PCCF, HoFF, U.P. with Dr V.B. Mathur placing the inauguration plate in *Ganga Tarini*



Visitors on *Ganga Tarini*



Visitors visiting *Ganga Tarini* on the ghats of Varanasi

1.6 Evaluation of effectiveness

As both *Ganga Darpan* and *Ganga Tarini* were unique initiatives in Varanasi, it was important to evaluate the effectiveness of them on the visitors.

Methodology

A pre and post questionnaire survey was conducted to know the impact of *Ganga Darpan* and *Ganga Tarini* on the visitors and was divided into 4 parts -

- 1) Demographic details,
- 2) Prior knowledge about Ganga.
- 3) Attitude
- 4) New things visitors learnt.

To evaluate all these aspects few visitors were given a questionnaire when they arrive at the centre/*bajra*. After they completed the questionnaire, they took a walk in the exhibition and when they come out of the exhibition, a post questionnaire was given to another set of visitors to know the knowledge gained by them through the exhibition.

Outcomes

The information was collected from 200 visitors each in *Ganga Darpan* and *Ganga Tarini*. After evaluation it was noted that the exhibitions are being appreciated by one and all.

Efficiency of Ganga Darpan as Knowledge Centre

After the analysis of the questionnaire survey it was found that the majority of the visitors were from Uttar Pradesh and were less than 25 years of age. Young people are a key in conserving the biodiversity therefore engagement of youth through interpretation is an effective way to encourage people towards conservation.

Hoarding and Posters was found as the best mean to attract visitors towards the Ganga Darpan followed by Word of mouth.

In Ganga Darpan interpretation centre visitors were most satisfied with the Dioramas followed by information through TV and Kiosk.

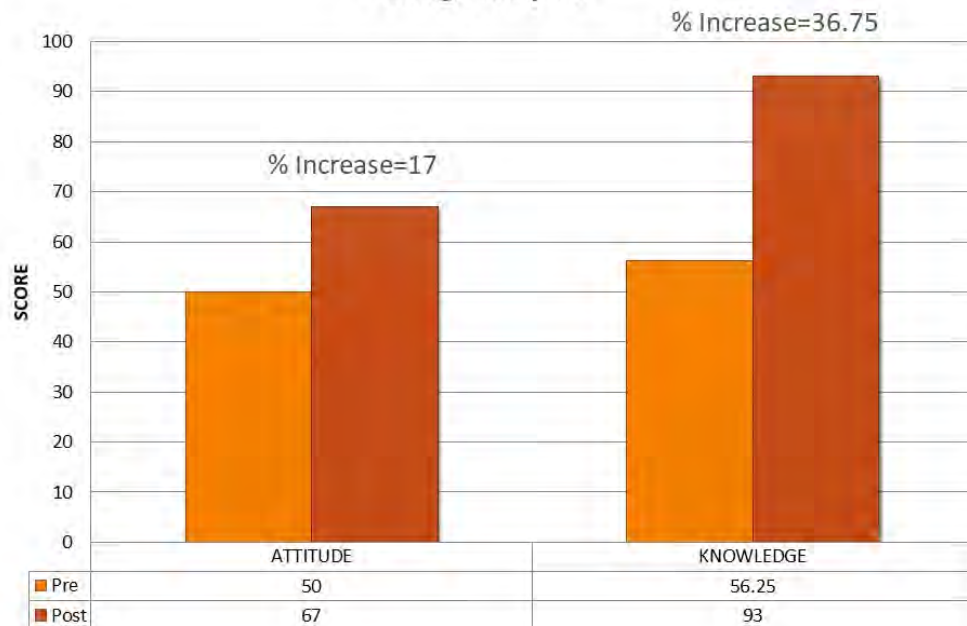
After the analysis it was revealed that there is an increase of 36.75% in knowledge and a positive attitudinal change from pre to post questionnaire survey towards biodiversity conservation of river Ganga.

The result clearly indicates that the interpretative facilities (Informative panels, Dioramas, Kiosk, information through TV and 3D Display) used are concrete for imparting Knowledge and changing attitude of people towards the biodiversity conservation.

Efficiency of Ganga Darpan as a Knowledge Centre

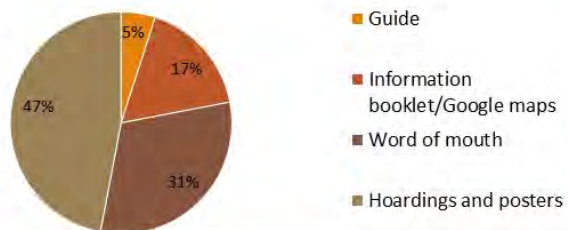


Ganga Darpan

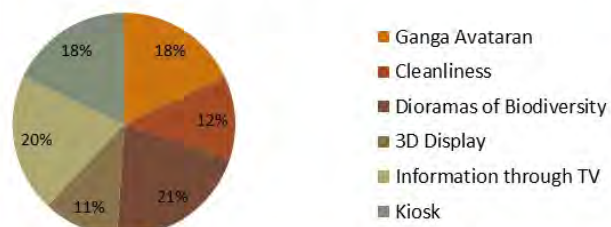


Efficiency of Ganga Darpan as a Knowledge Centre

Hear about this interpretation centre (Ganga Darpan)



Like the most



Efficiency of Ganga Tarini as a floating exhibition

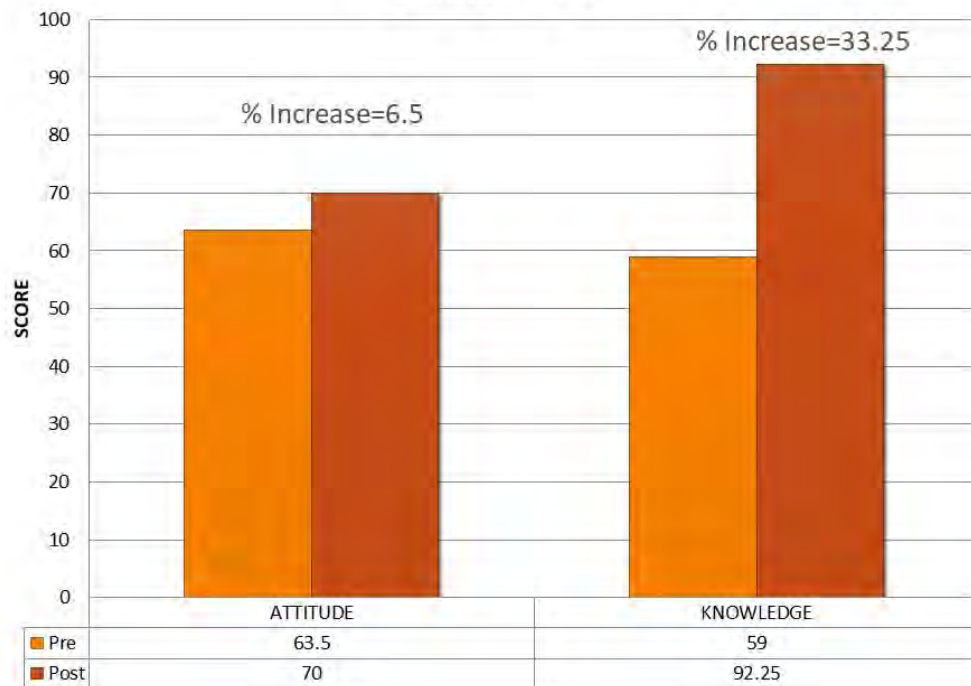
After the analysis of the questionnaire survey it was found that the majority of the visitors were from Uttar Pradesh and were less than 25 years of age. Young people are a key in conserving the biodiversity therefore engagement of youth through interpretation is an effective way to encourage people towards conservation.

In Ganga Darpan interpretation centre visitors were most satisfied with the attractive Dioramas of Sarus, Gharial and Otter.

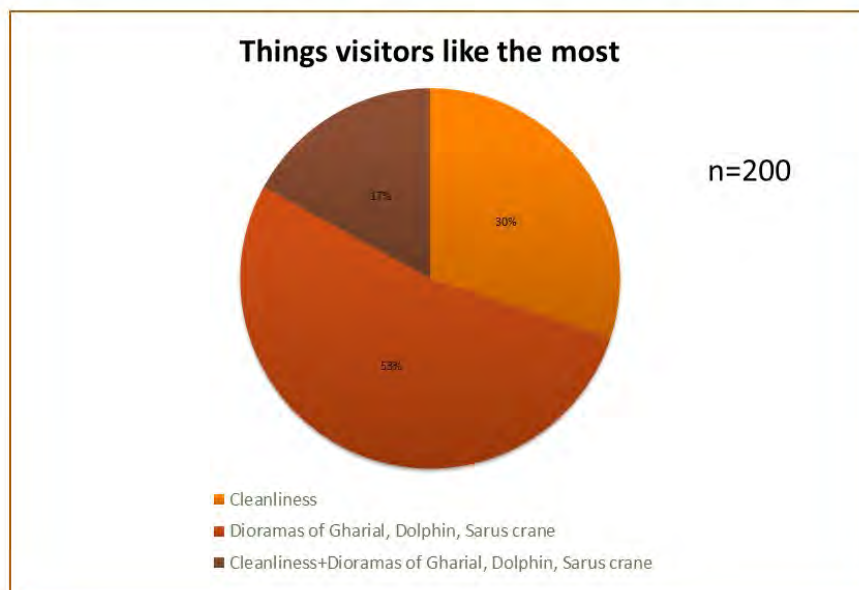
After the analysis it was revealed that there is an increase of 33.25% in knowledge and a positive attitudinal change from pre to post questionnaire survey towards biodiversity conservation of river Ganga.

99% of the visitors found Ganga Tarini as a good and interesting way to aware public about the conservation of Ganga river.

