



Capacity Building of Forest Department and other Stakeholders



Report

Training for transformation

COMPONENT 3- CAPACITY BUILDING OF FOREST DEPARTMENT AND OTHER STAKEHOLDERS

2016-2019

Published by

Wildlife Institute of India (WII)

P.O. Box 18, Chandrabani,

Dehradun-248001, Uttarakhand, India

Ph.: +91 135 2646263,

Fax: +91 135 2640117

Website: <https://www.wii.gov.in>

© WII-NMCG Training

Project Coordinator & Nodal Officers

Dr. Ruchi Badola

Dr. S.A Hussain

Citation

Angom, Sangeeta; Mehralu, Monika; Rawat Mohan Aakash; Sharma, Monika; (2020),

Capacity building of forest department and other stakeholders. Wildlife Institute of India,

Dehradun. pp

CONTENT

ACKNOWLEDGEMENT

PREFACE

EXECUTIVE SUMMARY

FLOW CHART

LOG FRAME

CHAPTER 1 INTRODUCTION

- 1.1 About WII-NMCG Project
- 1.2 Capacity building: A WII-NMCG Primer
- 1.3 Approaches
 - 1.3.1 Elements of the capacity building programmes
 - 1.3.2 Building blocks of capacity building initiatives
- 1.4 Constraints and Challenges
- 1.5 Transparency and Accountability
- 1.6 Objectives
- 1.7 Training sites

CHAPTER 2 METHODOLOGY

- 2.1 Training techniques
- 2.2 Training model
- 2.3 Training monitoring and evaluation
- 2.4 Statistics and Documentation

CHAPTER 3 CAPACITY BUILDING PROCESS

- 3.1 Capacity building framework
- 3.2 Target groups
 - 3.2.1 *Policy level professionals*
 - 3.2.2 *Implementation level Professionals*
 - 3.2.3 *Execution level Professionals*
- 3.3 Training Needs
- 3.4 Training Modules
 - 3.4.1 *Wetland and River Conservation*
 - 3.4.2 *Ecological Survey/Biodiversity Monitoring*
 - 3.4.3 *Participatory Management*
 - 3.4.4 *Conservation Education*

CHAPTER 4 RESULT

- 4.1 Capacity building in action
 - 4.1.1 Generation of training materials
- 4.2 Establishment of spearhead teams
 - 4.2.1 Training of spearhead teams
 - 4.2.2 Training of volunteers using expertise of spearhead teams
- 4.3 Training of other stakeholders

4.4 Certification events

CHAPTER 5 *BAL GANGA PRAHARI* PROGRAMME

- 5.1 Overview
- 5.2 Activities of children
- 5.3 Output

CHAPTER 6 TRAINING DATA MANAGEMENT

- 6.1 Training database overview
- 6.2 Significance of keeping training records
- 6.3 Training in print media and social forum
- 6.4 Generation of success stories

CHAPTER 7 MONITORING AND EVALUATION

- 7.1 Training impact assessment
 - 7.1.1 Pre training assessment
 - 7.1.2 Post training assessment
 - 7.1.3 Analysis
- 7.2 Carry forward activities

CHAPTER 8 DISCUSSION

- 8.1 Link between activities and objectives
- 8.2 Capacity building and synergies with forest departments
- 8.3 Creating awareness through capacity building programmes
- 8.4 A growing space for citizen science engagement and transparency

CHAPTER 9 FUTURE ENDEAVOURS

ANNEXURES - RESOURCES

- Annexure I: List of training materials for capacity building programmes
- Annexure II: Different level of workshops at five Ganga States
- Annexure III: Number of participants trained under four Modules of Ganga biodiversity conservation
- Annexure IV: Programme schedules of four Modules designed for Ganga biodiversity conservation
 - IV (a) Wetland and River Conservation
 - IV (b) Biodiversity monitoring and Ecological Survey
 - IV (c) Participatory Management
 - IV (d) Conservation Education
- Annexure V: Carry forward conservation activities with spearhead team of State Forest Department and WII-NMCG team
- Annexure VI: Abbreviations

REFERENCES

Acknowledgements

This report has been developed for component “CAPACITY BUILDING OF FOREST DEPARTMENT AND OTHER STAKEHOLDERS” as a part of the Wildlife Institute of India project ‘Biodiversity Conservation and Ganga Rejuvenation’ funded by the “National Mission for Clean Ganga”, Ministry of Jal Shakti, River Development and Ganga Rejuvenation under its flagship programme “*Namami Gange*”. We express heartfelt thanks to Shri Gajendra Singh Shekhawat Union Cabinet Minister, Ministry of Jal Shakti; Shri U.P Singh, Secretary, Ministry of Jal Shakti; Shri Rajiv Ranjan Mishra, Director General, National Mission for Clean Ganga; Shri Rajiv Kishore, Executive Director (Administration), National Mission for Clean Ganga; Shri Rozy Agarwal, ED (Finance), Dr. Sandeep Behera, Consultant (Biodiversity) for the kind support and coordination. Our sincere gratitude to Dr. Dhananjay Mohan, Director, WII and Dr. Y.V Jhala, Dean, Faculty of Wildlife Sciences, WII for providing logistic and technical support. We also owe sincere thanks to the principal investigator of the project Dr. Ruchi Badola, Dr. S. A. Hussain and project personals of the ‘Biodiversity Conservation and Ganga Rejuvenation’ Project, for their constant support, inspiration and encouragement in preparing this report.

Preface

The Ganga River is among the largest rivers in Asia, flowing from the Himalayas to the Bay of Bengal covering a length of 2,525 km and 26% of India's landmass. The Ganga is a trans-boundary river forming the world's largest delta, Sunderbans, and influences two major countries, India and Bangladesh. The river is considered an element of symbol of Indian culture encompassing its historical, spiritual, cultural, socioeconomic attribute and biodiversity values. Compare to other transboundary rivers such as Nile, Amazon and Mekong, the Ganga is incomparable in terms of people dependency on its resources directly or indirectly and most vulnerable ecosystems in terms of biodiversity loss and decline in ecosystem services. The dependence of 500 million people have had its adverse impacts like unsustainable resource extraction, reduced water availability, habitat loss, water pollution, decline in prey-base, poaching of aquatic wildlife, and natural flow of the river.

Success of the efforts to restore the biodiversity of the Ganga River would depend on building of human resources capacities of stakeholders, through an integrated and holistic approach. The effort intended to build the capacity of multiple stakeholders, so they can effectively contribute to the restoration of ecological integrity of the Ganga River. The involvement of multiple stakeholders is required who are aware and trained in field methodologies for undertaking habitat assessment, ecological monitoring, rescue and rehabilitation, environmental pollution, community participation, and conservation education. The capacity building programmes aim to include the key stakeholders *viz.* forest departments, veterinarians, entrepreneur, industrialist, local communities, NGOs, scientists, professors, teachers; university and college students, school children and volunteers from concerned areas. The stakeholders would act as self-sufficient human resources capable of carrying forward the conservation and monitoring activities.

Capacity of Forest Department and other stakeholders developed

OBJECTIVE 1: To develop training materials for different capacity building programmes on the Ganga biodiversity conservation for future use.

- Training curriculum and framework developed.
- Training materials such as field guide manual, booklet developed.
- Awareness materials i.e brochures, posters, pamphlets developed.

Activities

- Thorough literature review carried out (Annexure III)
- 16 training need assessment workshops with different target groups organised to design the training programmes and materials.

OBJECTIVE 2: Identification and establishment of spearhead teams in the five Ganga states, consisting of selected forest staff and local youth, and to train them in different aspects of biodiversity conservation and methodologies for survey of the indicator species.

- Spearhead teams of 7-21 forest officials established in five Ganga states.
- 307 youth trained in biodiversity monitoring, wetland and river conservation, participatory management and conservation education.

Activities

- Spearhead teams established and trained through 2 National level training programmes organised in 2017 and 2019 on different aspects of aquatic biodiversity conservation.
- Volunteers identified through extensive interactions at village levels with key stakeholders and universities and colleges.
- Training programmes conducted for university students on biodiversity monitoring.
- Training programmes conducted for local youth on participatory management and conservation awareness.

OBJECTIVE 3: To develop capacity of forest officials and other stakeholders for monitoring of Ganga aqualife, management planning of wetlands, community involvement and conservation education.

- 227 Forest officials; 54 scientists/professors; 5 representatives from NGOs; 10 Media personnel trained in biodiversity monitoring.
- 219 Forest officials; 39 scientists/professors; 5 representatives from NGOs; 10 Media personnel; 15 representatives from line agencies trained in wetland conservation.
- 212 Forest officials; 39 scientists/professors; 5 representatives from NGOs; 10 media personnel trained in community involvement.
- 207 Forest officials; 39 scientists/professors; 5 representatives from NGOs; 10 Media personnel trained in conservation education.
- 64 schools brought under *Bal Ganga Praharis* programme.

Activities

- 736 participants from multiple stakeholders trained from 2017 to 2019 on four modules:
 - Monitoring of Ganga aqualife.
 - Wetland and river conservation.
 - Participatory management.
 - Conservation education.
- 10 National training programmes, 9 State level training workshops, 120 sensitization workshops conducted.
- >12000 participants were sensitised in different stakeholder groups.
- >8000 school children sensitized through 74 programmes.

Executive Summary

Biodiversity conservation approach requires mobilization of stakeholders for sustainable conservation of biodiversity of the Ganga River. Success of the efforts to restore the biodiversity of the Ganga River would depend on development of human resources comprising of multiple stakeholders which include forest departments, veterinarians, entrepreneur, industrialist, local communities, NGOs, scientists, professors, teachers; university and college students, school children and volunteers from concerned areas, through an integrated and holistic approach. The involvement of those stakeholders who are aware and trained in field methodologies for undertaking habitat assessment, ecological monitoring, rescue and rehabilitation, environmental pollution, community participation, and conservation education. The effort intended to build the capacity of stakeholders, so that they can effectively contribute to the restoration of ecological integrity of the Ganga River. Moreover, the stakeholders would act as self-sufficient human resources capable of carrying forward the conservation activities.

The main objective was to develop training materials for different capacity building programmes on Ganga biodiversity conservation for future use. Under which the primary goal was to identify and establish the spearhead teams in the five Ganga states, consisting of selected forest staff, and local youth, train them in different aspects of biodiversity conservation and methodologies for survey of the indicator species. It also intended to develop the capacity of forest officials of Ganga States and other stakeholders for monitoring of Ganga aqualife, conservation of rivers and wetlands, community involvement and imparting conservation education.

The training programmes have been implemented at 120 sites in five Ganga states viz. Uttarakhand, Uttar Pradesh, Bihar, Jharkhand and West Bengal respectively. The trainings were organized in four diverse modules – Wetland and river Conservation, Biodiversity monitoring, Participatory management and Conservation education. The training techniques have been implemented in an andragogy mode and competency based methods so as to ensure development of adequate competence among the participants. Monitoring and

evaluation was done based on the Kirkpatrick's model using a random follow up E-questionnaire assessment to examine the 'after' training efficacy and effectiveness amongst the participants from 2017 to 2019. Comparison was done between pre and post impact assessment to evaluate how much the training programmes contributed to multiple stakeholder's groups. KnightLab software was used to trace and map the success stories of stakeholders with an aim to propagate such activities either individually or at the institutional level.

As part of this initiative, various capacity building programmes have been implemented at 120 sites in five Ganga states involving multiple stakeholders. Sixteen training need assessment workshops with different target groups were conducted to finalize the design of training materials. The training curriculum and materials have been developed for stakeholders on the themes of Ganga Biodiversity conservation. Spearhead teams comprising of 7-21 forest officials have been established in all five Ganga states. A total of which 73 forest officials were trained in two National level training programmes in 2017 and 2019 on different aspects of biodiversity conservation. Approximately 307 youth has been trained so far in methodology of baseline survey of indicator species through spearhead teams. Further, the trained spearhead teams have conducted 7 trainings and 30 sensitization programmes in which more than 5000 participants were mobilized and 422 participants were trained.

Skill building programmes have been conducted for other stakeholders in which 736 participants were trained and 12219 were sensitized in 19 trainings and 120 sensitization programmes during 2016 to 2019. Through the *Bal Ganga Prahari* programme, sixty four (N=64) schools have been identified along the banks of Ganga River and >8900 school children have been sensitized through 74 programmes. A training database at the WII-NMCG webpage have been developed as a single point source to disseminate training information to a wider audience. The training database is an online repository that provides comprehensive and compiled information on the training programmes carried out from 2017 to 2019.

The pre-training assessment helps in gauging the existing level of knowledge and attitude towards the Ganga biodiversity in different target groups of stakeholders whereas the post assessment reflects their state of knowledge, awareness, attitudinal shift and motivation level after the training programmes. The training impact assessments suggest that, such programmes result in attitudinal change of stakeholders further providing them a pathway to engage meaningfully in the efforts to restore the Ganga river ecosystem.

A total of 158 respondents were evaluated and monitored through a semi-structured e-questionnaire assessment. As a result, it was found that almost every respondent ($\approx 85\%$) has benefited from the training programmes. Approximately, 80% of trained participant carried forward conservation activities on Ganga aqualife conservation. Out of these, $>40\%$ helped in creating awareness through workshops and various other forms of interactive events, while $\approx 34\%$ trained more people on biodiversity monitoring. The trained cadre assist in various conservation activities and are deployed at field stations further assisting various survey teams, forest departments and trained cadre were used for piloting the training programmes at the Ganga states. Also, trained and interested individuals are being attached to the research and training institutes of their choice as per their qualification.

This monitoring and evaluation process act as critical indicator of the past trainings while planning future activities to ensure efficacy, effectiveness and sustainability of the trainings imparted. The evaluation shed light on existing knowledge, awareness, attitudinal shift and motivation level towards Ganga's biodiversity in different target groups of stakeholders. A Pool of trained individuals was used as a citizen science engagement tool which helped in conducting in ecological survey & monitoring. The efforts suggest that, such programmes result in change of attitudes of stakeholders and also provide them a pathway to engage meaningfully in the efforts to restore the Ganga river ecosystem.

Keywords: Target groups, Biodiversity, Training, Sensitization, Mobilization, Database, Evaluation, Monitoring, Ganga River

CHATER 1 INTRODUCTION

1.1 ABOUT WII-NMCG PROJECT

The “Biodiversity conservation and Ganga rejuvenation” Project, implemented by the Wildlife Institute of India (WII), under the “*Namami Gange*” – A flagship programme of the Prime Minister of India, The Ministry of Jal Shakti, River Development and Ganga Rejuvenation through National Mission for Clean Ganga (NMCG), which has developed a comprehensive approach to address the challenges faced by the National River “The Ganga” to restore the river ecosystem and biodiversity through multi-dimensional preventive and corrective measures and conservation strategies. This project aims to restore the dwindling aquatic wildlife of Ganga River by involving multiple stakeholders. In order to facilitate the largest river restoration and aquatic species conservation programme ever undertaken by the Government of India, an integrated capacity building programme is being implemented for stakeholders of Ganga River.