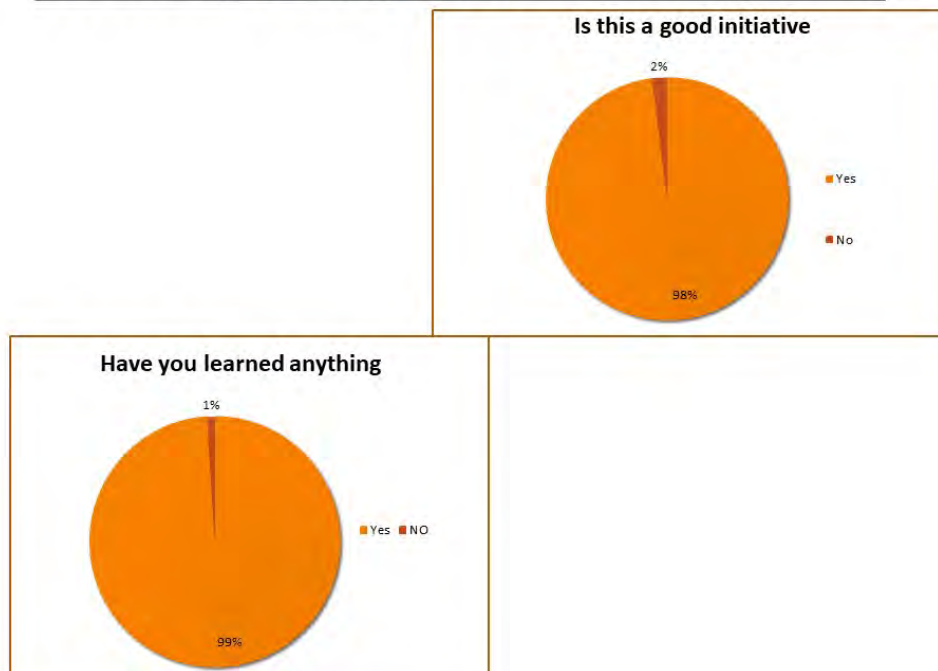
Ganga Tarini



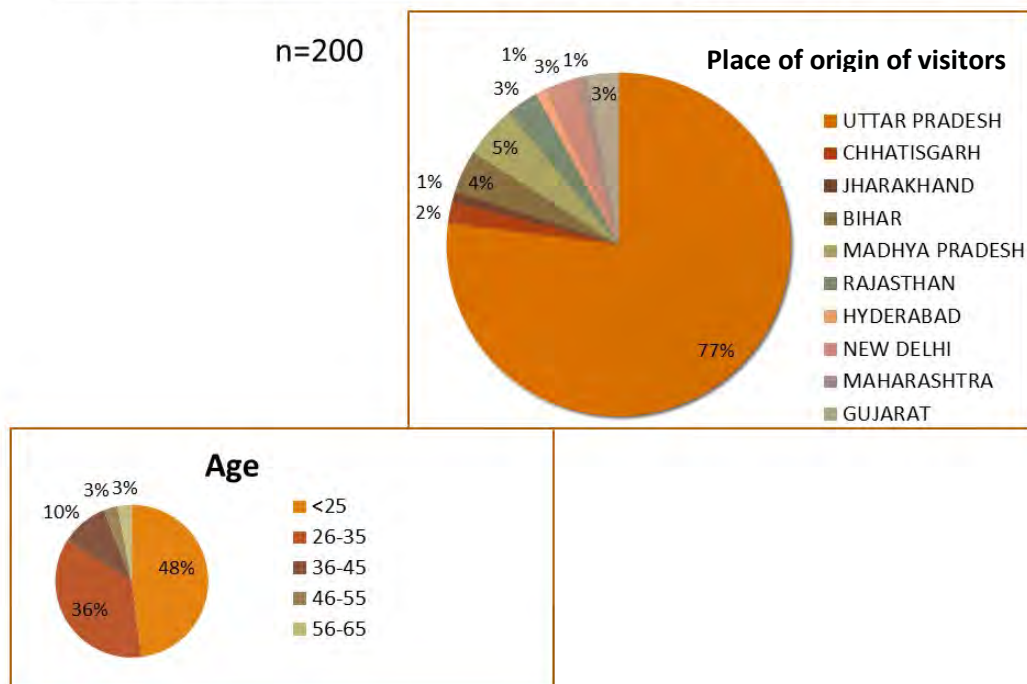
Efficiency of Ganga Tarini as a floating exhibition



Efficiency of Ganga Tarini as a floating exhibition



Efficiency of Ganga Tarini as a floating exhibition



1.7 Anubhuti - Interpretation Centre at Kanpur Zoo

A building in Kanpur Zoo, known as Allen Forest building, a heritage site was identified to house the interpretation centre. Nestled on the banks of river Ganga, Kanpur stands as one of North India's major industrial centres with its own historical, religious and commercial importance. Kanpur Zoo has a footfall of 7-8 lakhs every year. Thus, making it a suitable destination for disseminating information about the Ganges and create awareness. Kanpur Zoological Park is a part of lush green Allen forest was developed in the British era between the years 1913 to 1918 on the banks of Ganga. Sir George Burney Allen constructed a rest house on the banks of a lake known as Lake View. The lake is spread in around 18 hectares of land and has always been a centre of attraction as numbers of fishes are present in the lake and a large variety of birds visit the lake regularly. Allen forest was developed by Sir George Burney Allen who was a famous British industrialist and Botanist. He was the key proponent of the Kanpur zoo to be located within Allen forest. Though his idea didn't materialize during his lifetime, the state government decided to name the zoo after the botanist when it finally opened in Allen Forest in 1974.

Overall the building was intact but since it was also built as a residence and was left unused for many years, it required modification and maintenance. The renovation work was undertaken by CPWD. New electricity wiring and the old windows were replaced by aluminium frame windows as all the wood work was infested with termite. A fresh coat of paint was given to the interiors as well as the exterior.

There are three halls in the ground floor. Hall one has the history of Allen Forest and about the river, hall two is about bird diversity along the river and hall three depicts the major causes of pollution in the river. The central hall has dioramas of otters, sarus and other birds. The halls have a mix of back-lit panels and dioramas. Hall one also has an exhibit of Tab Augmentation. The tab allows you to have a three dimensional look of the species based on your body and hand

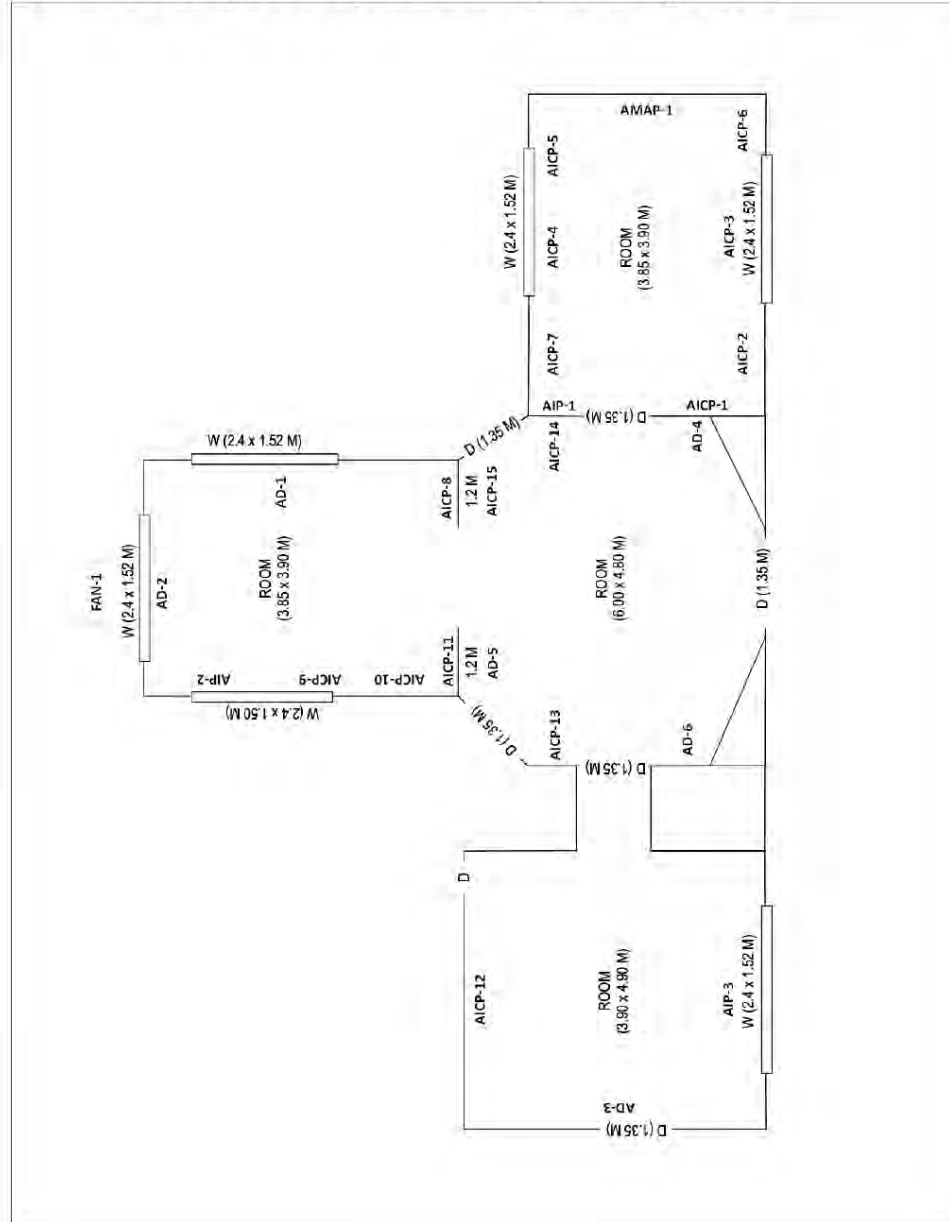
movements. It also displays information about the species. Hall two has an exhibit on bird calls. Visitors can hear the calls of birds in just one press of the button and later can identify the birds in field by just hearing their calls. First floor houses a library has been set-up which has books related to environment education and conservation. Students and researchers can utilise the library during their visit. The first floor also has a 30 seat conference Hall. An LFD screen for projecting films and presentations is also installed. The outdoor area was landscaped and two selfie points were established. The interpretation centre is named "*Anubhuti*" meaning experience of Ganga. **(Table 1.7.1)**

Table 1.7.1: Panels in Anubhuti Interpretation centre

S.No.	Panels	Dimensions	Descriptions	Panels Code
Hall 1				
1	Panel: What's in the Name	6*3ft	Brief about history of how many times the name of city Kanpur was changed.	AICP-1
2	Panel: Where are you?	6*3ft	Background about the Allen Forest Zoo.	AICP-2
3	Panel: Ganga Avtaran	6*3ft	Panels discussing the mythological story on how River Ganga was brought to the Earth.	AICP-3
4	Panel: Through the Ages	6*3ft	Panel shows two creations from the past both relating to Ganga.	AICP-4
5	Panel: Royal Love for the River	6*3ft	This panel depicts the mention of River Ganga in older times by different kings.	AICP-5
6	Panel: Glorious Past to Unsure Future	6*3ft	This panel brings in notice how Ganga has changed overtime	AICP-6
7	Panel: Ganga on Big Screen	6*3ft	The panel has all the references of Ganga taken in every form of cinema.	AICP-7
8	Origin to Destination 3D Map		A 3D Map which shows the map of Ganga and has all the cities lying on its banks marked.	AMAP-1
9	3D Augmentation - Interactive Panel		It is an Interactive panel using 3D Augmentation.	AIP-1
Hall 2				
10	Beaks and Feet Diorama		This diorama shows how various birds around Ganga use their beaks and feet as tools.	AD-1
11	Panel: Wildlife Wealth	6*3ft	This panel depicts the biodiversity of river Ganga.	AICP-8
12	Panel: Feathered Friends - 2	6*3ft	This panel contains all the information about birds found in and around Ganga.	AICP-9, AICP-10
13	Panel: India's Tallest Flying Bird	6*3ft	This panel describes briefly about Sarus Crane.	AICP-11
14	3D Advertising Fan		3D advertising fan showcasing flying Sarus crane and logos.	FAN-1
15	Dioramas of Gharial, Skimmer and Turtle		This diorama shows the biodiversity of Ganga.	AD-2
16	Voice Command Panel		This panel has all the calls of various birds found in and around Ganga.	AIP-2
Hall 3				
17	Panel: The Threatened River	6*3ft	This panel mentions various threats faced by River Ganga.	AICP-12
18	Plastic Pollution in Water Bodies with diorama of Pelican - 3, Turtles - 2, Wired Structure of		A diorama pointing a major issue of plastic pollution in river.	AD-3
19	Interactive Panel - Good Deeds		Panel involves the visitors to take pledges and keeps a track of the number of pledges.	AIP-3
Middle Hall				
20	Panel: Tiger of the Ganges	6*3ft	This panel is about Gangetic Dolphin.	AICP-13
21	Panel: Aquatic Abundance	6*3ft	This panel is about various species of fishes found in Ganges.	AICP-14
22	Dioramas of 3 birds		This diorama incorporates various birds found near Ganga.	AD-4
23	Diorama of Sarus Crane		This diorama shows Sarus and its eggs.	AD-5
24	Diorama of Otter		This diorama shows otter and its surroundings.	AD-6
Activity Hall				
25	LFD Screen		Placed to play various movies and shows for visitors.	LFD-1
26	Library		Includes various books on Ganga and other subjects.	ICLIB
Outside				
27	Butterfly Selfie Point		A selfie point placed outside the building where visitors can click pictures.	SELFIE POINT
28	Sarus Crane Diorama		A life like diorama of Sarus crane is placed outside.	AD-7
29	Anubhuti Name Plate		A name plate named "Anubhuti" placed on the entrance of the building.	NP-1

Layout of Anubhuti Interpretation Centre

Anubhuti – Interpretation Centre at Kanpur Zoological Park





Interpretation centre in Kanpur Zoo before renovation



Interpretation centre in Kanpur Zoo after renovation



Interior designs of 'Anubhuti'



Interior designs of 'Anubhuti'



Library set upstairs in *Anubhuti*



Selfie point installed at the entrance of *Anubhuti*

CHAPTER 2

Conservation Education Program

2.1 Introduction

“Educating the mind without educating the heart is no education at all”. Therefore, in the field of biodiversity and conservation, education plays a very vital role. Environmental education is the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the interrelatedness among humans, their culture and their biophysical surroundings (IUCN, 1970).

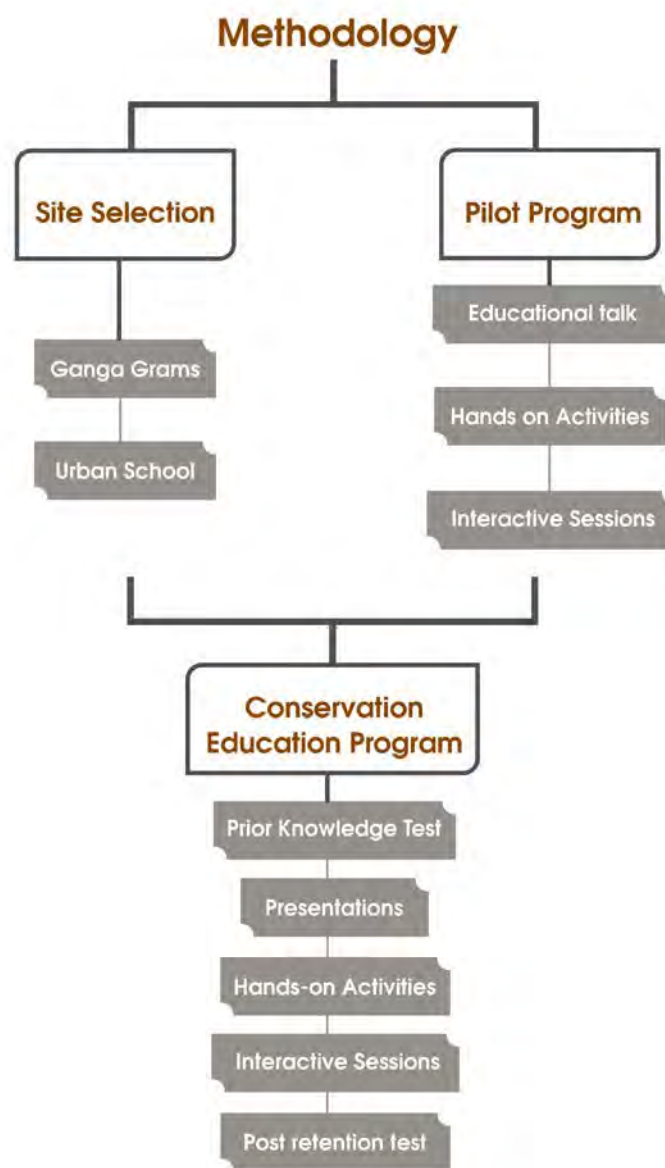
Teaching children at a younger age has a larger impact towards the enhancement of the country’s development as a child’s brain has developing neural pathways that are built to absorb information faster than adults (Patricia Kuhl, 2017). Therefore, inspiring children towards sustainable development and environment conservation is not only a sensitive issue but challenging as well. This in turn helps the children as well as all of us to acknowledge our responsibility towards the society but also connects us emotionally to the nature to all reside in. Environment education is seen as a task of educating the public about conservation and how to protect the environment from damaging human actions (Robert A, Hart, 1997).

An important purpose of environmental education is to teach students about the aquatic biodiversity of Ganga basin which is under stress due to reduction in water levels, pollution and over exploitation of riverine resources. Therefore, raising awareness at the plight of our national river and making citizen realise particularly youth and children about the crucial role they can play in restoring the river health.

2.2 Objectives

- 1) To sensitize students about the aquatic biodiversity of the Ganga River and the crucial role they play in the natural resource management of the Ganga River.
- 2) To enable students to make connections and apply their learning in the real world.

2.3 Methodology



2.3.1 Site Selection

The conservation education programs were conducted in rural and urban government schools in both Uttar Pradesh and Uttarakhand states.

Table No. 2.1: Details of the sites

S. no.	Study area	State	Coordinates (N)	Coordinates (E)	Population	Literacy rate (%)
1.	Varanasi	Uttar Pradesh	25.3176°	82.9739°	3,676,841	77.05
2.	Kanpur	Uttar Pradesh	26.4499°	80.3319°	2,767,031	83.98
3.	Dehradun	Uttarakhand	30.3165°	78.0322°	1,696,694	89.32
4.	Haridwar	Uttarakhand	29.9457°	78.1642°	2,290,000	73.43
5.	Uttarkashi	Uttarakhand	30.7268°	78.4354°	330,086	75.78

(Source: Census, 2011)

2.3.2 Criteria for selection

For conducting effective education programs the rural and urban government schools within 1 km to 8 km range of the river Ganga and its tributaries in both Uttar Pradesh and Uttarakhand states were selected. The Governments schools were targeted for education programs because they have shortage of resources and very little practical knowledge.

2.3.3 Ganga Grams

National Mission for Clean Ganga identified the villages near the Ganga River to develop these villages as model villages that will display itself as an economic, historic, cultural and sanitized unit on the banks of Ganga. These villages have been identified as Ganga Grams. Therefore we identified schools in Ganga grams for conducting awareness programs in rural areas as these villages are directly dependant on the river. (Fig 2.3, 2.4, 2.5)

2.3.4 Urban Schools

National Mission for Clean Ganga identified the villages near the Ganga River to develop these villages as model villages that will display itself as an economic, historic, cultural and sanitized unit on the banks of Ganga. These villages have been identified as Ganga Grams. Therefore we identified schools in Ganga grams for conducting awareness programs in rural areas as these villages are directly dependant on the river. (Fig 2.3, 2.4, 2.5)

Fig 2.3: Map showing schools covered along the Ganga River as part of the conservation education programs in Varanasi.

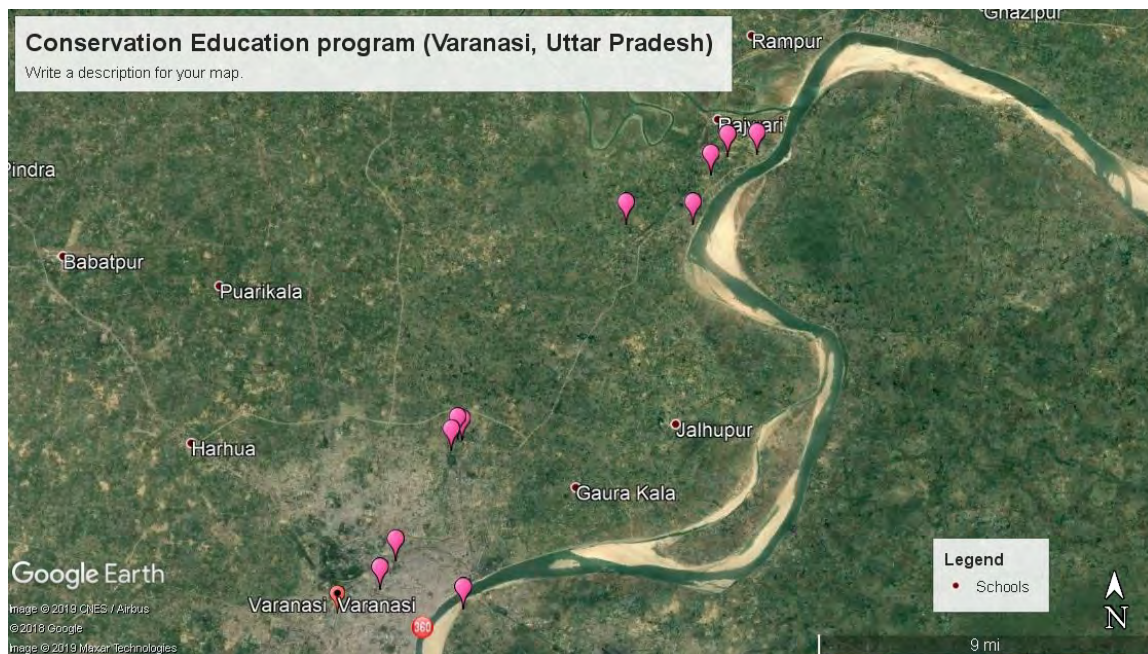


Fig 2.4: Map showing schools covered as part of the conservation education programs in Uttarkashi district