1.2 CAPACITY BUILDING: A WII-NMCG PRIMER

Capacity building involves the training and development of stakeholders with the skill set, required to play an active role in the conservation and restoration of the Ganga River and its biodiversity. The capacity building would depend on the building of human resource capacity of multiple stakeholders including forest departments, veterinarians, entrepreneur, industrialist, local communities, NGOs, scientists, professors, teachers; university and college students, school children and volunteers from concerned areas. The stakeholders would act as self-sufficient human resources capable of carrying forward the conservation and monitoring activities. The aim of the capacity development programme was to enable the trained cadre to improve their performance and to become more competitive in a sustainable way.

1.3 Approaches

Biodiversity conservation approach requires mobilization of stakeholders for sustainable conservation of biodiversity of the Ganga River. The effort aims to provide different capacity building programmes which would aid in creating a cadre of trained stakeholders in various aspects of biodiversity conservation who would be the future trainers for successful biodiversity monitoring and restoration of the Ganga River and carry forward the activities individually or at institutional level. The overall approach would assist in developing and strengthening the participant’s skills, instincts, abilities, processes and resources that

organizations and communities need to survive, adapt, and thrive in conserving the ecosystem of the river.

1.3.1 Elements of the capacity building programmes

The elements of capacity building programmes starts from the principle that target groups are best empowered and skilled to realize their full potential when the means of conservation are sustainable – long-term, strengthen and maintain the capabilities to set and achieve their own development objectives over time (Leidel et al. 2012). For WII-NMCG project capacity development contains elements of (i) Identification of target groups/stakeholders and engage them through meetings, correspondence, workshops etc. (ii) Identification of capacity development needs (iii) Formulation of capacity development programmes (iv) Implementation (v) Evaluation (Figure 1). These are the essential management skills of any capacity building programmes that allow for planning, implementation, monitoring and evaluating initiatives for conservation of biodiversity of Ganga River.

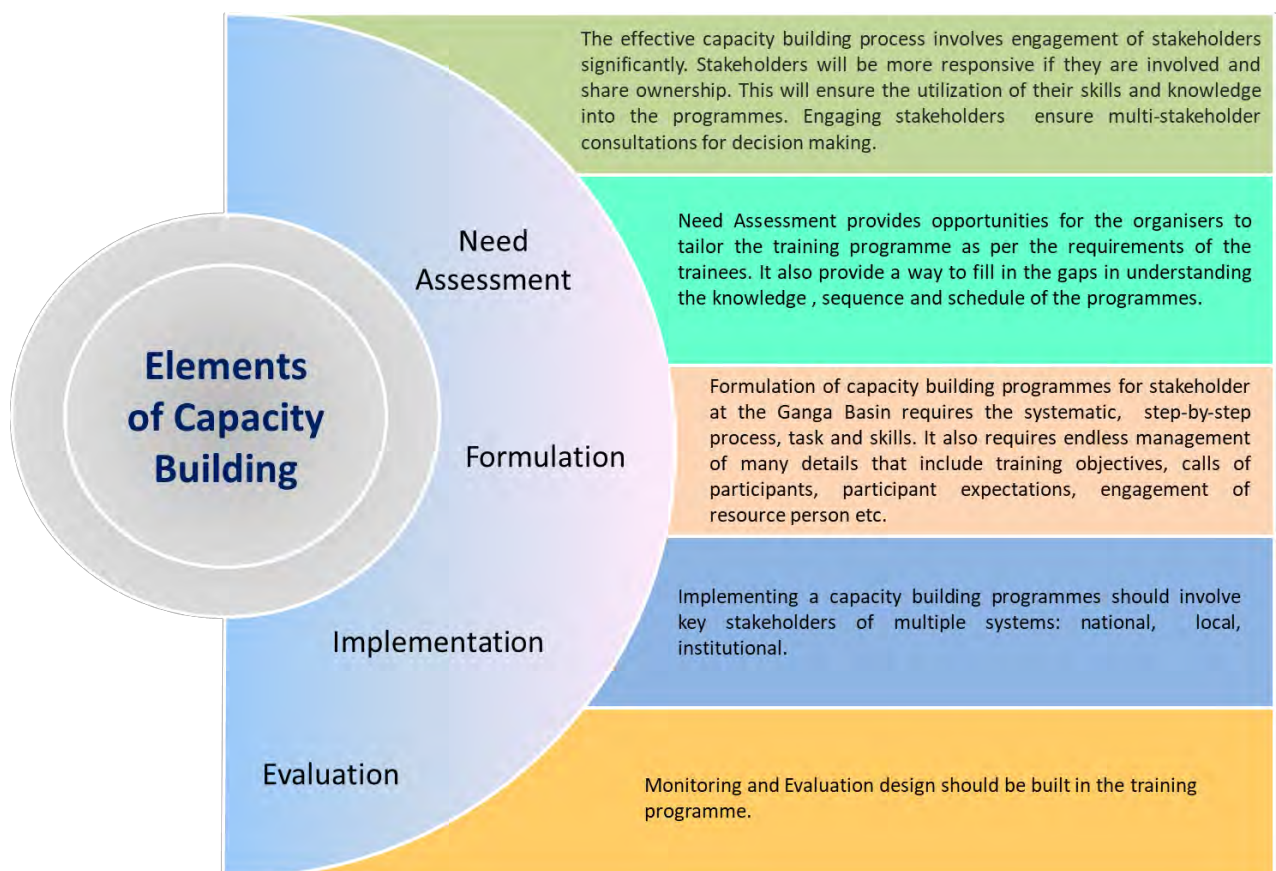


Figure 1: Elements of capacity building programmes

1.3.2 Building blocks of capacity building initiatives

Organizing a capacity building programmes for stakeholders at the Ganga basin requires a systematic, step-by step process, tasks and skills. Although training coordination takes place during the design phase, coordination begins at the time of training is proposed and continues even after it is delivered and participants leave (Alaerts, 2009). It requires endless management of many details that include training objectives, calls of participants, expectations, engagement of resource persons etc. After the identification of key stakeholders, the first step was identification of the potential role of target groups through a process of meetings, dialogues, and workshops. This enabled us identifying their training requirements and needs. Once, the training needs were identified, the next step was to formulate the trainings. Training checklist logistics serves as a monitoring tool to check the effectiveness of the programmes. Training management requires diverse information such as setting team direction, work plan, tracking progress, develop to support the achievement of the project objectives etc. (Figure 2) that arise from training needs assessment. Implementation phase was designed based on the requirements of skills and knowledge of the target groups of the Ganga states, where training is planned and execute for the participants on diverse programmes.

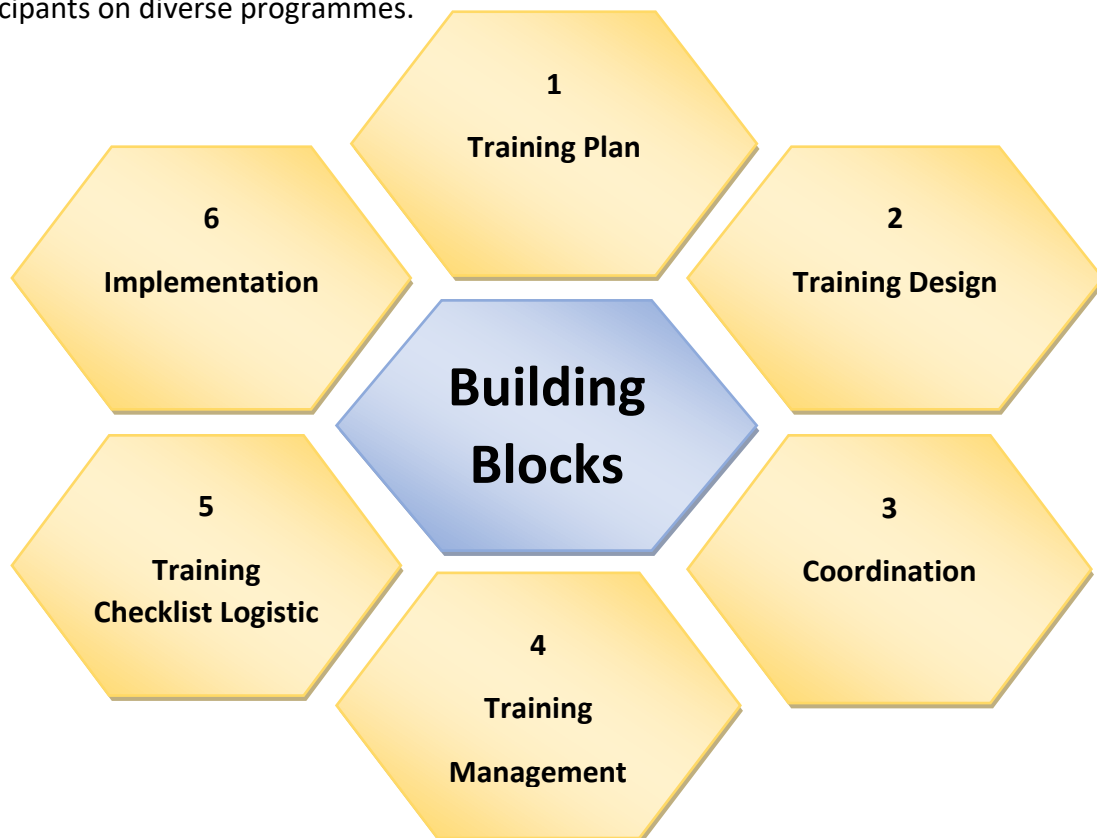


Figure 2: Building Blocks of capacity building initiatives

1.4 Constraints and challenges

The WII-NMCG project 'Biodiversity Conservation and Ganga Rejuvenation' was initiated in the year 2016, therefore the capacity building Programmes were operationalized from 2017, wherein the phase I of the project was sanctioned to be completed within 3 years, by 2019. River rejuvenation and revival is an extensive and huge task; it calls for nationwide actions by policy-makers, protected area managers, forest officials, research organizations, local communities, youth, NGOs, industries etc. Given that the Ganga River stretches is enormous area of 2,525 km and considering the wide spectrum of stakeholder categories also poses a limitation at times, since each stakeholder groups have specific requirements in terms of training needs and methodologies to be utilised. The major constraint is in terms of engaging different stakeholders and mobilizing them for effective implementation of sustainable effort in maintaining the ecological integrity of the Ganga River. Within this spectrum, earlier efforts to restore the Ganga River were largely limited to water quality maintenance without giving due importance to other ecological functions. Information on the outcome of the decades of studies on aquatic biodiversity is scattered and needs consolidation. Community participation was not encouraged also the perception and attitude of the local people were not built towards the restoration process.

There are various other variables, facing challenges related to assignment of manpower and resource persons in the field, which is required for intensive generation of awareness programmes for the local communities along the entire stretches of the Ganga River. As an offshoot to the presence of the wide array of stakeholder, each stakeholder group has to be dealt with stakeholder-specific manner, which makes overall process complex under certain circumstances. Another constraint faced was, the stakeholder acts indifferent, antagonistic or unwilling to participate and getting involved in the conservation efforts that leads to the inability to establish a constant presence in five Ganga states for monitoring of the events and carry-forward activities post training and sensitization workshops.

5 Transparency and Accountability

To set the highest standards of transparency and accountability, the WII-NMCG training component has done a full disclosure of its activities, events, total number of participants trained, contact details and engagement of resource person by placing both in the annual

reports and training database on the WII-NMCG Webpage. To ensure complete transparency in training data, all the budgets and amount utilized on the training programmes and the sanctioned amount by concerned authorities including finance officer of WII, data is placed for audit annually.

1.6 Objectives

Setting comprehensive and practical objectives is a key to the success of the conservation initiatives, and is a vital part of implementation of the capacity building programmes. The overall objectives were planned according to the needs of the stakeholders for effective implementation and to ensure the long-term sustainability of these programmes (Figure 3).

These include:

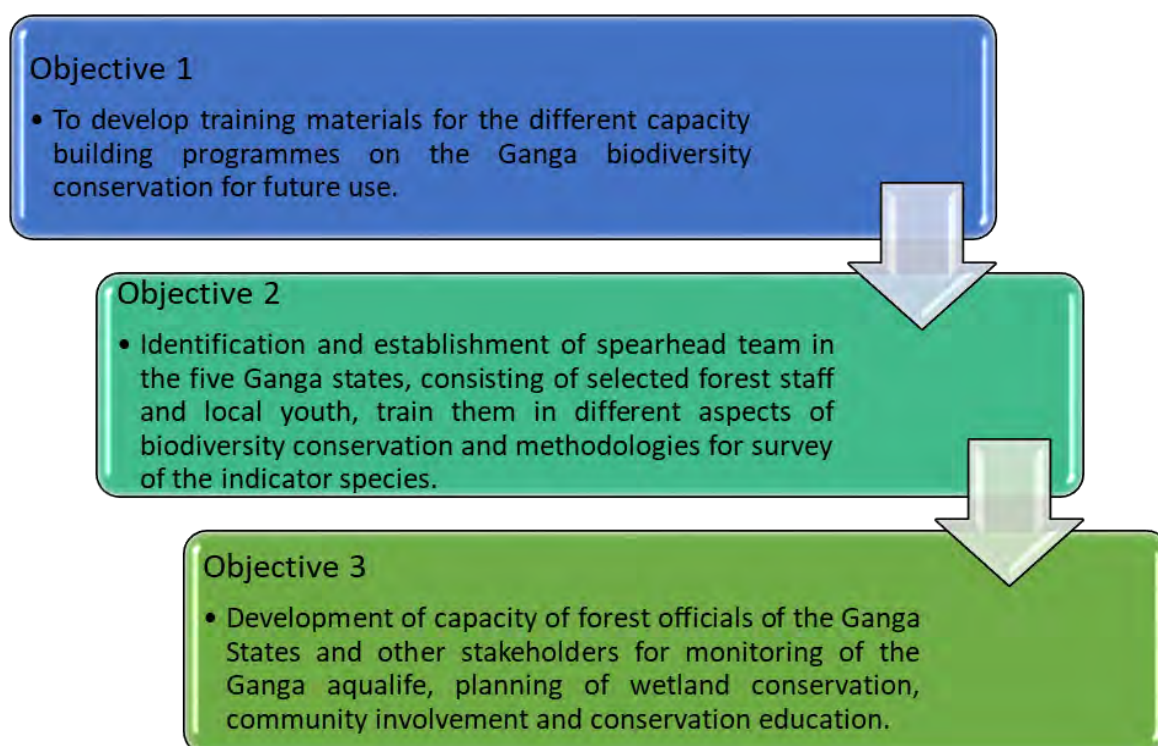


Figure 3: Objectives of capacity building programmes

1.7 Training sites

The training programmes were spread across the entire stretch of the Ganga River involving different stakeholders. The programmes have been implemented at 120 sites in five Ganga

River States viz. Uttarakhand, Uttar Pradesh, Bihar, Jharkhand and West Bengal respectively (Figure 4).

The Ganga River

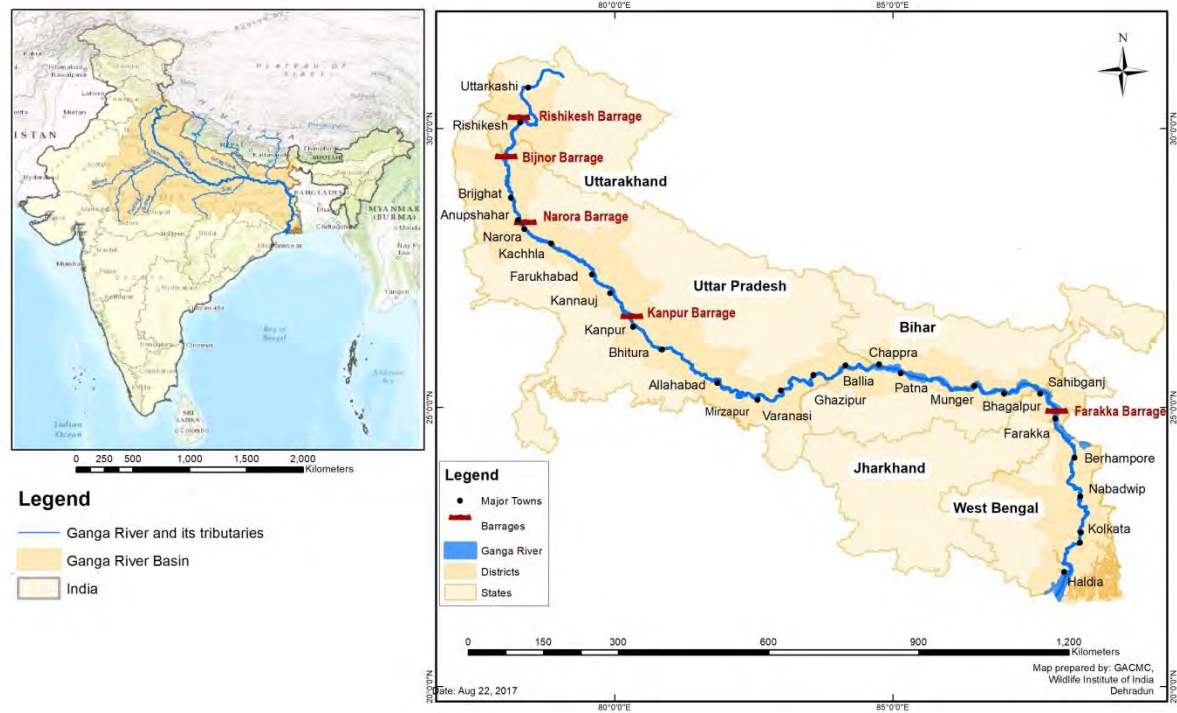


Figure 4: Training programmes implemented at five Ganga states

CHAPTER 2 METHODOLOGY

2.1 Training techniques

As the training programmes have to be implemented in five Ganga states, for an array of stakeholders, it is important to recognize that every participant has different learning capacity and therefore requires the use of multiple training methods. The capacity building programmes were operated in an andragogy mode and competency based training methods to ensure development of adequate competence among the participants. Competency based training emphasizes what a person can do in the organization after completion of the training or through learning that has taken place in any institution or elsewhere. Competency based training operates on the concept that people can learn transferable skills and that most training is transferable. Competency based training is a kind of training that is designed to allow a learner to demonstrate participants and feel motivated enough to ask questions and feel confident that their inputs are incorporated in the agenda (Malcolm et al., 2005).

2.2 Training model

The capacity building process is being tested and based on Kirkpatrick Model, which has four pillars of training approach which are (1) Analysis (2) Learning (3) Behaviour (4) Result (Kirkpatrick, 1996). In the first phase, the participant's initial understanding & effectiveness of training materials, resource persons, etc. of the programme were analysed (Figure 5). However, the level of knowledge & skills absorbed by the participants was assessed in the second phase. Subsequently, in the third phase, the influence of trainings on behaviour and attitude of the participants was determined and evaluated. In the last phase, the overall impact of training programmes were analysed and documented.

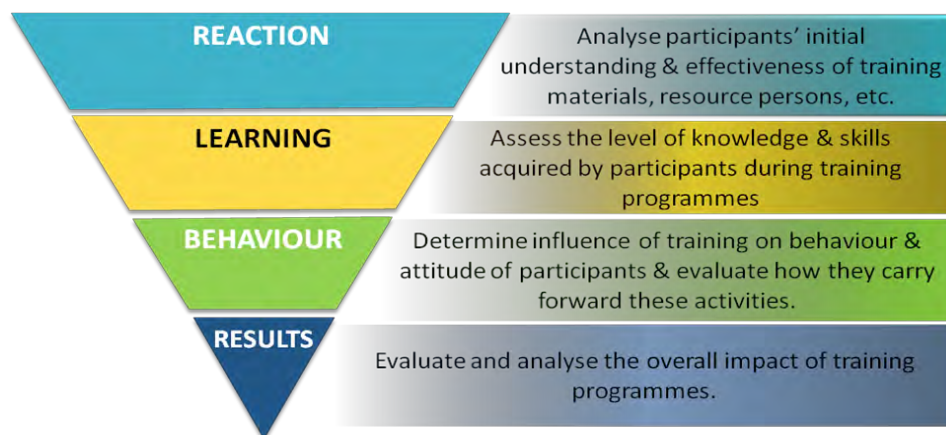


Figure 5: Kirkpatrick Model for training approach

2.3 Training monitoring and evaluation

Training and development activities were evaluated before, during and after the training programmes. A comparison was done between pre and post impact assessment to evaluate how much the training programmes contributed to the multiple stakeholder's groups. Pre and post training questionnaire was framed in three languages English, Hindi and Bangla. The evaluation process assessed the participants levels of awareness, knowledge, attitude, skill and behaviour were compared before and after the training programmes. Monitoring and evaluation was done based on the Kirkpatrick's model using a random follow up E-questionnaire survey to examine the 'after' Training efficacy and effectiveness amongst the participants from 2017 to 2019 (Figure 6). A total of 158 respondents was evaluated and analysed through E-questionnaire assessment.

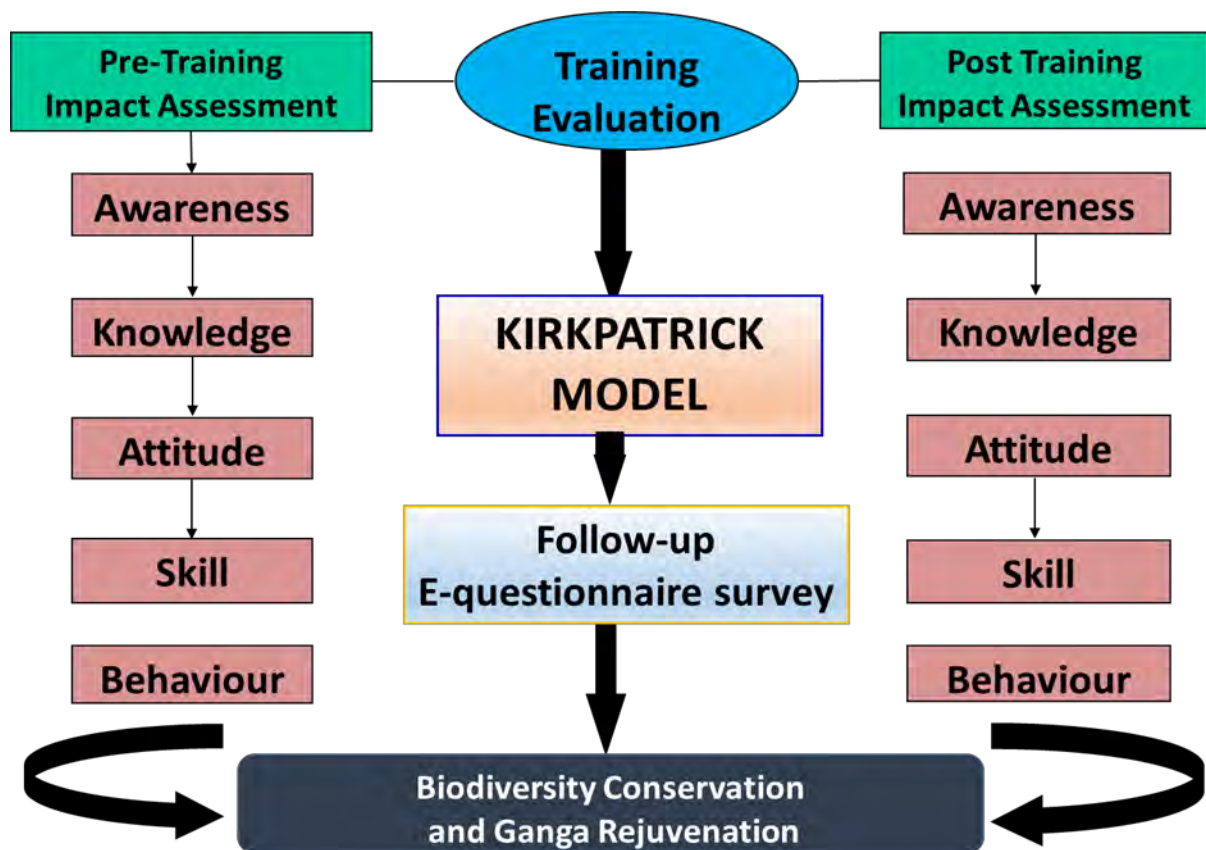
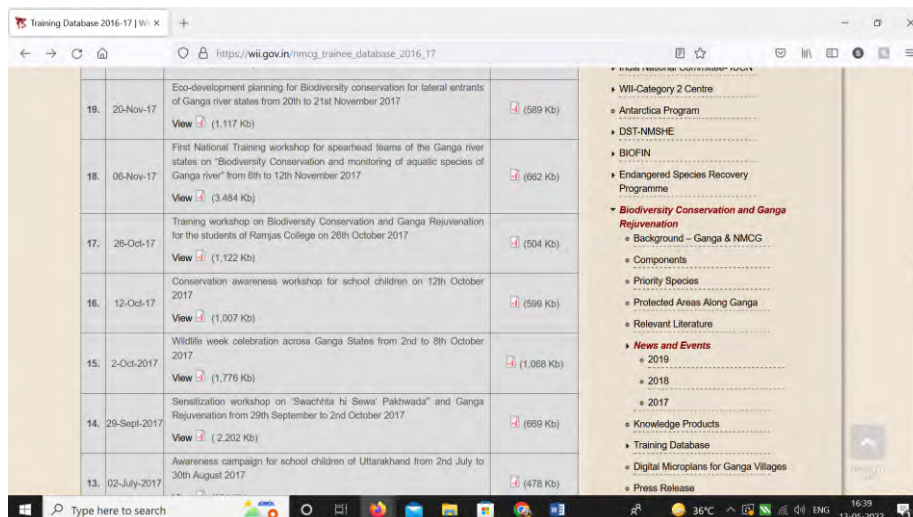
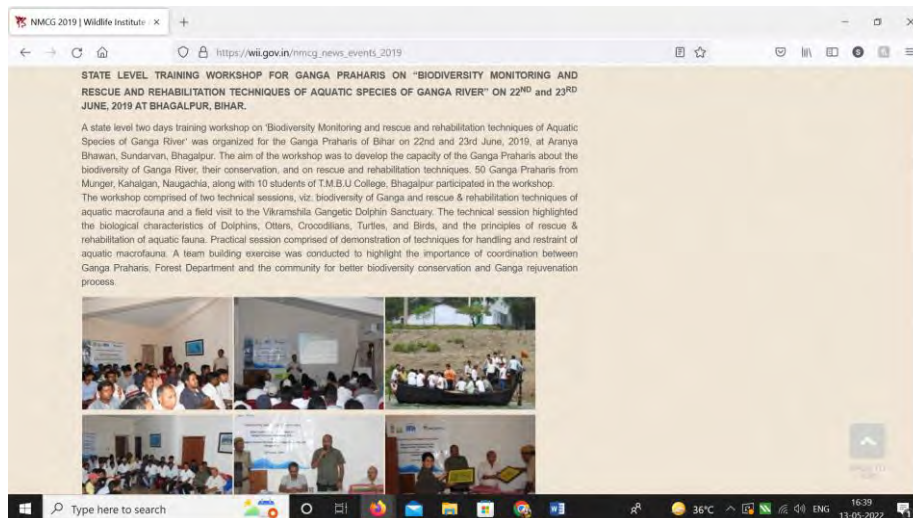


Figure 6: Monitoring and Evaluation of Training Programmes

2.4 Statistics and Documentation

The quantitative questionnaires data were analysed using standard descriptive statistics. The qualitative data elicited from the open-ended questions and were analysed using a basic content analysis approach, with similar responses grouped together in summary categories. KnightLab software was used to trace and map the success stories of stakeholders with an aim to propagate such activities either individually or at the institutional level. A training database at the WII-NMCG webpage has been developed as a single point source to disseminate training information to a wider audience.



CHAPTER 3 CAPACITY BUILDING PROCESS

3.1 Capacity building framework

To achieve the training objectives and goals, a comprehensive capacity building framework has been designed (Figure 7). The first step was the identification of key stakeholders along the Ganga States. Then, the need assessment was carried out to identify the training requirements of each target groups. Establishment of the spearhead teams was conducted through a comprehensive process of consultations, communications and meetings with the State Forest Departments of the Ganga states. The trainings were intended to organize for the established spearhead team so that the team would become the trainer of the trainer in future.