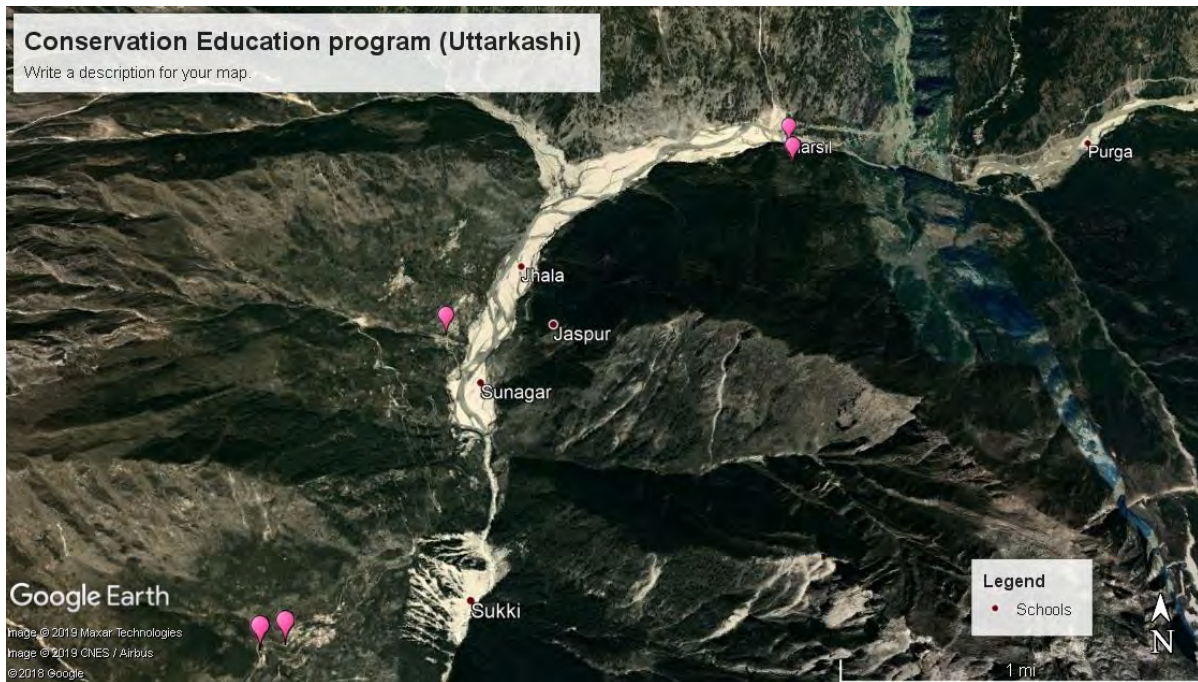
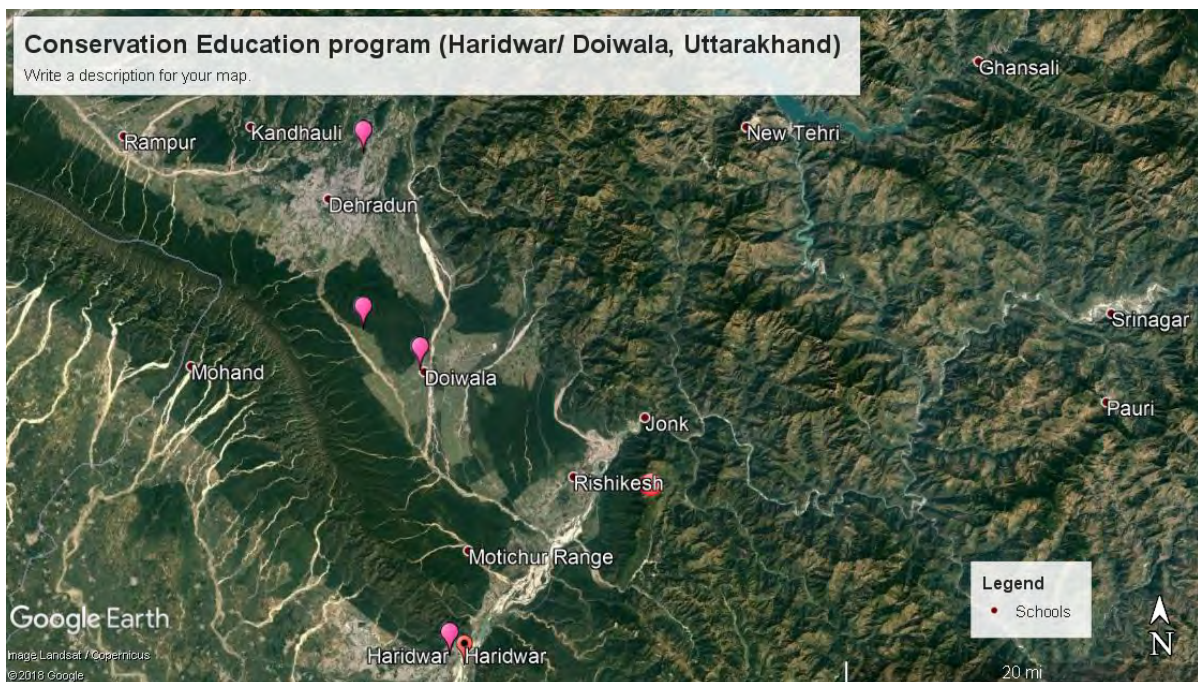


Fig 2.5: Map showing schools covered during conservation education programs in Haridwar& Dehradun district.



2.3.5 Pilot program

When schools are targeted as key Stakeholders they include everyone from the Principal, the teachers and the students involved in the education system. In order to enhance the impact of learning for students a pilot survey by means of a close ended questionnaire was conducted with the school principals of 70 schools in Varanasi to find out as to how many schools were positive in recognizing the value of conservation teaching and were willing to conduct conservation education programs. The result showed that about 48% schools agreed to participate in conservation education workshops.

A second pilot program was undertaken with students in government schools with to find out their response and relevance of the aspects being covered and the mode of education being used in conservation education program as per the curriculum for different age and class groups. The pilot program was divided into three parts –

- i. **Educational talk**
- ii. **Hands On Activities**
- iii. **Interactive Sessions**

After the remodelling of the program a conservation education module was created for the schools.

2.3.6 Prior knowledge test

A questionnaire was used for the assessment of prior awareness regarding Ganga and its biodiversity among the rural and urban students. The questionnaire was grouped into five categories in order to assess the student's behaviour, knowledge, skills and attitude towards the conservation of the Ganga River. The categories were –

- a) Basic demographic information (n = 4)
- b) River related questions (n = 6)
- c) Species related questions (n = 5)
- d) Threats related questions (n = 1)
- e) Attitude of the students towards the biodiversity conservation of the river (n = 2)

4.3.7 Presentations

Visual presentations were used as relevant means to make education program more interactive and interesting.

2.3.8 Hands -on Activities

One of the objectives of the education program was to enable students to make connection with the river ecosystem and be creative. The participants based on their interest, were divided into two groups, viz drawing & painting, essay/ slogan writing. The essays, slogans and painting were evaluated for thought process creativity and originality.

2.3.9 Interactive Sessions

Environmental education is necessary to analyze various sides of environmental issues through critical thinking. The education program was designed in the form of activity based learning to supplement their existing curriculum with a new set of tools. One of the constraints in administering the questionnaire in Ganga gram schools was that the students were not able to fill up the form themselves and required assistance.

2.3.10 Post retention test

After duration of 3 months the same questionnaire was administered with the same students to find out the retention and knowledge gained by the students.

2.4 Results

2.4.1 Demographic Structure of participating students

The education programs were conducted in both urban and rural schools. Conservation education programs were conducted in 21 schools in both Uttarakhand and Uttar Pradesh

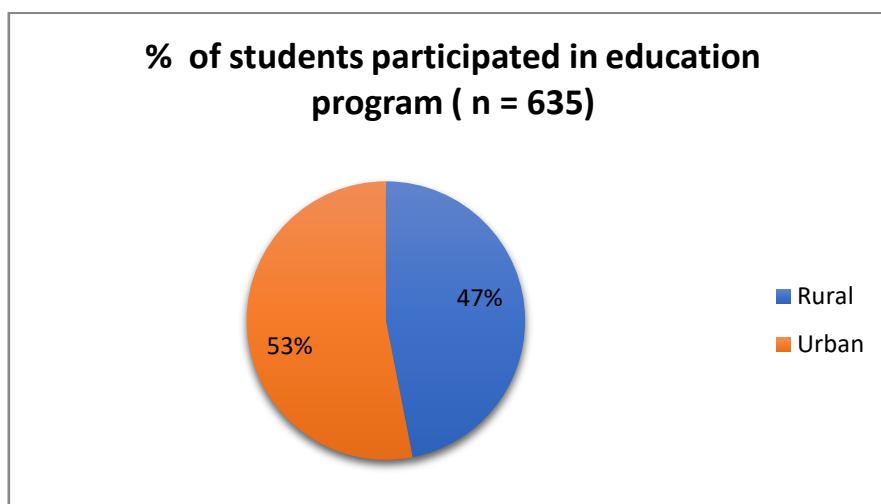
district, out of which 11 were from rural areas and 7 from urban areas. Total number of students sensitized as part of the conservation education program was 1928 out of which 298 students in rural and 337 students in urban schools administered both pre/post retention tests. An 'eco conscious scale' was used to evaluate the results.

Table 2.2: No. of schools covered during conservation education program.