Further, the training was prioritized in four main diverse modules – Wetland and River Conservation, Biodiversity Monitoring, Community Involvement and Conservation Education. Before the implementation of training programmes, the first and most important step was pre-training assessment, where the existing knowledge and awareness of participants about the Ganga Biodiversity was assessed. After that, planning of diverse training programmes was done which includes hands on training, fields visit, simulated exercises, classroom lectures and presentations, distribution of training materials, screening of videos and short films on Ganga biodiversity theme etc. Further, post-training impact assessment was done to examine the attitudinal shift and motivation level after the completion of training programmes. Finally, the information was disseminated through mobilization by the trained and sensitized participants. At the end, the trained cadre is expected to carry forward the conservation activities in their respective states.

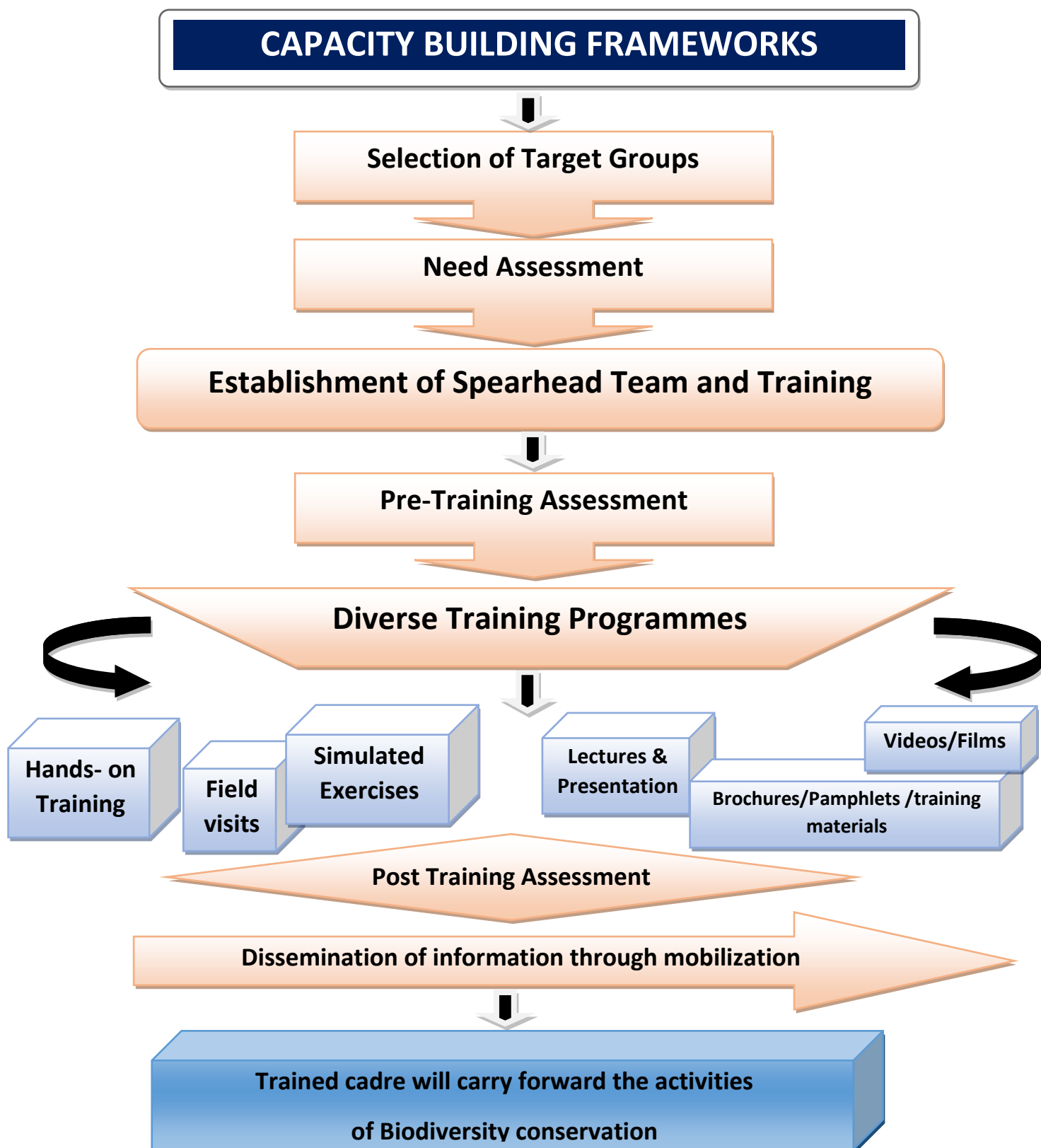


Figure 7: Capacity building Framework

3.2 Target groups

Biodiversity conservation approaches required development of human capacities for different stakeholders of the Ganga River. To continue the project objectives, the training of different target groups was carried out in different aspects of biodiversity conservation. For the purpose of capacity building programmes, the stakeholders have been categorized into three levels *viz.* policy, implementation and execution levels professionals (Figure 8). The capacity building programmes were more or less common for various levels of target groups. However, the emphasis and objective of the programmes was different as per the requirement of each stakeholder groups (Figure 9).

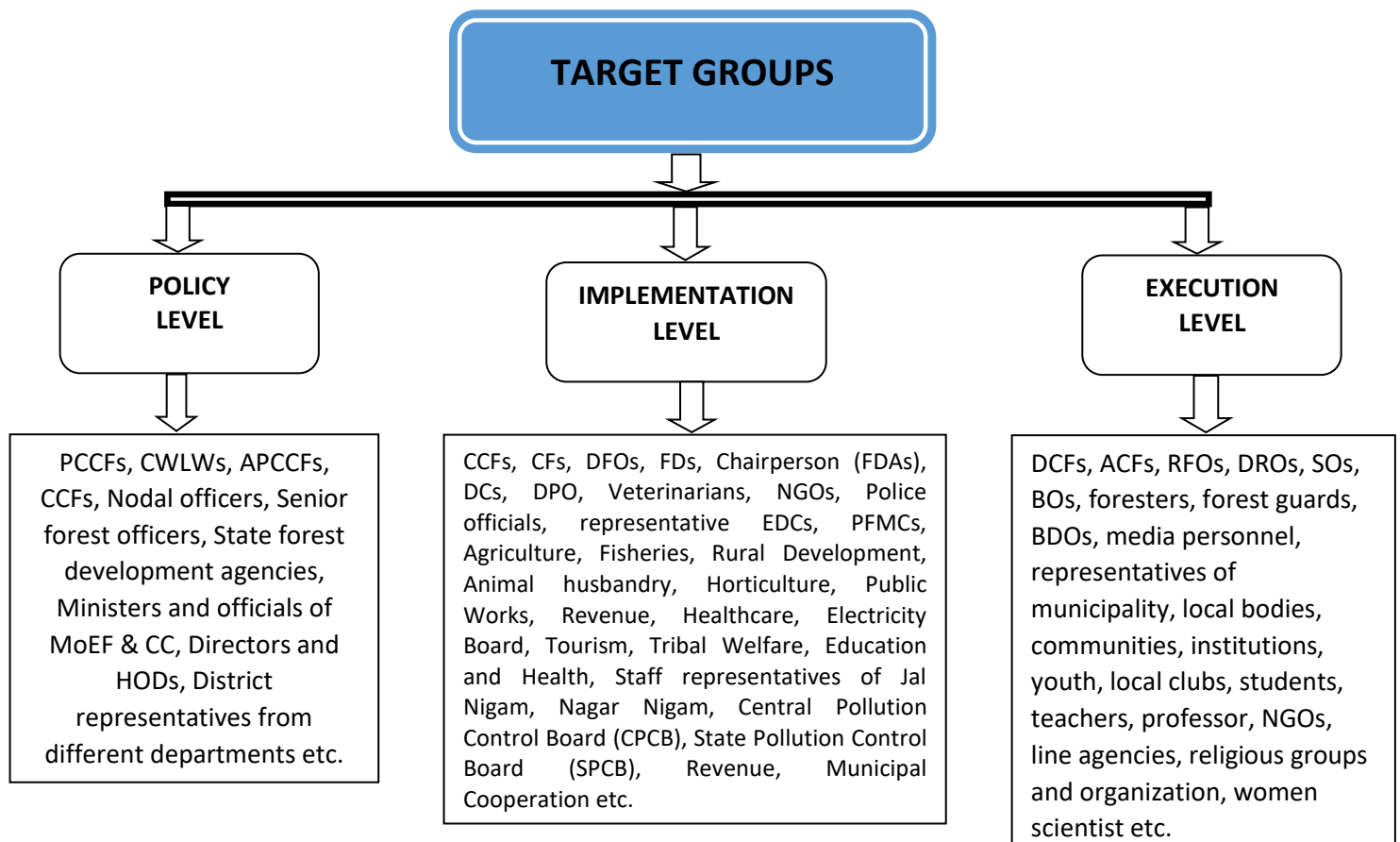


Figure 8: Target groups

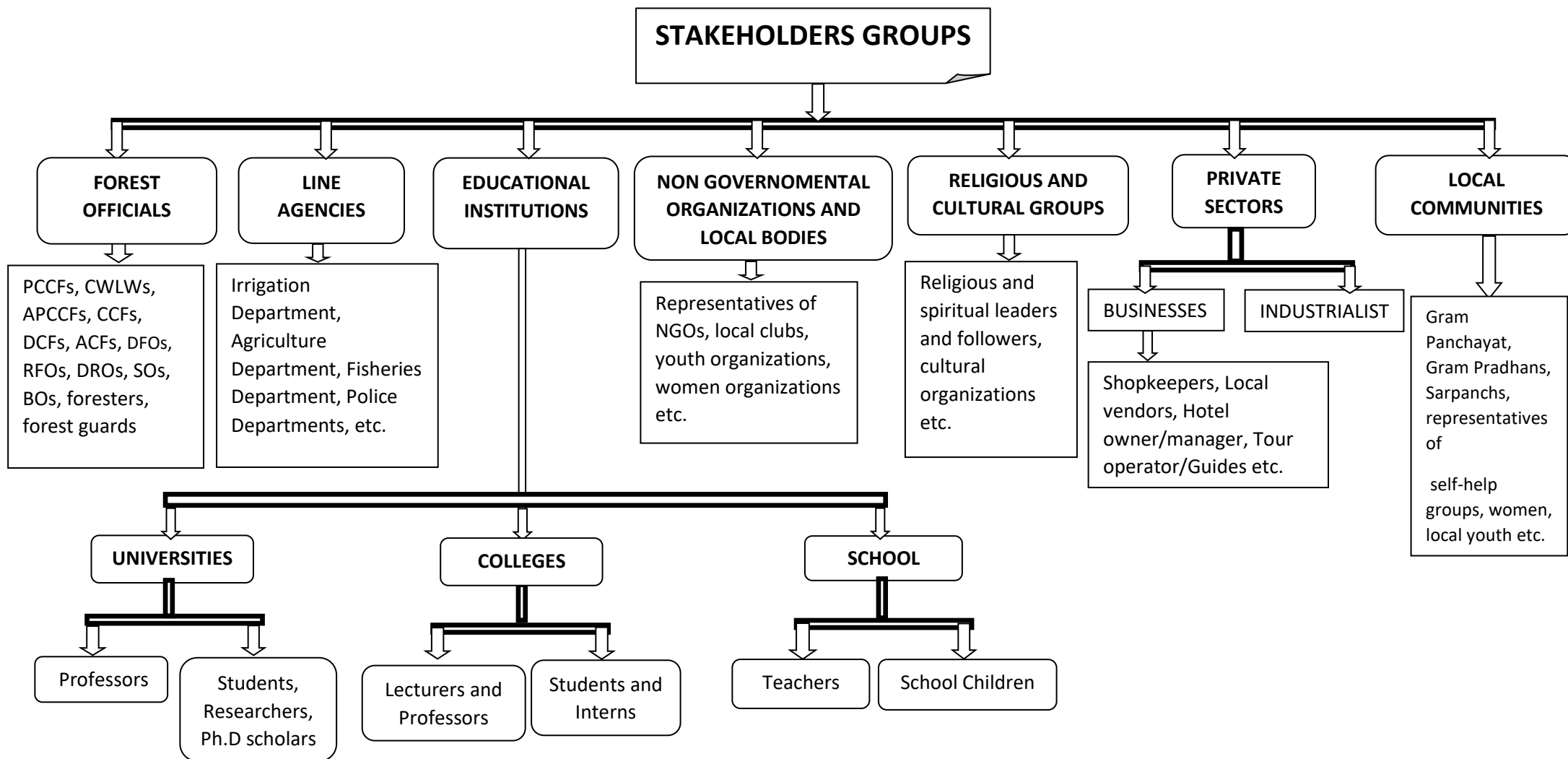


Figure 9: Stakeholder groups

3.2.1 Policy level professionals

Policy level professionals make decisions that can bring significant changes at ground level. Biodiversity conservation and monitoring of aquatic species of the Ganga River and its resources demands a union of scientific research and policy making, to meet the desired challenges and goals. Pro-active involvement and better contribution of policy level professionals can be ensured through skill development and enhancement. Introducing them to the relevant information, methodologies and approaches for aquatic species management can aid in informed decision making. In the face of rapid urbanization and development around the Ganga River, it becomes imperative to facilitate the synergy between conservation with development through relevant policies. Hence, it is of utmost importance to sensitize the policy makers and decision makers on significance of biodiversity conservation of Ganga River for human well-being at all spatial levels. It is also crucial to inform them about different ecological, socio-economic, cultural issues for mainstreaming biodiversity conservation of Ganga rejuvenation in policy and practice.

3.2.2 Implementation level professionals

Implementation level professionals are vital elements in ensuring effective implementation of policies, rules and regulations, as they act as propellers. Since, they act like a bridge between the policy-makers and the executors i.e. the frontline staff, it is important that they are also made aware of various challenges and opportunities in biodiversity conservation of the Ganga River. More importantly, these professionals ensure development by delivering programmes and services focusing on respective agenda. It is crucial to acquaint them with relevant conservation practices and issues on monitoring and management approaches for the river and its species restoration.

3.2.3 Execution level professionals

The execution level professionals are the most important of all the three levels as they have the responsibilities to execute the programmes on ground and interact with public, local communities and other stakeholders. They are the main players for ground level execution of policies and plans. Therefore, rigorous training and capacity building programmes are very important for their skill development in basic data collection, biodiversity monitoring and dealing with key stakeholders. Since many of them are not very well educated, they require frequent trainings and workshops to constantly keep themselves abreast with current techniques to overcome challenges experienced in the field. Hence, there is a need

to create tailor made training programmes for the frontline staff and field level PA managers in agreement with the level of education and hierarchy in administration.

3.3 Training Needs

When initiating a biodiversity conservation and Ganga rejuvenation programme it can be assumed that there will be a considerable gap between current capacity and skills, and the level that is actually required or desired. Assessing this gap between ‘what is’ and ‘what should be’ is known as a capacity building needs assessment; this will help define the type of training required and who it is required for. A needs assessment was done at the onset of programmes (Box 1). A needs assessment may use a combination of individual questionnaires or more qualitative approaches like brainstorming, focus group discussions or other tools. Needs must be prioritized in consultation and in an open and transparent manner. The situational analysis also involves reviewing the resources available for capacity building. Needs assessment provide an opportunity for participants to seek clarification on issues, identify and fill in gaps in knowledge and understanding of the sequence and scheduling of implementation of activities (Hough, 2006).

The following key questions have been posed in capacity building needs assessment:

BOX 1

Capacity Building Needs Assessment

- Who is the target participant?
- What do we need to know about the target groups and the organizations?
- What do the participants need to train? Identify what type of training is designed for different stakeholder in the Ganga River?
- What do these target participants presently do in their roles?
- What gaps exist between the trainer and the target groups?
- What do they could contribute after obtaining the training programme?

3.4 Training modules

The training programmes were focussed on four various modules such as wetland and river conservation, biodiversity monitoring/ ecological survey, participatory management and conservation education. Based on these training modules, the programmes was designed and implemented for multiple stakeholders (Figure 10).



Figure 10: Modules of capacity building programmes

3.4.1 Wetland and River Conservation

Wetland act as natural filter for water pollutants and trap sediments which may deteriorate the water quality. Wetland has been described as halfway world between terrestrial and aquatic ecosystem. It conducts important phase of Carbon, Nitrogen, Phosphorus and Sulphur cycle. An improved knowledge and better understanding of the characteristics of wetlands and their impacts is necessary to implement effective training programmes at Ganga Basin. Wetlands with their associated river systems supports diverse

and unique habitats with numerous ecological goods and services but are under tremendous stress due to rapid urbanization, industrialization and agricultural intensification, manifested by the shrinkage in their areal extent, and decline in the hydrological, economic and ecological functions they perform (Bassi et al., 2014). The issue of sustainable ecosystem management is providing humanity with one of its greatest challenges and wetlands and their associated rivers are among the most threatened ecosystems worldwide (Brinson and Malvarez 2002, Malmqvist and Rundle 2002, Tockner and Stanford 2002). The problem is particularly complex for freshwater systems, where humans and natural systems are inherently linked. Increasing water demands for an expanding human population competes with protecting aquatic ecosystems and ecological services (Mea 2005). As a consequence, restoration of rivers and wetlands has emerged as a worldwide phenomenon as well as booming enterprises (Kondolf 1995, Brookes and Shields 1996, Nienhuis and Leuven 2001, Shields et al., 2003, Bernhardt et al., 2005, Palmer et al., 2005). Habitat fragmentation, as wetlands are drained or hydrologically altered, may result in changes in species composition as wetlands species are replaced by upland species; loss of large, wide-ranging species; loss of genetic integrity (Harris 1988, Fleming et al. 1994). Imparting training on wetland and River ecology forms a core area for Biodiversity Conservation and Ganga Rejuvenation.

3.4.2 Ecological Survey/ Biodiversity Monitoring

Ecological assessment forms one of the basic requirements to evaluate the distribution and population status of flora and fauna. It is a measurement of biological diversity to determine its status and trend. The ecological survey system is a minimum starting point and helps in understating the causes for change in status and trends; biodiversity monitoring also covers measurements of environmental pressures (Nordeco and Denr, 2001). This is significant in understanding the complexity of biodiversity, incomplete taxonomic knowledge, and high cost of total biodiversity assessments, monitoring relies on indicators (Nordeco and Denr, 2001). The biodiversity indicators being monitored may be qualitative (e.g. presence or absence of an indicator species) or quantitative (abundance or population density of a species, distribution area of a habitat, number of typical species in the habitat, etc.). Monitoring of water quality is an important step for the evaluation of heavy metals, pollutants, changes in the water quality that leads to loss of natural habitat,

and local extinction of species. Methods such as vegetation quantification like quadrates and circular plots followed by line transects and for studying fauna, point count, mark recapture and line transects has been developed for ecological survey. Training, teaching and disseminating information on this biodiversity monitoring helps different target groups to understand the conservation significance, and cause of decline in the biodiversity and its habitat. Further, this will help in conservation of several endangered taxa found in the Ganga River.

3.4.3 Participatory Management

Involving local communities and public will create general awareness regarding the changing scenarios of environmental problems emerging in different kind of ecosystems. The simple way of achieving this is participatory management. It is the practice of empowering members of a group, such as citizens of a community, to participate in organizational decision making. Environmental problems are typically complex, uncertain, multi-scale and demands transparent decision-making that is flexible as per the changing circumstances, and embraces a diversity of knowledge and values. To achieve this, stakeholder participation is increasingly being sought and embedded into environmental decision-making processes, from local to international scales (Stringer et al., 2007). Widespread acceptance and promotion of participation has partly been driven by increasing public scepticism about science, increasing knowledge and interest in environmental decisions (Irwin's, 1995 "citizen science") and ongoing policy trends that emphasise sustainable development and partnership working (Younge and Fowkes, 2003, Richards et al., 2004). Also including the public in environmental monitoring, research and decision-making has been an area of growing research among conservation biologists (Reed, 2008) and has implications for understanding the nature of many current pressing contemporary social and ecological issues (Crain et al., 2014). The interest in this area has given rise to several paradigms related to public participation in decision-making and more inclusive forms of conservation, including citizen science (Bonney et al., 2009) and participatory modelling (Voinov and Bousquet, 2010). The importance of participatory management highlighted the needs and coordination between different stakeholders and the involvement of communities for better biodiversity conservation and Ganga rejuvenation process.

3.4.4 Conservation Education

Spreading awareness and knowledge about the recent changes in environment and ecosystems at grassroot level will help in saving the threatened ecosystems facing problems due to both environmental and anthropogenic pressures. Conservation awareness covers important issues of environment through subjects like conservation education which can help in involving multiple stakeholders. Conservation education is the process of influencing people's attitudes, emotions, knowledge, and behaviours about wildlife and its habitats. This is done through the efforts of skilled educators and interpreters, who use a variety of techniques, methods, and assessments to reconnect people with the natural world (Schultz, 2011, Gusset and Lowry, 2014). This helps people of all ages understand and appreciate natural resources and learn how to conserve those resources for future generations. Through conservation education, people develop the critical thinking skills they need to understand the complexities of ecological problems. It also encourages people to act on their own to conserve natural resources and use them in a responsible manner by making informed resource decisions. Through structured educational experiences and activities targeted to varying age groups and populations, conservation education enables people to realize the significance of conservation of biodiversity of the Ganga River, how the decline in the habitat and ecosystems affecting each other and how resources can be used wisely.



CHAPTER 4 RESULT

4.1 Capacity building in action

About 16 training workshop for different target groups were organized in Ganga basin for field-testing and need assessment (Table 1). After finalization, capacity building programmes were delivered according to the constitution of the target groups divided at three levels and delivered in four main modules. Based on these four modules, diverse training programmes were organized at the five Ganga states from May 2017 onwards.

Table 1: Training needs assessment workshops with different target groups for designing of training materials

S. No	Target Groups	Training programmes	Number of Participants
1	WII-NMCG project team	1	25
2	Graduate, Post Graduate and Professors	6	286
3	Frontline forest officials	4	213
4	Veterinarians and Line agencies	1	56
5	Local People	1	50
6	School Students and Teachers	3	485
Total		16	1115

4.1.1 Generation of training materials

To develop the training materials, literature reviews were carried out and through 16 training need assessment workshops, various information products were generated based on the requirement of different stakeholders. The training curriculum and materials has been developed after intensive literature review, consultation with experts and implementation of diverse training programmes organized at five Ganga States (Annexure I). The training curriculum has been developed and which provide information about the syllabus and key approaches for developing and implementation of training programmes for multiple stakeholders in Biodiversity Conservation of Ganga. This curriculum ensures a science-based aquatic species restoration plan for Ganga, by involving multiple stakeholders and also provide an insight to the stakeholders to comprehend its significance from the ecosystem perspective.

The monitoring field guide was especially developed to train the frontline officials and youth in the techniques of biodiversity monitoring and data collection methods. Two brochures have been developed based on planning and management of capacity building programmes.

The first brochure titled “Training plan for stakeholders” provides complete information regarding formulation and implementation of training programmes. The second brochure namely “Training database for capacity building programmes” provides a comprehensive process of developing a retrievable database and its application.

Several awareness materials had been developed for school children viz. a booklet focussed on water conservation approaches for school children focusing on how to empower younger generation to save and conserve water. Furthermore, the “Ganga Biodiversity Calendar” was developed for *Bal Ganga Praharis* was to inculcate awareness in school children about the conservation of biodiversity of Ganga River through celebration of special events and days annually. Several awareness posters and pamphlets were also printed on the themes of conservation and creating awareness of Ganga Biodiversity.

4.2 Establishment of spearhead team

Establishment of spearhead team is one of the vital goals under the project “Biodiversity Conservation and Ganga Rejuvenation”. The spearhead team consisting of 7-21 members, representing the Forest department has been established through a comprehensive process of consultations, communications and meetings with the forest departments of five Ganga states. The composition of spearhead team has one leader, in the post of Chief Conservator of Forest or Divisional Forest Officer, 2-3 Range Officers, 3-4 Deputy Range Officers, 3-4 Foresters, 3-4 Forest Guards (Figure 11). The goal of establishment of Spearhead team in Ganga states was to create an in house capacity in the State Forest Departments for biodiversity monitoring, conservation and management of the riverine species along the Ganga River. The objective was to (i) train the spearhead team members for each of the Ganga River states in the areas of aquatic biodiversity monitoring for practical and action-oriented implementation of science-based research carried out by the WII (ii) create a pool of trainers within the state who would be the future trainers for other frontline staff for successful biodiversity monitoring and restoration of the Ganga River and to carry forward the activities after obtaining the training programmes.

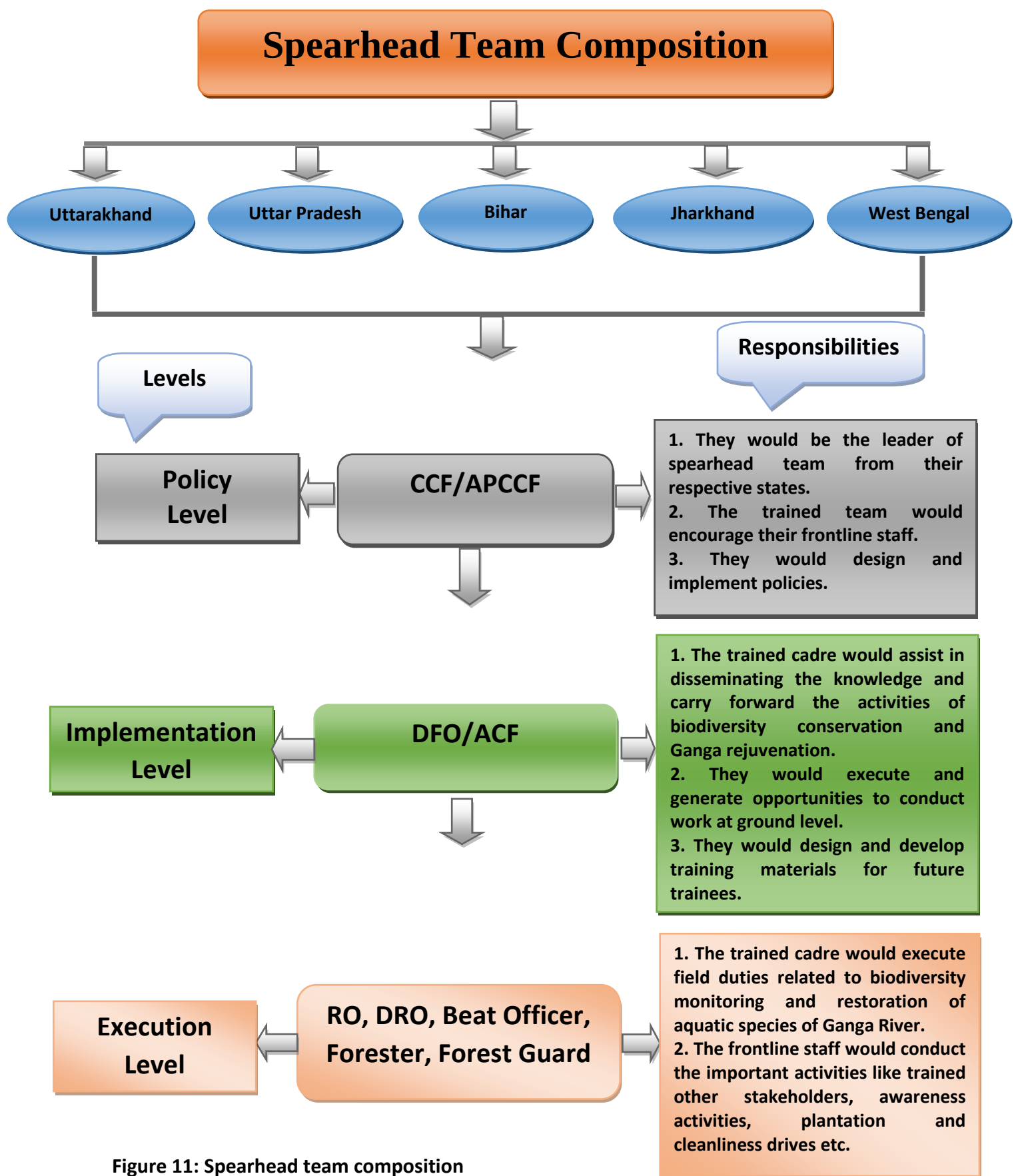


Figure 11: Spearhead team composition

4.2.1 Training of spearhead teams

Once, the spearhead team was established comprising of forest officials from the five Ganga states. National level training programmes were organised for spearhead team on different aspects of aquatic biodiversity monitoring, Wetland and River Conservation, Participatory Management and Conservation Education. A total of 36 forest officials in 2017 and 37 in 2019 has been trained so far (figure 12).