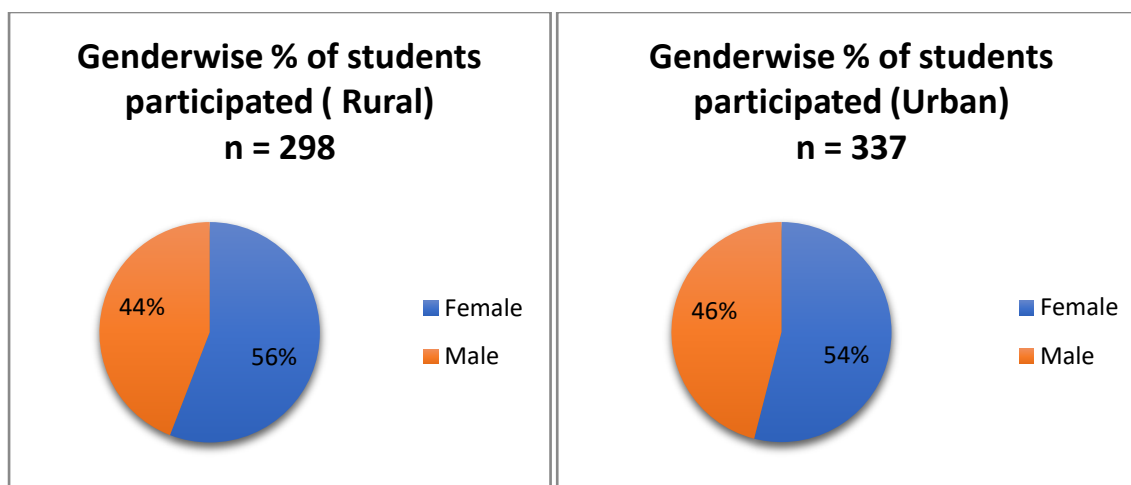
S. No.	State	District	No. of schools
1.	Uttar Pradesh	Varanasi	11
3.	Uttarakhand	Dehradun/Haridwar	5
4.	Uttarakhand	Uttarkashi	5

The number of schools covered in rural areas was comparatively more than the school covered in urban areas but the number of participating students from the urban schools was still more than the participating students from the rural schools. (Fig. 2.6)

Fig 2.7: Percentage of students participated in education program

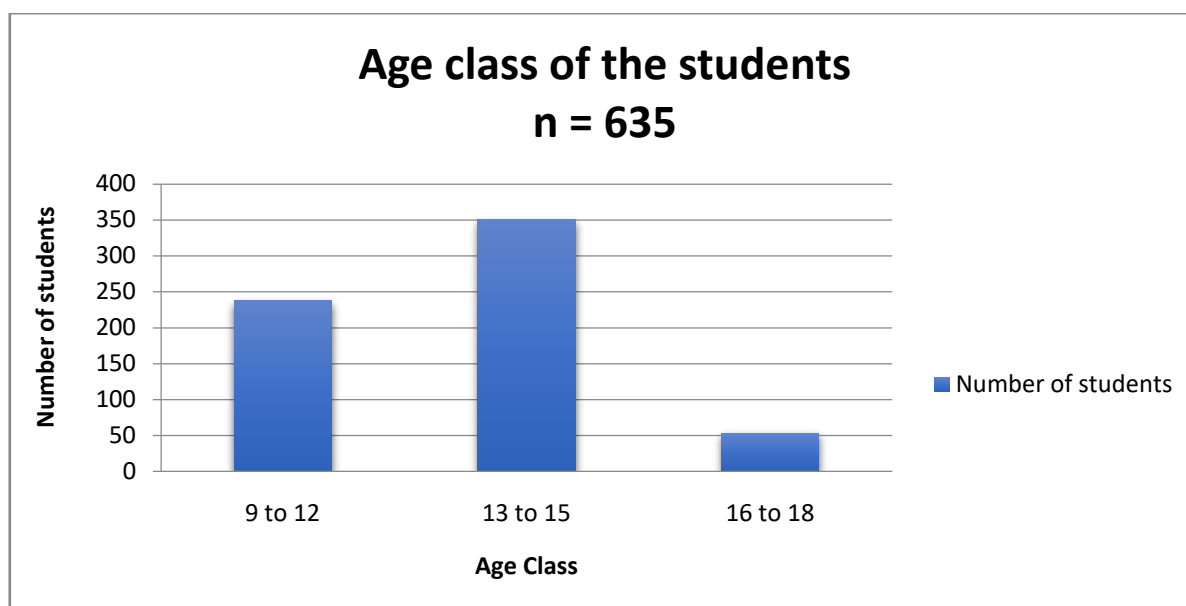


About 56% of the males and 44% of the females participated in education program in rural schools, whereas 46% males and 54% female students participated in urban schools. (Fig.2.7)

Fig 2.8: Gender-wise percentage of students participated in rural and urban schools

2.4.2 Age class

Student's environmental awareness and attitudes are also influenced by the age of the students. Results from the demographic studies revealed that the percentage of students falling under age class 13 to 15 is higher than the other two age classes. (Fig 2.9)

Fig 2.9: Age class of the participating students

2.4.3 Pre/Post retention questionnaire

i. River related questions

The pre test showed 45% percentage of marks in the category “Knowledge on basic river related questions” (source of the river, its major tributaries and places from where the river passes) when during pre test. After post test analysis it was observed that there is an increase in percentage of marks in the same category.

ii. Species related questions

After pre/post test analysis it was observed that Student’s knowledge related to aquatic biodiversity of Ganga River is relatively less than the other two categories. Although the percentage of marks increased in the post retention test but when compared with the percentage of marks in other categories it was still low.

iii. Threat related questions

The pre/post test results revealed that student’s response in the threats related questions was relatively higher than the other two categories both in pre and post retention test. The question included the knowledge related to the major types of pollutants of Ganga River. (Fig 2.6)

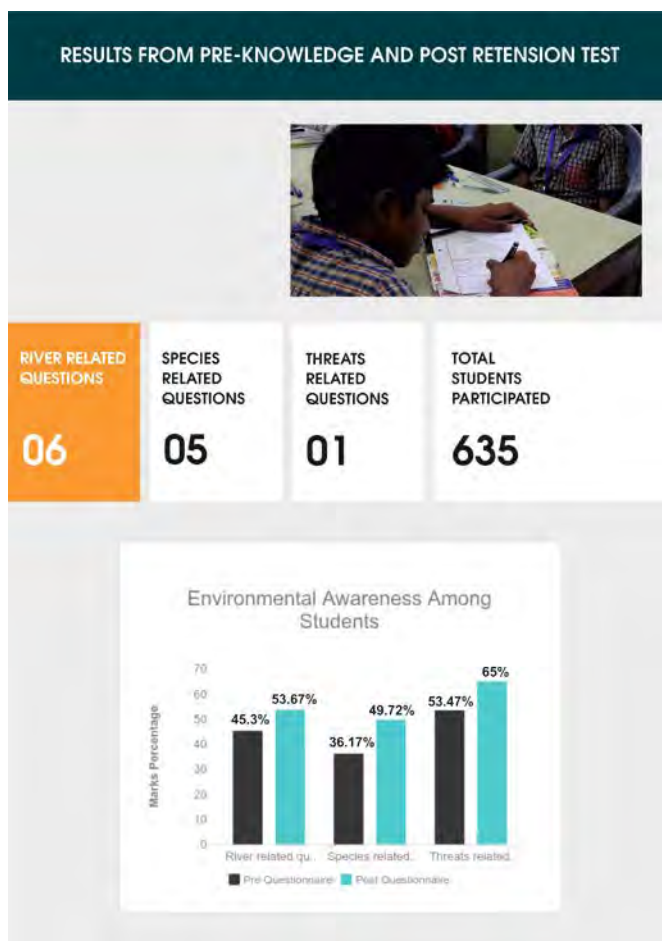


Fig 2.10: Pre-post test results

2.4.4 Eco conscious scale

The questions were asked to provide students an opportunity to form their own opinion about the issues and challenges in conservation of river Ganga based on which the Eco conscious scale was formed. The term 'eco-conscious' was first used in 1972 and is a broad term that means "marked by or showing concern for the environment.". Eco conscious is a broad term that describes many different behaviors, guidelines, and laws that exist to reduce or minimize environmental harm. In order to assess the ecological concern among students the scale was categorized into two viz., Aware (Marks > 3.5) and Unaware (Marks < 3.5) out of 6 marks to check the attitude of students towards the biodiversity conservation of Ganga River. (Fig 2.7)

Eco Consious Scale

The questions asked to provide students an opportunity to form their own opinion about the issues and challenges in conservation of river Ganga based on which the eco consious scale was formed. the results from the eco consious scale indicate that there is an increase in awareness and environmental concern amongst students from both urban and rural schools. More than 56% of students were found to be environmentally aware in rural areas as the result of post questionnaire whereas more than 53% of students were found to be environmentally aware in urban school.

Urban (n)= 337

Rural (n)= 298

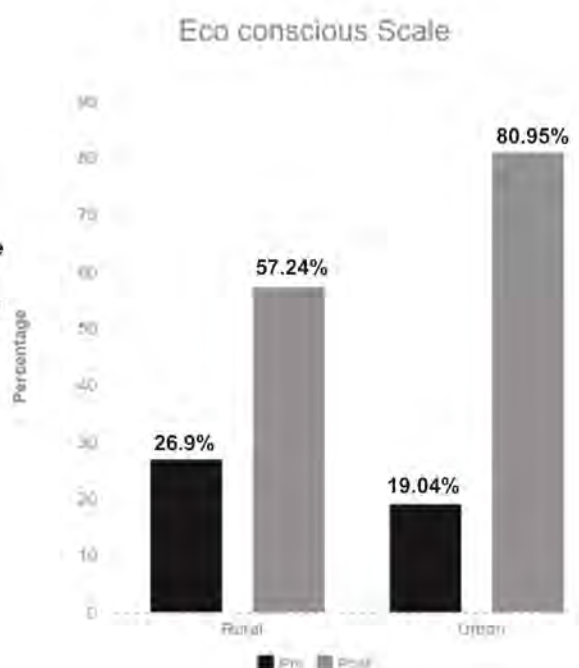


Fig 2.11: Eco conscious scale

2.4 Gangaridai Eco club

Under National Mission for Clean Ganga we constituted an Eco Club named "*Gangaridai*", "*Gangaridai*" (term used by the ancient Greco-Roman writers to describe people or a geographical region of the ancient Indian subcontinent. Several modern scholars located *Gangaridai* in the Ganges delta of the Bengal region. *Gangaridai* Eco club focuses on students so that they get exposed to field activities such as Nature Trails, Quiz, Rallies, Drawing, Painting and Poster competition, etc to create enthusiasm regarding issues about Biodiversity and Nature. This in turn motivates the students to keep their surroundings green and clean by undertaking plantation of trees, conserving the river system, segregation of waste and its proper disposal, etc. A total number of 7 Gangaridai eco club in 4 sites have been established.

2.4.1 Objectives

- To create environmental consciousness amongst students and establish a cadre of nature-friendly children having affection for nature which will work towards conservation and cleaning of Ganga and other river ecosystem.
- To involve students in efforts to conserve biodiversity and rejuvenate Ganga River.

2.4.2 Goals

- Formation of groups of students to participate in activities where they will get opportunities to show their talents through posters making, drawing, paintings, crafts, debate, poem, essay, slogan writing and other activities related to cleaning and conservation of Ganga River.
- Involve schools and arranging field trips to the banks of Ganga to spread awareness about the rising river pollution.
- Motivate students to imbibe habits and lifestyles for minimum waste generation.
- Sensitize the students to minimize the use of plastics bags and promote the concept of 3 R's: Reduce, Reuse and Recycle.
- *Gangaridai* endeavours to deploy the best available knowledge and resources amongst students for Ganga rejuvenation.