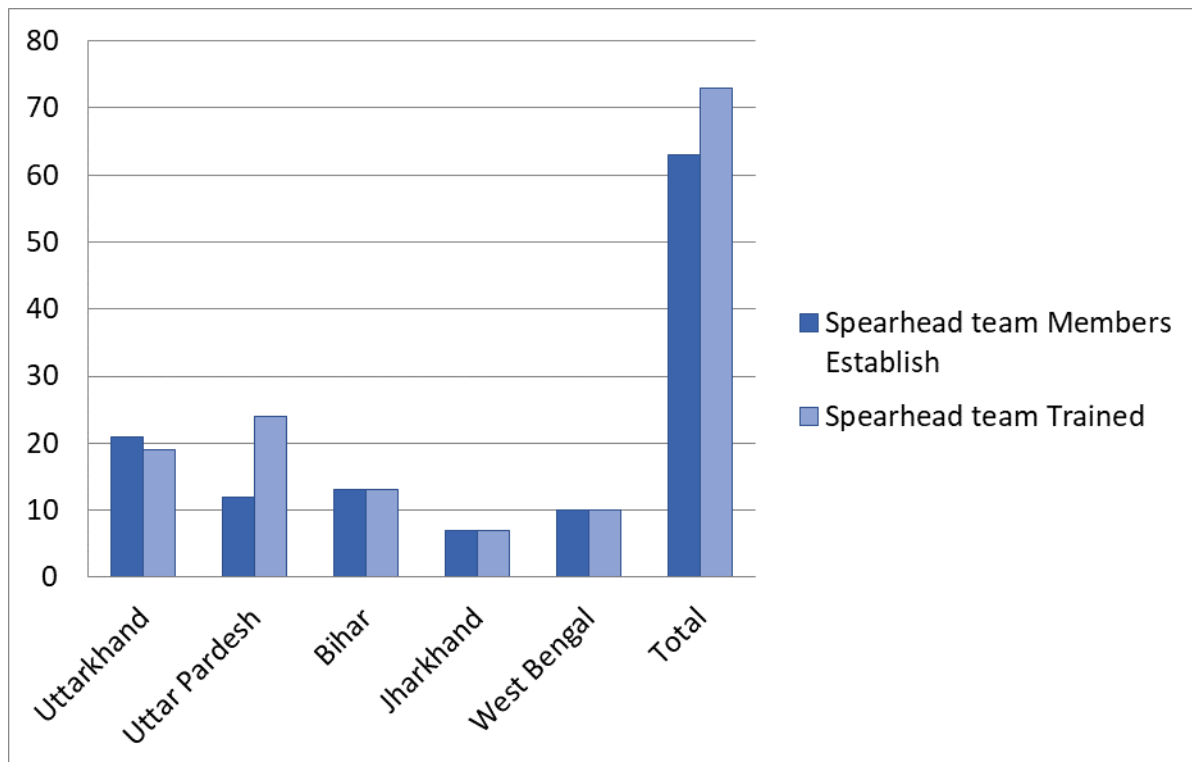


Figure 12: Establishment and training of spearhead team in five Ganga states



.2.2 Training of volunteers using expertise of spearhead teams

A pool of 307 youth has been trained for methodology of baseline survey of indicator species through spearhead teams over a period of three years (Figure 13). The trained individuals have been deployed at field stations assisting various survey teams, forest departments and were used for piloting the training programmes at the Ganga states. Trained and interested individuals are being attached to the research and training institutes (especially those working in river conservation) of their choice as per their qualification.

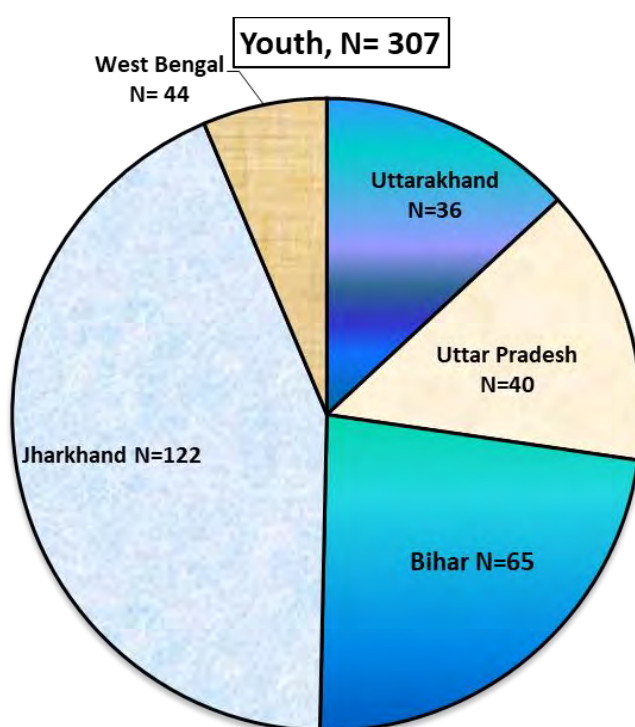


Figure 13: Total number of youth trained using expertise of spearhead teams



4.3 Training of other stakeholders

A total of 19 trainings and 120 sensitization programmes have been implemented during 2017 to 2019 (Figure 14). So far, 736 participants were trained (Figure 15) and 12219 were sensitized (Table 2) in different stakeholders.

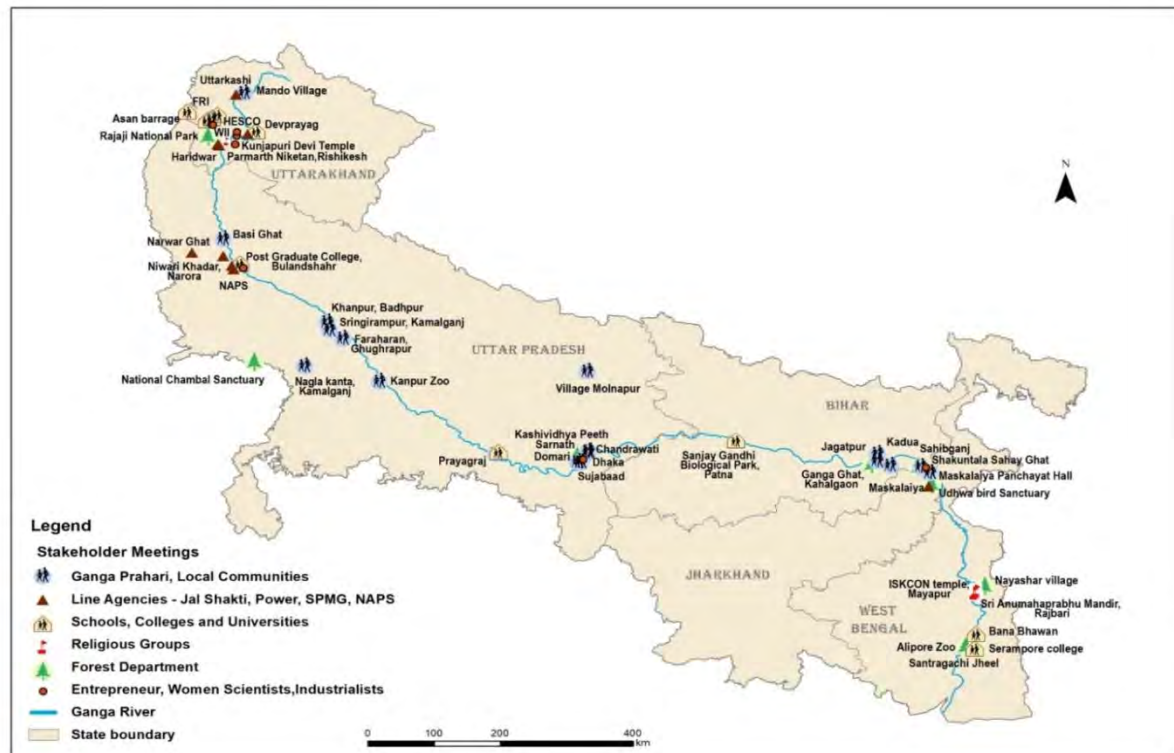


Figure 14: Training programmes implemented at the five Ganga States during 2017-2019

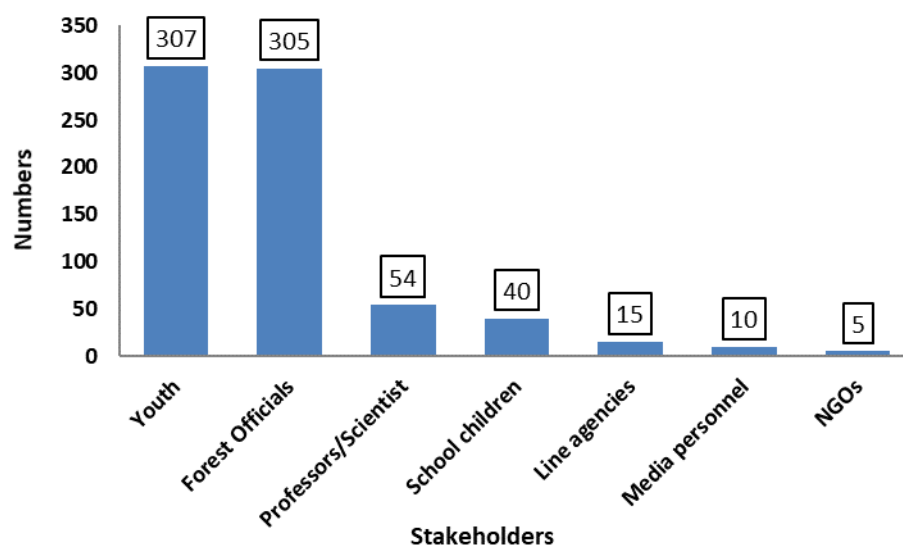


Figure 15: Total number of stakeholder trained at the five Ganga States

Table 2: Total number of stakeholder sensitised at the five Ganga States

States	Forest official	Veterinarian	SPMG official	Professor/Teacher	College Student	Communities	Religious group	Ganga Praharis	Media personnel	School children	NGOs	Line agencies	Entrepreneur
Uttarakhand	79	0	13	154	288	96	5	53	6	5053	16	140	34
Uttar Pradesh	117	40	1	149	74	1053	0	174	14	1954	3	8	0
Bihar	3	0	1	70	31	86	0	81	1	1201	0	1	0
Jharkhand	5	0	1	2	0	188	0	4	0	528	0	0	0
West Bengal	13	0	2	22	140	29	56	40	1	172	22	0	0
Total	217	40	18	397	533	1452	61	352	22	8908	41	149	34

The important goal of capacity building programmes of multiple stakeholders was to provide equal importance and training to each of the multiple stakeholders groups. However, it was found that there are variations in total number of training input given to different stakeholders. Therefore, varying levels in the number of input given have also reflected in the output activities of each of these stakeholders. For instance, in Uttarakhand, the highest number of trained and sensitized stakeholders were college students followed by professors and scientist, hence, the outputs were more related to carrying out sensitization programmes and awareness campaign (Figure 16). Subsequently, the highest number of local people were sensitized and trained in the Uttar Pradesh, the output was more related to plantation and cleanliness drive (Figure 17). Similar situation was observed in Bihar and Jharkhand which shows local communities and *Ganga Praharis* were the highest trained stakeholders (Figure 18 and Figure 19). At Jharkhand, we found that the forest officials and teachers were two different stakeholders but they coordinated as a team to sensitize other target groups such as media personnel, representatives from NGOs and school children. In West Bengal, the religious and spiritual organization was an important stakeholder since lots of ritualistic customs occurred at the Ghats. Hence, sensitizing this target group was also an important task for restoration of integrity of the Ganga River (Figure 20).

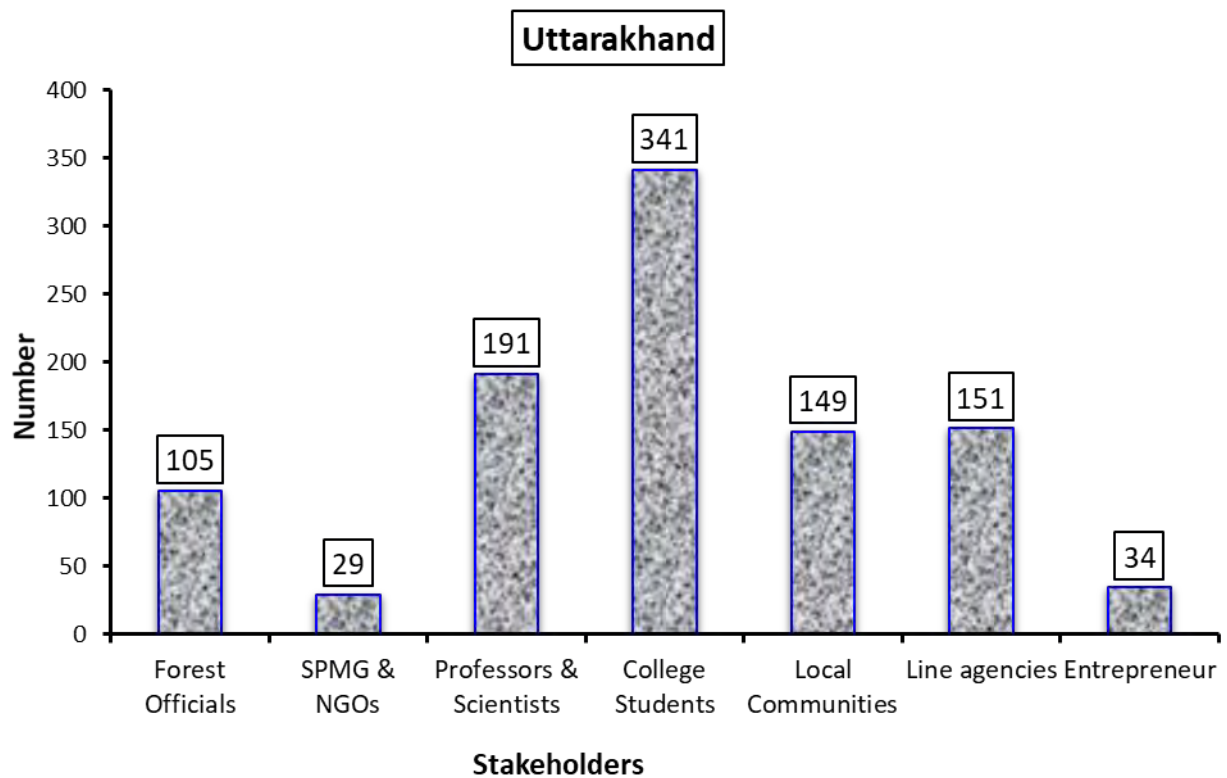


Figure 16: Trained and sensitized stakeholders in Uttarakhand

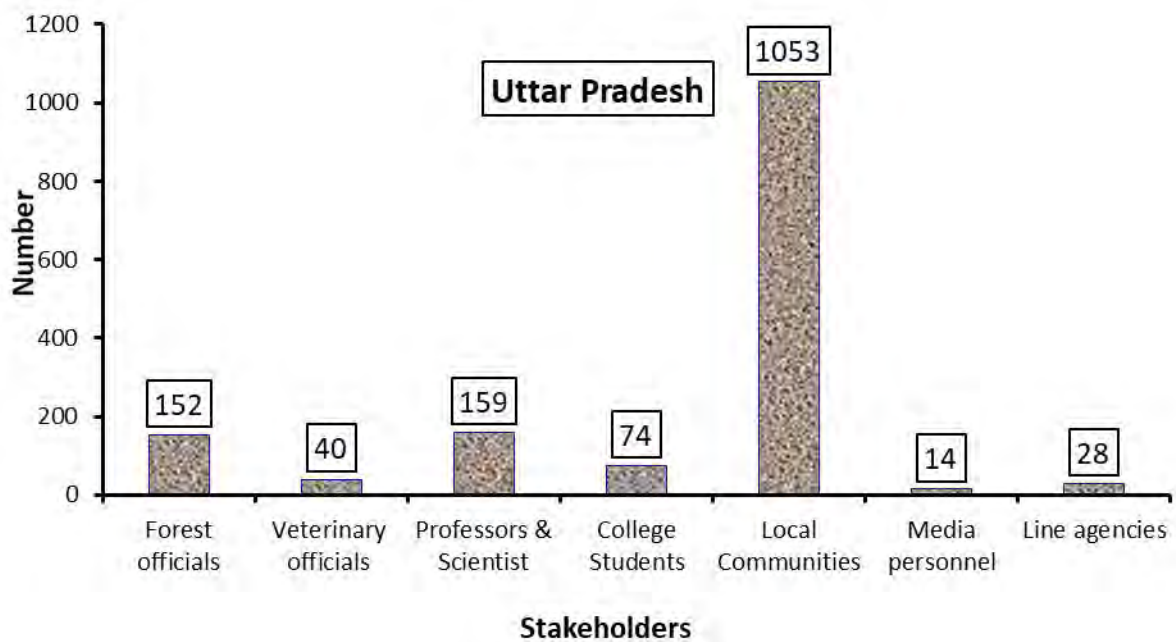


Figure 17: Trained and sensitized stakeholders in Uttar Pradesh

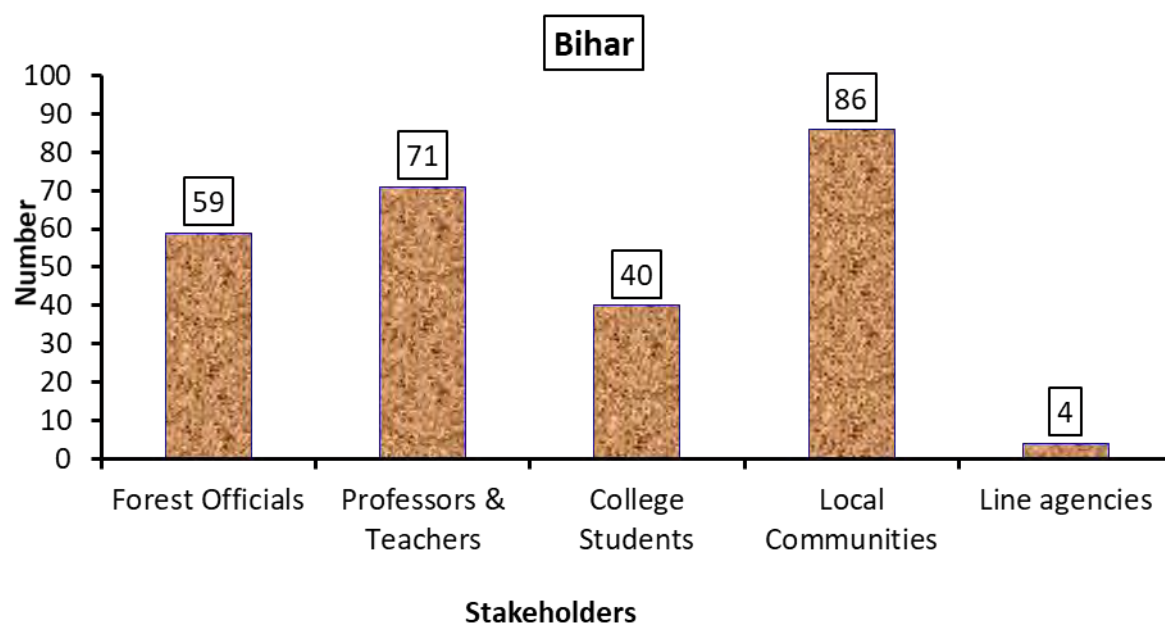


Figure 18: Trained and sensitized stakeholders in Bihar

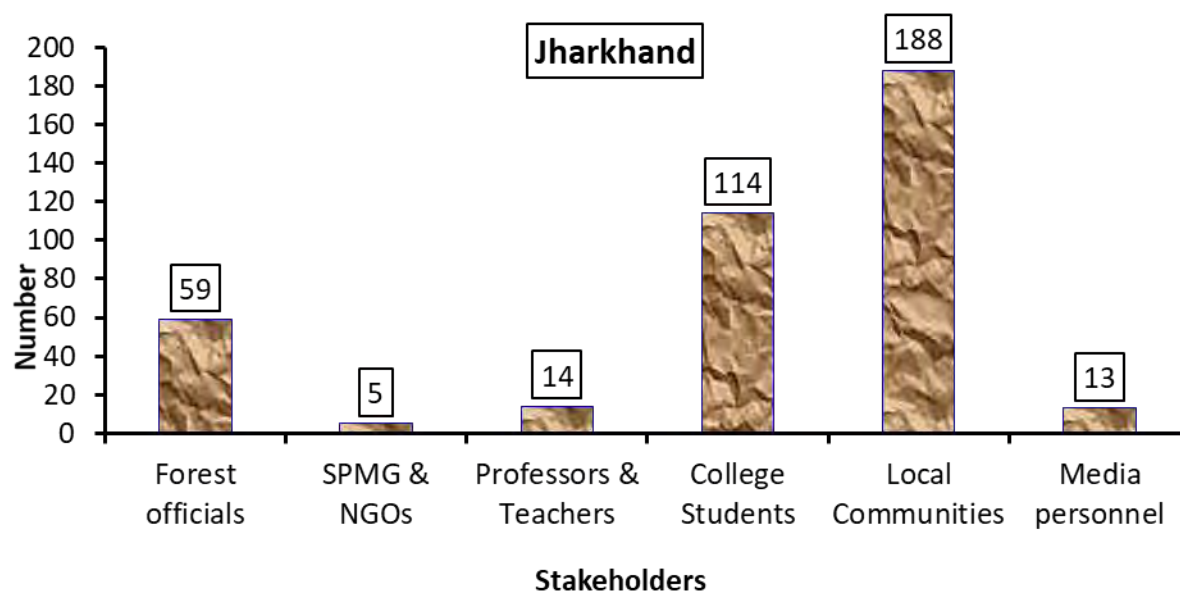


Figure 19: Trained and sensitized stakeholders in Jharkhand

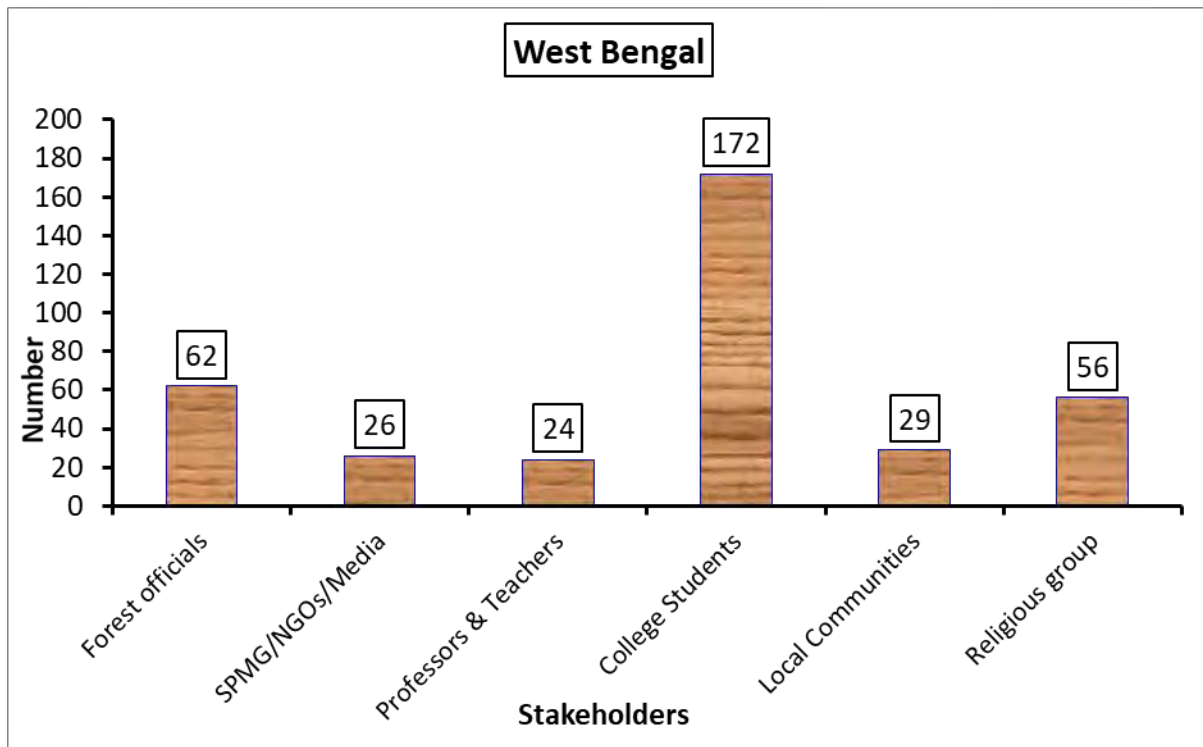


Figure 20: Trained and sensitized stakeholders in West Bengal

4.4 Certification events

Completion of a training course fully in the assigned capacity building programme has been an achievement for the participants. Prior to the certification event, WII-NMCG training team are assigned, following a rigorous selection and training process, whom they mentor through the process. The WII-NMCG training team assessed the competence of professionals who underwent the training programmes and their suitability for certification. The final decision on whether to certify the participants, was based on their skilled and abilities to carry forward the activities and effectively contribute to the restoration and conservation of the biodiversity of the Ganga River.



CHAPTER 5 **BAL GANGA PRAHARI PROGRAMME**

Bal Ganga Prahari is an extension of the *Ganga Prahari* programme, created by the Wildlife Institute of India, under the National Mission for Clean Ganga funded project, “Biodiversity Conservation and Ganga Rejuvenation”. Through this programme, we aim to mobilize school children on issues related to the biodiversity conservation of the Ganga River, as young minds are easier to train and mould.

In the words of John F. Kennedy “Children are the living messages we send to a time we will not see.”

School children from the Ganga states were divided into three categories viz. junior (classes 6-7); middle (classes 8-10) and senior (11-12) (Figure 21) who participate in various activities, workshops and sensitization programmes, related to the biodiversity conservation of the Ganga River.

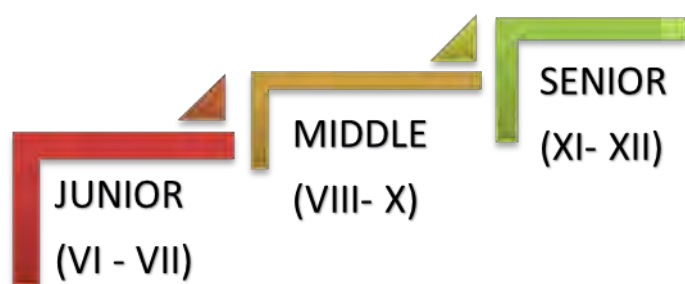


Figure 21: Categories of school children for *Bal Ganga Prahari* programme

5.1 Overview

The vision of this programme is to educate children about the ecological significance and biodiversity conservation issues associated with the Ganga River. The children must be informed about the various biological characteristics of the species including their morphology and distribution along the course of the river. The most important mission for today is to raise aware and responsible children to clean and save the river for future generations. This programme aims at raising such sensitive future citizens who can manage their environment sustainably. The objective of *Bal Ganga Prahari* programme is to make them the “KNIGHTS OF NATURE” and to educate with the various themes related to safeguarding Ganga & preserve its social, religious, economic and ecological characteristics of river.

5.2 Activities of children

Several activities are designed and conducted for school students based on their age groups. These activities are planned in such a manner so that children are engaged, learn important lessons, display their talent and creativity as well as gain the required knowledge about the river and its habitat. The activities vary from age to age keeping in mind the capability and interests of the students. The schools situated along the Ganga River were randomly selected and series of conservation awareness programs and sensitization workshops were carried out with them. Various outreach activities were conducted ranging from awareness rallies, cultural events, Nukkad Natak, slogan and poster making competition, hand and face painting competition etc. (Figure 22). As they pass out from school life, they will dissipate this knowledge and create awareness amongst the masses. The concept is to plant the seed of biodiversity conservation into the children's mind, as they are the foundation of tomorrow.