2.4.3

Activities undertaken in *Gangaridai Eco Club*

Slogan writing: Clean Ganga

Conducted in 6 schools with 56 students
Uttarkashi and Dehradun

Rally: Ganga Sanrakshan

Conducted 6 rallies with 93 students
Uttarkashi, Dehradun and Kanpur

Plantation Drives

Conducted with 77 students
Uttarkashi, Dehradun and Haridwar

Cleanliness Drives

More than 100 students participated in
various cleanliness drives conducted in
Uttarkashi, Dehradun, Haridwar, Varanasi

Nukkad Natak

Showcased on the ghats of Varanasi
by school students

Wildlife Week Celebration, 2019

Harsil and Kanpur

World Environment Day, 2018 & 2019

Exhibition in Vigyan Bhawan for 3 days
Activities with school students in Harsil for 2 days

International Day for Biological Diversity, 2019

Conducted with 55 students and teachers
Doiwala, Haridwar

Best out of Waste
Quiz Competition

Conducted with 55 students
Kanpur Zoological Park

Painting on Walls

Conducted with Mahabodhi School
Sarnath, Varanasi

Visit to River/ stream system

Organised with 15 students
Doiwala, Dehradun

Visit to Interpretation Centre

Students from different schools visited Ganga Darpan
Sarnath, Varanasi



Gangaridai activities in Harsil



Rallies organized with students of GangaridaiEco club



Slogan writing with the students of GangaridaiEco club



Field based activities near tributaries of Ganga with students of *Gangaridai* Eco club



Ganga quiz organized in Kanpur Zoological Park during Wildlife week



Essay writing competition organized during Wildlife Week in Kanpur Zoological Park



Cleanliness drive conducted by *Gangaridai* eco club students in Harsil



Plantation drives being carried out by *Gangaridai* eco club students



Special need students performed an act about global warming during Wildlife Week celebration at Kanpur Zoological Park



Students performed a dance sequence describing the need for trees on earth during Wildlife Week celebrations at Kanpur Zoological Park



NukkadNatak performed by the students of Mahabodhi Inter College, Sarnath on Rajghat, Varanasi



Walls painted by school students of Gangaridai eco club in Varanasi



School students and local children visiting Ganga Darpan

2.5 Teacher's Training

Teachers training help the teachers with knowledge, attitude, behaviour and skills they require to perform their tasks efficiently inside and outside the classrooms. Besides the academic qualifications, knowledge of the subject matter, skills of teaching and the commitment of the teacher have effective impact on the teaching learning process.

2.5.1 Objectives of Teacher's Training

With the view to understand this study the following aims and objectives are considered-

- i. To convey adequate knowledge about river conservation.
- ii. Build capacity to impart knowledge about river conservation through curriculum.
- iii. To train teachers to use "Discovering Ganga" manual.

2.5.2 Site Selection

Teacher training programs were conducted in Uttar Pradesh and Uttarakhand state. In U.P., two districts viz. Varanasi and Kanpur were selected. The teacher training program was conducted with 19 teachers from four different schools in Varanasi in both rural and urban areas. In Kanpur, the training was conducted with about 37 teachers from 22 different schools. In Uttarakhand state, Dehradun and Uttarkashi district were selected. In Dehradun, the training was done with 11 teachers from 3 different schools in Doiwala region. Based on the distance from Ganga River and its tributaries, the teacher's training program was conducted in three places; Harsil, Jhala and Sukhi with 17 teachers from 3 different schools.

Table 2.3: Details of teacher training program conducted

S. No.	District	Number of participants
1	Varanasi	70
2	Kanpur	50
3	Dehradun	47
4	Uttarkashi	24
Total		191

2.5.3 Methods

The primary methodology used for teacher's training workshop was visual presentation and hands-on activities. At the end of the program feedback from teachers were also taken. The methodologies are shown in the table below:

Table 2.4: Teacher's training module

Target groups	Aspects to be covered in the process of conservation education	Mode of education
Teachers	Imparting clear understanding of river ecosystem. Impart learning of ecosystem through various hands on activities. Promoting environmental concern and skills for meeting environmental challenges.	Visual Presentation : Ganga and its Biodiversity Activities from the teacher's manual – Say No to Plastic: Reuse, Reduce (Activity) Water quality test Companions of Ganga (Activity) Food Web of Ganga (Activity) Distribution of resource material.

2.5.4 Introduction to River and its Biodiversity

It involves a presentation regarding the biodiversity of Ganga River and how the activities of mankind contribute directly and indirectly to the degradation of the river system was given.

2.5.5 Hands-on Activities

The second part of the workshop included various knowledge-based hands on activities regarding Ganga biodiversity conservation such as Group Discussion, Environmental games from the teaching manual 'Discovering Ganga' like snake and ladder, the web of life etc, hands-on training to check water quality, temperature etc were conducted with the teachers.

2.5.6 Resource Material

The teachers were trained to use the “Discovering Ganga” a teacher’s training manual for environmental education in the classroom. Some other resource materials like factsheets about the aquatic ecosystem and its priority species were also distributed among the teachers.





Teacher's Training in the Kanpur Zoological Park during Wildlife Week





Teacher's Trainings in Doiwala, Uttarakhand and Varanasi, U.P.



CHAPTER 3

PUBLIC AWARENESS

Objective

- Foster public awareness of the river ecosystem, its ecosystems and its resources

3.1 Outreach Activities

Outreach activities helps in creating awareness amongst the communities, as these activities involves the local people so they get to know what all their activities are contributing in degrading the river and they may come up with ideas or solution to improve the condition. People meetings/ *goshti* where villagers gather can discuss problems in their society. Activities conducted were:

3.1.1 Turtle Release Program

Awareness programs were conducted during turtle release programs in Varanasi, U.P. During the first program in October 2017 around 450 students from eight different schools were involved in this activity. The participants were sensitized about the turtles present in Ganga and their role and significance. The participants were distributed posters and bookmarks with information on turtles and how they can contribute towards turtle conservation.

3.1.2 World Turtle Day Celebration

World turtle day was celebrated at the Turtle Rescue and Rehabilitation Centre at Sarnath on 23rd May, 2018. 23 young boys and girls were invited from the neighbouring village. They were sensitized about turtle conservation. Drawing and painting competitions were also organized for the students.

3.1.3 Paintings on Boats

Boats are the only means of transportation in the river. Both pilgrims and visitors use the boat to traverse from one ghat to another and also to enjoy the waters of the Ganga. Therefore it was decided to paint boats with slogans and pictures of priority species along with the logo of the National Mission for Clean Ganga. This would help in three ways: a) branding; b) beautification of the boat; c) help in attracting visitors. This initiative would also connect the local boatmen with the initiatives of NMCG. These six such boats were painted in Varanasi which are still mobile.

3.1.4 Painting on Walls

A wall at Rajghat on the banks of the river Ganga at Varanasi was identified. This wall is strategically located and the painting would be visible to all from a distance in the river. The theme of the rich biodiversity of Ganga and the responsibility on the shoulder of humans to protect it was decided. The painting on the wall has been done in vibrant colors in collaboration with the students of Fine Arts of Banaras Hindu University.

Two walls at Narora railway station with high visibility were identified. Priority species, Dolphin and Otter were painted on the walls along with slogans. It was observed that people stop for a while to read the message and click pictures.

Similarly paintings were made on prominent walls of schools where conservation education programs were conducted with Biodiversity of Ganga. Quotes were also written on walls. This was done with the help of *Gangaridai* Eco club of the school.

3.1.5 Signage on e-rickshaws

To spread awareness about the river and how general masses can contribute to the Ganga restoration programme, posters were installed behind e-rickshaws. The objective was to reach out to a large number of people as the e-rickshaw travelled throughout the city. Initially, the e-rickshaw drivers were reluctant for the initiative. They were sensitized through a half day interactive session about the NMCG initiatives which convinced a few. Later on, the drivers voluntarily came up to have the posters installed on their e-rickshaws.

3.1.6 Exhibitions

1. **Ganga Janmotsav and Ganga Mela:** A large number of pilgrims come to take bath in the holy waters of the Ganges on the ghats in Narora and Varanasi during special days. Temporary exhibitions were set-up during the *Ganga Mela* on January 14, 2018, and during *Ganga JanmotsavMela* on the ghats in Narora.
2. The exhibition was visited by a large number of students and villagers. The visitors to the exhibition were sensitized about the pollution in Ganga, the biodiversity of the river and how their actions impact the river. TV screen was installed to showcase the videos about Ganga River, NMCG initiatives and the puppet shows as well. People were also given awareness and take away material.

3. **World Environment Day:** The World Environment Day, 2018 with the theme “Beating Plastic Pollution” was celebrated. India was the host for the celebration. A three-day exhibition was organized on the grounds of *VigyanBhawan*, New Delhi which was visited by a large number of International delegates participating in the event, school children and common masses. Puppet show titled “*DekhoDekho Sab BadalRahaHai*” which talks about the pollution in river and sea causing problems to the species found in the Ganga River was showcased . Publications on Ganga River were displayed and distributed to visitors.
4. **Book Fair at NIEVPD:** A three-day exhibition on Ganga and its biodiversity was set-up during the Book Fair organized by the National Institute for the Empowerment of Persons with Visual Disabilities (NIEVPD), Dehradun. A large number of students from schools in Dehradun visited the fair. A ‘Ganga Quiz’ was organized for the students visiting the stall comprising of generic questions about Ganga and its biodiversity. Students were asked to go and see the exhibition panels on Ganga and then come and answer the written quiz. 208 students including 49 visually challenged students participated in the quiz. Participation certificate to all the students was given on the spot. Top scorers of the quiz were facilitated on the World Heritage Day with a prize and a certificate.
5. **Kumbh Mela, Prayagraj:** The *Kumbh Mela* 2018 was at Prayagraj provided the right pattern to set up an exhibition, on Ganga and its biodiversity was set up in the Ministry of Environment, Forest and Climate Change pavilion. Lakhs of pilgrims and local visitors visited the exhibition each day. The exhibition showcased panels on Ganga River and its biodiversity, mythological history, threats, causes of pollution, government initiatives and how we can help to reduce the pollution. Film shows were also screened on a large display screen. Awareness material on Ganga was distributed to the interested visitors. Records show that the material reached at least 151 cities through the visitors to the exhibition.

3.1.7 Puppet Shows

Puppet has been a traditional means of creating awareness and attracts all age classes. Keeping this in view, two puppet shows titled “*Sparsh Ganga*” and “*DekhoDekho Sab BadalRahaHai*” were developed.

The script for the puppet shows were developed in-house in collaboration with NCERT, New Delhi. Voice to the puppets and manoeuvring was done by the team members of the project. Team members were trained by NCERT for voice modulation for the puppets. Initially, the shows were held with a live voice. Later the voice of the characters was digitally recorded in the NCERT studio at New Delhi.

“Sparsh Ganga” talks about the ill health of the river and creating awareness amongst the children and adults alike. The show include five major characters; School Teacher, Student, *Panditji*, *Ganga maiya* and *Bhageerath*.

“DekhoDekho Sab BadalRahaHai” talks about the situation of the biodiversity that thrives in and around Ganga and the harmful effects of pollution in the rivers. It has five major characters; Turtle, Fish, Dolphin, Scientist, and *Samudra* (ocean).

A large number of shows during awareness events, special days like World Environment Day, World Heritage Day, International Biodiversity Congress were held. During school awareness programs live shows are held. The digital video version was being screened at the KumbhMela. Both the puppet shows are uploaded on YouTube:

Sparsh Ganga: <https://www.youtube.com/watch?v=72gH6oBDr5A>

DekhoDekho Sab BadalRahaHai: <https://www.youtube.com/watch?v=nycqHQC0vUQ>

3.2 Interaction with Gram Pradhans

In order to create awareness amongst different communities, it was first decided to sensitize the village heads. Two blocks namely Dibai and Anoopshaher were selected around Narora. One-day each sensitization workshops for the Gram Pradhans of Dibai and Anoopshaher was conducted in the presence of the Block Development Officers and the Block Pramukhs of both the blocks. There were 61 participants in the workshop held in Dibai and 82 participants in Anoopsheher. The participants were given an introduction to the Ganga River, its biodiversity, issues, and threats. Activities of the villagers that are contributing to the degradation of the river and how they can improve were also discussed. The participants also pledged to sensitize the villagers and contribute towards the cleanliness of the ghats and river. The initiatives were appreciated by the participants.

As a follow-up of these workshops, dustbins and the signages were installed on the ghats of Narora. Another such discussion was organized with three Gram Pradhans in Uttarkashi at individual level.

The villages that were covered were Harsil, Dharali and Mukhwa. In the end an open ended questionnaire was administered with the participants. The questionnaire addressed concerns like conserving water quality and conserving biodiversity of River Ganga and proper disposal and sewage facilities.

In response to the feedback by the Gram Pradhans, ideas for conducting discussions at group level was taken into account and “**Ganga Avdharna Manch**” was established for public meeting where villagers gather to discuss problems in their society or sometimes celebrate events.

An informal meeting with the villagers in two villages namely Kaithi and Dhakua of Cholaipur block in Varanasi and two villages in Uttarkashi namely Bagori and Jhala was organized and villagers were introduced to the project.

Table 3.1: Showing the details of the Ganga Avdharna Manch

S. No.	Village	No. of participants	Source of income	Key problems	Solution
1.	Dhakua	22	Fishing, labour	Less number of dustbins in the village. The problem of burying of dead animals and livestock. Public toilets and crematorium provided by the government is not used by most of the village people.	Dustbin were installed in the village in according to their requirements. Awareness about the other alternatives provided. Sensitized about the harmful effects of
2.	Kaithi	33	Fishing, agriculture	Less number of dustbins in the village. People are not aware of the schemes provided by the government.	Dustbin Installation is in process. Sensitized about all programs under National Mission for Clean Ganga.

3.	Bagori	25	Agriculture	Recycle of plastic items. Open defecation, Sign board	Awareness about the other alternatives provided. Sensitized about the harmful effects of bodies nearby the river.
4.	Jhala	26	Agriculture, Business(Hotel)	Recycle of plastic items. Open defecation, Sign board.	Awareness about the other alternatives provided. Sensitized about the harmful effects of bodies nearby the river.

3.3 Sensitization of Boatmen

Boatmen has the highest stake as they are directly dependent on the river for their livelihood. They are the stakeholders who are at the site and can make a significant difference in the situation as they interact with the pilgrims and visitors who take a ride in their boats and can spread the mantra of saving Ganga amongst the public. 23 boatmen from the ghats of Varanasi participated in the day long workshop. Workshop was conducted at Sarnath for the boatmen where they were sensitized about the priority species, the pollution and how they can contribute towards the Clean Ganga Initiative. They were also made aware of the species that are found in their region and if they find any animal in distress along the ghats or in the river how they should act and whom they should contact.

3.4 Sensitization of Fishermen

Like the boatmen, fishermen's livelihood also gets affected by the pollution in any river. They spend their entire life around the river and understand it better than anyone. They have grown up on the banks and have seen the changes that the river has gone through thus impacting the catch and their source of earning. Keeping this in mind, two sensitization workshops of one day duration were organized for the fishermen living on the outskirts of Varanasi. A total of 50 fishermen participated in the workshop.

3.5 Tourist Guide Training

As tourism is becoming of vital importance globally, the tourist guides are the stakeholders

who accompany the visitors and pilgrims visiting an unknown city. Hence, to a large extent, the way in which the visitor's behaviour depends on how the tour guides conduct themselves publically. In alternative words, these tour guides, are accountable to guiding the pilgrims about the biodiversity of River Ganga. Two training programs of one day duration were held at the Interpretation Centre at Sarnath. A total of 31 guides from Varanasi and 30 guides from Sarnath participated in the training program.



Turtle Release program in Varanasi



World Turtle Day exhibition in Ganga Darpan, Sarnath



Painting on boats in Varanasi



Painting on Walls at Narora Railway Station



Painting on walls in Varanasi



Painting on wall at Rajghat, Varanasi



Signages installed on e-rickshaws in Narora



Exhibition at Rajghat in Narora during Ganga Mela



Exhibition during World Environment Day in New Delhi



Exhibition in Book Fair at NIEVPD, Dehradun



Exhibition during KumbhMela in Prayagraj



DekhoDekho Sab BadalRahaHai performed during World Environment Day in New Delhi



Sparsh Ganga performed in IGNEA



Turtle release programs in Varanasi



Interactions with Gram Pradhans in Dibai and Anoopsheher



Sensitization of Boatmen and Fishermen of Varanasi and Sarnath



Tourist Guide Training in Sarnath

3.6 Publications

Publications help in raising awareness about something that was known or is new to the public. Ready to use print material are used to communicate important messages and to enhance the public perception about an organization or an issue.

Main objectives to bring out publications under the project were;

- to disseminate knowledge about Ganga River and its biodiversity to a wide range of audience
- to make information available to audiences that don't have access to libraries or internet

3.6.1 Print Media

i. **Discovering Ganga – A Teacher's Manual**

An activity-based learning manual, “Discovering Ganga” is prepared in both English and Hindi to help educators and the students in primary and secondary schools. It comprises of hands-on activities and new age learning about our surroundings, the importance of water in life, threats to the river system. All the activities are simple and can be adapted in any school curriculum. Teachers can explain the scientific concepts of the river Ganga by involving the students in the activities. The activities act as a supplement to their existing curriculum with a new set of tools that combine both learning and fun.

ii. **Companions in and around Ganga**

A fact sheet named “Companions in and around Ganga” on priority species was developed. The factsheet is being distributed to the fishermen, boatmen, students and the communities living along the Ganga River. The fact sheet has been prepared in English and Hindi. The fact sheets were, laminated in water-resistant material and distributed to the boatmen and fishermen. The boatmen and fishermen have been trained to use these fact sheets and communicate information about the National Mission for Clean Ganga and the priority species to the visitors.

iii. Bag It or Bin It

To create awareness about the harmful effects of Plastic in our daily activities, a publication on causes of plastic pollution and its harmful effects is designed named “Bag it or Bin it”. This booklet has interactive activities to engage students of all age groups and sensitize them about the importance of rivers in our lives. A lot of reuse and recycle methods are listed in the booklet that can be adapted by every individual in their life which will reduce our dependence on plastic products. Designed in a format that can be used as supplement knowledge with the school curriculum, ‘Bag It or Bin It’ is fun learning experience that can help the children build a better future.

iv. Sarpdansh

A small booklet on snake bite named “*Sarpdansh*” has been developed and distributed amongst the locals living along the Ganga River basin. *Sarpdansh* is a collection of myths about snakes that local people generally believe in and the facts about them. It also contains first aid and prevention methods that can be followed to avoid such situations. The feedback for this booklet has been exceptionally good and people have appreciated this effort as it helps them tackle this day to day problem.

Other distribution materials like awareness posters, bookmarks and name slips containing the priority species and slogans were designed and printed for mass distribution.

3.6.2 Digital Media

Keeping in mind the idea of ‘Digital India’, we have now started to focus more on digital content and platforms to disseminate knowledge and awareness about the river and its biodiversity.

i. Story of Neela

A digital animated story titled “**Story of Neela**” has been developed for the public especially school children to understand the turtle species *Nilssoniagangetica* found in the Ganga River Basin. The story talks about their lifecycle in the river and the threats faced by them. The storyline is weaved interestingly with a comical representation to grab the attention of the youth. To make it cost-

efficient, all the digital work and voice-overs are done by the team. It is made both in English and Hindi and is available on the youtube channel, *Ganga Darpan*.

ii. Social Media - Instagram, Facebook and Youtube

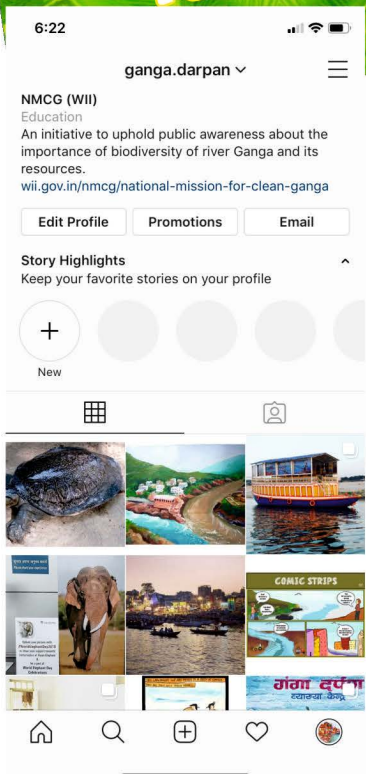
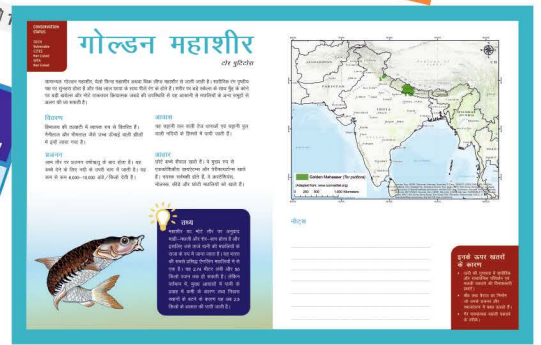
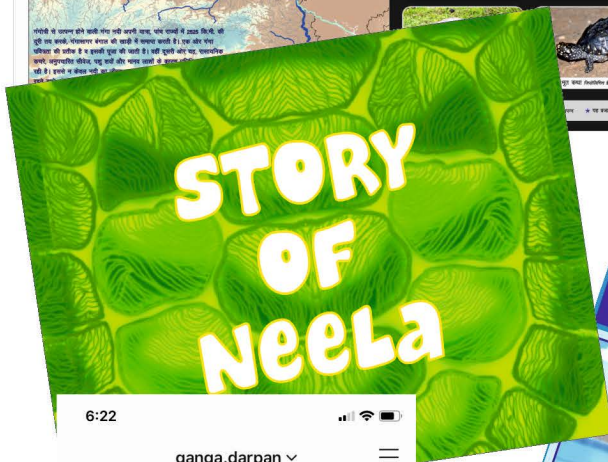
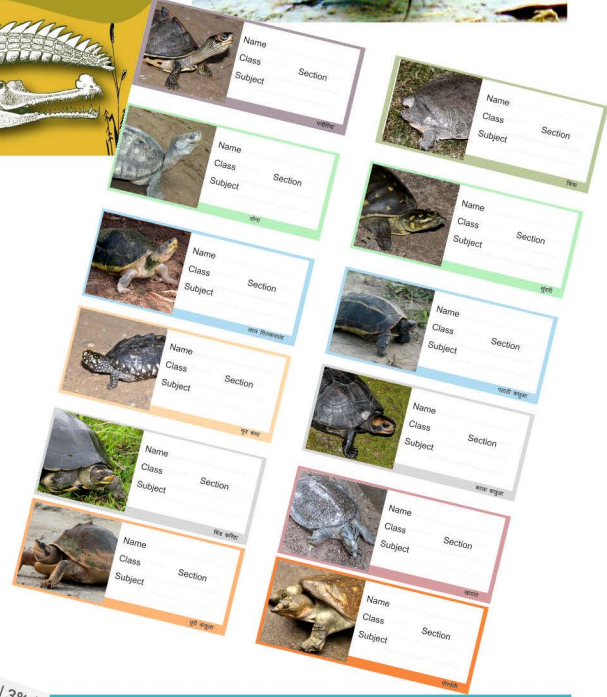
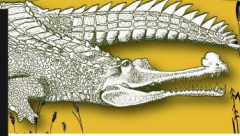
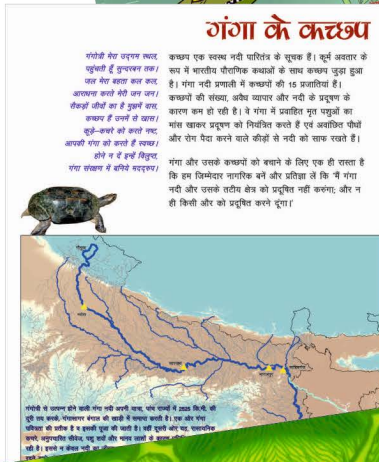
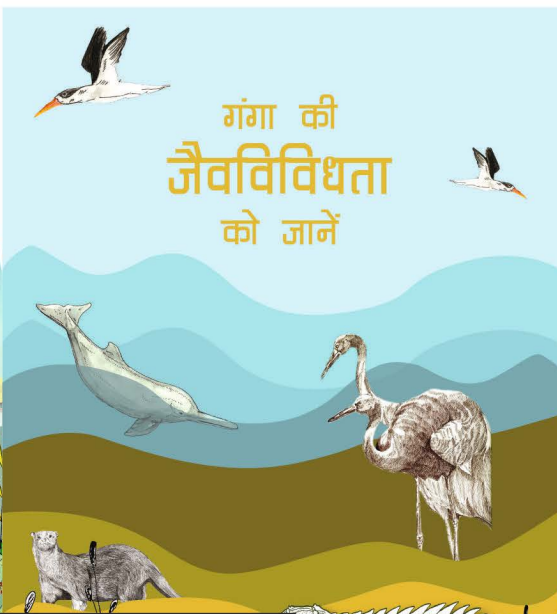
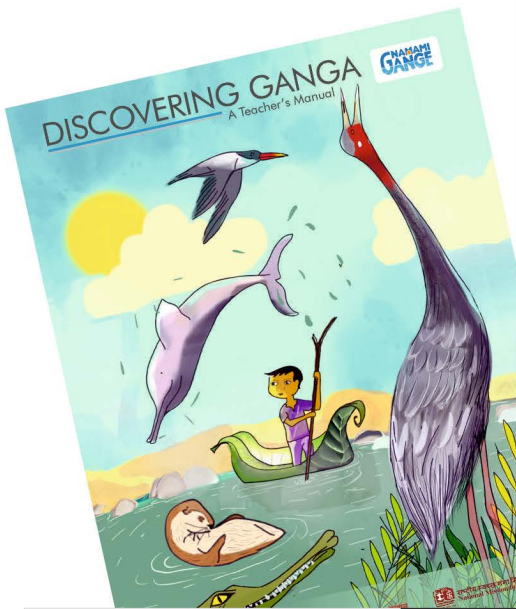
As we are living in a digital world, disseminating knowledge through digital platforms is good way to create awareness among the masses. Also print media is expensive and can only reach the audience with whom we are interacting. Instagram page and Facebook account named '*Ganga Darpan*' was created. The pages are constantly updated and educational content is generated to create awareness. Slowly the number of followers is gaining momentum. Puppet shows and digital videos are also being uploaded on the youtube channel, '*Ganga Darpan*'.

Links to all the platforms:

Facebook: <https://www.facebook.com/ganga.darpan.39>

Instagram: <https://www.instagram.com/ganga.darpan/>

Youtube: <https://www.youtube.com/channel/UCMH8cFQOk1E6FDIQA08nWQ?>



Annexure

COMPONENT – 6		
NATURE INTERPRETATION AND EDUCATION FOR BIODIVERSITY CONSERVATION OF GANGA RIVER		
Objective 1: Communicating to the community about the value of aquatic biodiversity and natural processes through the establishment of Interpretation Centre at three sites.		
Proposed	Achieved	Outcomes
Site Selection for the Interpretation Centres Interpretation centres at 3 sites to be established	- Established three interpretation centres in Sarnath, Varanasi and Kanpur. - These centres were established after obtaining necessary permissions. Forest department, renovation and modification of identified sites. - Concept of Ganga specific interpretation center developed, panels, exhibits and other display material developed for the interpretation centers. - A house boat hired, modified and renovated and a floating exhibition on Ganga and its biodiversity "Ganga Tarini" launched at Varanasi. Interpretation centre established within the premises of the Turtle Rescue and Rehabilitation Centre at Sarnath has 3 theme based exhibition halls with QR based panels defining the importance of Ganga River, its biodiversity, threats and how we can help. It also has a children's activity room for conducting workshops with school children.	Ganga Darpan - Ganga Darpan was inaugurated on February 27, 2019. - It had a total footfall of 2200 visitors till January 2020. Ganga Tarini - The first of its kind in the country, a floating interpretation center was setup at Varanasi and was opened to public on 27th February 2019. - It had a total footfall of 3300 visitors till December 2019. Anubhuti - Allen Forest building in Kanpur Zoological Park was renovated as the interpretation centre. - It had a total footfall of 3300 visitors till December 2019.
Remarks: 100% target achieved		
Objective 2: Educate and involve the public in the Ganga basin's natural systems by creating a network of community-based environmental education programs.		
Proposed	Achieved	Outcomes
2 eco clubs *3 sites Teacher's Training 2 training per site*3 sites*20 participants Curriculum based resource pack: Resource for education programs prepared	7 ecoclubs "Gangaridai" established at 4 sites, Uttarkashi (42 members), Varanasi (45 members), Dehradun – Haridwar (19 members), Kanpur (39 members) - Published 'Discovering Ganga': Teacher's manual for environmental education in the classroom and equipped teachers to use it. - Puppet shows created - Fact sheets 'Companions in and around Ganga' created about Ganga and its priority species in Hindi and English. - A total number of 1928 students sensitized about 'Ganga and its aquatic biodiversity' - Bookmarks, Name slips, Awareness posters, Sarpdash (Snake bite) booklet prepared. - Conducted 8 teacher training programs in four sites: Uttarkashi (24 participants), Varanasi (70 participants), Dehradun – Haridwar (47 participants), Kanpur- (50 participants) ➤ Water testing kit prepared for assessing parameters (Dissolved oxygen, pH, Temperature).	- Eco club members are actively participating in the slogan writing activities, rallies, plantation and cleanliness drives, nukkad natak, special days celebration, quiz competitions, wall paintings. - Training manuals distributed to more than 600 teachers as resource material. - Teachers trained to use puppet shows and other resource material. - Distributed 608 copies of facts sheets to students during various awareness campaigns. - A total number of 19,200 Bookmarks, 68,00 name slips 11,600 awareness posters and 500 copies of 'Sarpdash' booklet have been distributed as resource material during exhibitions, campaigns, awareness programs and 'Ganga Chaupal'. - Conducted several water quality tests with more than 1500 students and trained more than 100 teachers to use and handle water testing kit in classrooms.

COMPONENT – 6		
NATURE INTERPRETATION AND EDUCATION FOR BIODIVERSITY CONSERVATION OF GANGA RIVER		
Remarks: 100% target achieved		
Objective 3: Foster public awareness of the river ecosystem, its conditions and resources.		
Proposed	Achieved	Outcomes
Identification of target audience Program with different stakeholders Interactive website	A need assessment survey was conducted to assess interest of stakeholders in floating exhibition, Interpretation centre and conservation education programs. Interviewed Visitors (101), hotels (71) and schools (70). Conducted sensitization workshops for 61 Gram Pradhans, Dibai and 82 for BDO and Block Pramukh in Anoopshaher. Conducted informal meetings in 2 villages of Cholaapur block, Varanasi and 2 villages in Uttarkashi. Sensitization of 23 Boatmen done Tin boxes provided to each boatman to keep them in their boats as dustbins 50 Fishermen sensitized. A total of 31 guides from Varanasi and 30 guides from Sarnath were sensitized. Interpretation activities designed for different target groups Visitors • Paintings on walls in Varansi ghats and Narora Railway station. • Dustbins and signage placed on ghats of Narora and Varanasi. • Boats in Varansi ghats painted with messages and depiction of priority species. • Signage on E-rickshaw • Ganga Janmotsava temporary exhibition installed at Narora Hotels Flyers of Ganga Darpan and dustbins distributed to hotels, public places and heritage sites.	Schools agreed to participate in conservation education workshops, for trips to interpretation centers. Pradhans pledged to sensitize villagers and contribute or cleanliness activities. Boatmen, fishermen and tourists guides now sensitizing visitors and pilgrims and convince them to place their floral offerings in tin boxes. A bilingual and user interactive website hosted and linked with the QR codes placed on panels of the Interpretation Centres and Bajra. Link: www.gangadarpan.in The website makes it easy for the visitors to go through the panels anytime and is also an initiative towards digital India.
Remarks: 100% target achieved		