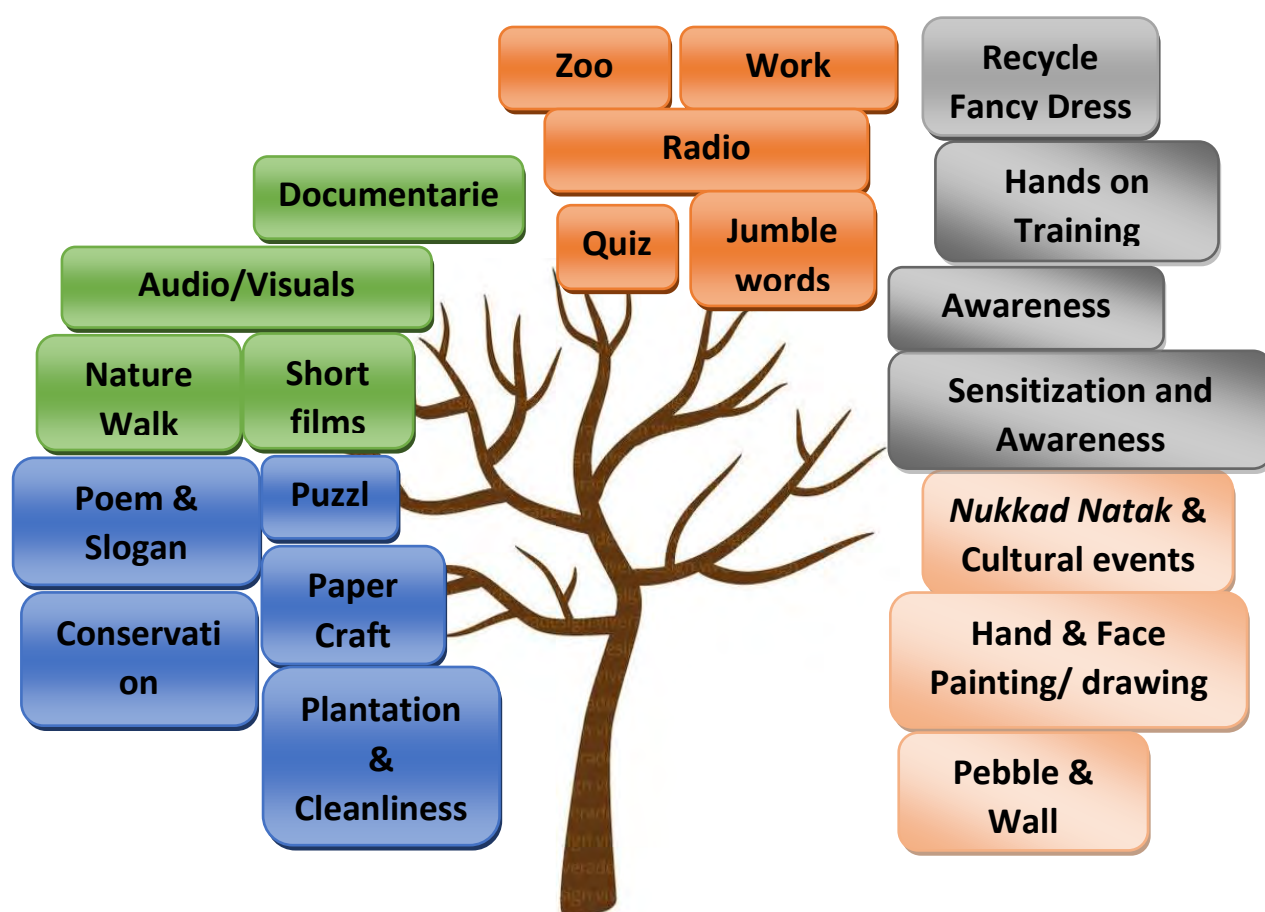


Figure 22: Activities designed for school children based on the age groups

5.3 Output

As a part of this initiative, a total of sixty four (N= 64) schools have been identified along the banks of the Ganga River (Figure 23) under the *Bal Ganga Praharis* programme and more than 8000 school children have been sensitized (Table 3).

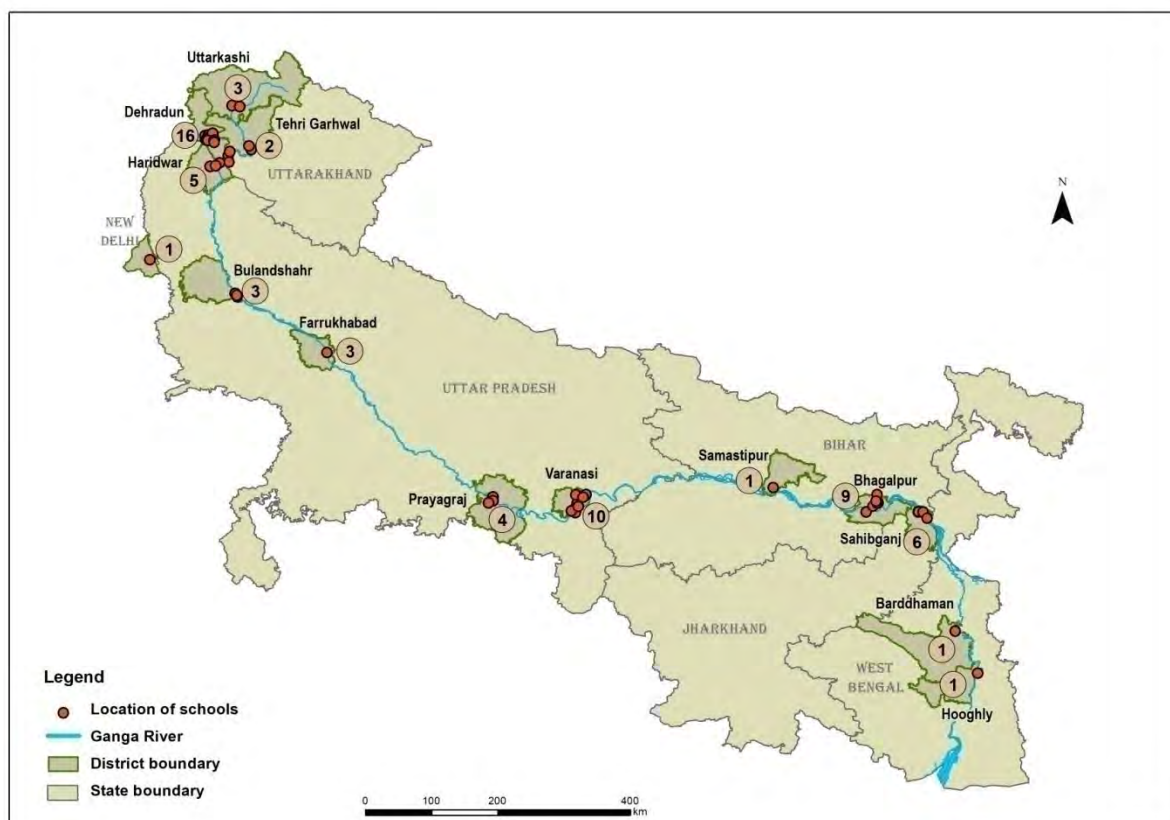


Figure 22: Location of *Bal Ganga Praharis* schools

Table 3: Total number of school children sensitized under the *Bal Ganga Praharis* Programme

<i>Bal Ganga Prahari Programme</i>		
S. No.	State	School Students
1	Uttarakhand	5053
2	Uttar Pradesh	1954
3	Bihar	1201
4	Jharkhand	528
5	West Bengal	172
Total		8908

CHAPTER 6 TRAINING DATA MANAGEMENT

Management of training database is important for networking among trainers, trainees, implementing agencies and citizens. The training database can be accessed by different organizations and line agencies for effective implementation of the action plan and to ensure the long-term sustainability of these efforts. The training database is an online repository that provides comprehensive and compiled information of the training programmes carried out under the project from 2017 to 2019.

6.1 Training database overview

The WII-NMCG training team conducts training workshops and regular sensitization programmes with the identified stakeholders to build their capacities. This training database is a single point source to disseminate training information to a wider audience (Figure 23). The “training database” contains comprehensive information regarding the participants including their contact details, training schedules, training budget, resource persons, GPS locations of the training programmes etc. This ensures transparency and accountability on every front. This database includes all the required information such as compilation of reports, management of training database and website, entry of data etc. of the stakeholders such as the forest officials, professors, teachers, scientists, entrepreneurs, Local communities, *Ganga Praharis*, students, line agencies and youth from the onsite locations to disseminate the motto of Ganga biodiversity conservation.



Figure 23: Training database of multiple stakeholders

6.2 Significance of keeping training records

A reliable database is a key input for capacity building of stakeholders. Development of an appropriate database for each training programme conducted is vital for keeping track of the progress of the efforts, and for maintaining a consistent track of the status of the river biodiversity.

6.3 Training in print media and social forum

To ensure dissemination of the training information to a wider audience, details of the events were given extensive media coverage. Various forms of print media including newspapers, brochures and booklets, radio, and numerous social media platforms like facebook, instagram etc. were utilized.

Quick Links

- Website: <http://www.wii.gov.in/nmcg/Training> database
http://www.wii.gov.in/nmcg/news_events
- Facebook Page: <http://facebook.com/glimpsesofganga>
- Instagram: <http://instagram.com/glimpsesofganga>

देहरादून में गंगा प्रहरियों का आठ दिवसीय प्रशिक्षण हुआ प्रारंभ

गंगा के आसपास के इलाकों में **जल संरक्षण के लिए** काम करेंगे

वैशाली कुमार • हरीद्वार

गंगा प्रहरी यानों गंगा के संरक्षकों के आठ दिवसीय ट्रेनिंग सोमवार से भारतीय वन्य जीव संस्थान, देहरादून में शुरू हो गई है। इस ट्रेनिंग में बिहार सहित पांच राज्यों के बीस प्रहरी भाग ले रहे हैं। वैशाली जिले से जंगल प्रखंड के लोमा बाँव निवासी पंकज कुमार चौधरी और दुर्गेश के लालबाबू सहित भी ट्रेनिंग लेने वालों में शामिल हैं। गंगा प्रहरी स्थानीय समुदाय के स्थिति स्थिति के अनुसार काम कर रहे हैं जो गंगा के आसपास के गाँवों का रहने वाला है। कुछ महीने पहले ही वैशाली जिले की बरौला झील के इलाके में 29 बीघा प्रहरियों का समूह बनाया गया है। गंगा प्रहरी गंगा की जीव विविधता के संरक्षण में सक्रिय रूप से अपनी भूमिका निभाएंगे। साथ ही गंगा के आसपास के इलाकों में जल संरक्षण के लिए भी काम करेंगे।

मालूम हो कि भारतीय वन्य जीव संस्थान, देहरादून के शोधार्थी अजय प्रकाश राय ने कुछ महीने पहले करीब 10 दिनों तक जंगल प्रखंड के लोमा बाँव में कैच कर गंगा प्रहरियों के समूह का गठन किया था। गंगा प्रहरियों के इस समूह ने तब लोमा मुसहरी पोखर, शिवमोहि लोमा गविनस पोखर की साफ-सफाई की थी। साथ ही सूखी हुई बरौला झील में समस्तीपुर के लखनिया से नून नदों का पानी लाने में सक्रिय भूमिका निभाई थी।

गंगा प्रहरियों के समूह के गठन का उद्देश्य : भारतीय स्वच्छ गंगा मिशन के तहत भारतीय वन्य जीव संस्थान, देहरादून गंगा की जीव विविधता के संरक्षण की दिशा में काम कर रहा है। भारतीय वन्य जीव संस्थान ही गंगा के किनारे के पांच राज्य उत्तराखंड, उत्तर प्रदेश, बिहार, झारखंड और पश्चिम बंगाल में



देहरादून के भारतीय वन्यजीव संस्थान में प्रशिक्षण के दौरान गुप्त फोटोग्राफी में विभाजन के सचिव गंगा प्रहरी • जवाहर

गंगा के किनारे के पांच गांवों पर बनेगा एक क्लस्टर

गंगा के किनारे के पांच गांवों पर एक क्लस्टर का निर्माण किया जाएगा। प्रत्येक क्लस्टर का एक लीडर होगा, जिसका चयन भारतीय वन्य जीव संस्थान, देहरादून के द्वारा अन्य गंगा प्रहरियों के परामर्श से किया जाएगा। उसके ऊपर लोक लीडर होगा, जो अपने विकास खंड के सभी वलस्टर को संचालित करेगा। क्लस्टर लीडर के कार्य का मूल्यांकन क्षेत्र में

उसके घराने के आधार पर किया जाएगा। प्रतिमाह इसकी रिपोर्ट राष्ट्रीय स्वच्छ गंगा मिशन और भारतीय वन्यजीव संस्थान को भेजी जाएगी। भारतीय वन्यजीव संस्थान, देहरादून में गंगा प्रहरियों की ट्रेनिंग दे रही सचि वडोला ने यहाँ पर जामरग से बातचीत में कहा कि ट्रेनिंग ले रहे गंगा प्रहरी खस है। उनकी राखी बढ़ाकर 12 सी करनी है। जाएगा, ताकि उसके कार्यक्रमों में गंगा प्रहरियों की प्राथमिकता दे जा सके। इतना ही नहीं, तैयारी यह भी है कि गंगा प्रहरियों की गैजटिंग के अक्सर प्रदान करने के लिए वन विभाग, सिंचाई विभाग, मत्स्य विभाग एवं अन्य अनुसंधान व विकास संगठनों व विभागों से भी जोड़ना जाएगा। उन्हें इस तरह से ट्रेनिंग दे जा रही है कि जीव विविधता का संरक्षण स्वच्छ गंगा के अनुकूल हो। गंगा प्रहरियों के नेतृत्व में गंगा से संबंधित गतिविधियाँ ऐसी होंगी जो स्थानीय लोगों में गंगा

अभी पहले क्षेत्र में पांच राज्यों के 55 गंगा प्रहरियों को ट्रेनिंग दी जा रही है। ये सभी बूझ से प्रशिक्षण प्राप्त कर अपने-अपने इलाके में जाकर गंगा प्रहरियों की टैट करेगे। न केवल गंगा बल्कि उसकी सहायक नदियों की स्वच्छता पर भी फोकस किया जा रहा है। अने वाले कुछ दिनों में देश के 11 राज्यों में इस कार्य को ले जाया जाएगा।

के प्रति आत्मोद्यता की भावना को बढ़ाएंगी। समुदाय के वे प्रतिनिधि यह सुनिश्चित करेंगे कि गंगा की जीव विविधता के संरक्षण में समुदाय की महत्वपूर्ण भूमिका रहे। गंगा प्रहरी एक लिंक की तरह होंगे जो आम लोगों को गंगा की जीव विविधता के संरक्षण के लिए चलाई जाने वाली गतिविधियों से जोड़ेंगे। भारतीय वन्य जीव संस्थान, देहरादून गंगा के किनारे के पांच राज्यों के गंगा प्रहरियों को एक मोबाइल एप (धुवन गंगा एप) से जोड़कर व्यापक नेटवर्क तैयार करेंगे।

6.4 Generation of success stories

KnightLab software was used to trace and map such success stories of stakeholders with an aim to propagate such activities either individually or at the institutional level. The evaluation shed light on existent knowledge, awareness, attitudinal shift and motivation level about Ganga's biodiversity in different target groups of stakeholders.

<https://uploads.knightlab.com/storymapjs/5d436162eb13431fd8578104e89ebf31/timeline-of-major-workshop-conducted-2017-19/index.html>

CHAPTER 7 MONITORING AND EVALUATION

7.1 Training Impact Assessment

Our training programmes are aimed at providing stakeholder-specific training to different groups of stakeholders that are involved with the ecological restoration of the Ganga River and the conservation of its biodiversity. A comparison was done between both the pre and post impact assessment to evaluate how much the training programmes contributed to stakeholder's engagement. This tells us about the level at which participants have gained the knowledge, awareness, attitude, motivation and skills that enabled them to contribute to the biodiversity conservation of Ganga River.

7.1.1 Pre training assessment

Pre training assessment is generally based on a formative evaluation and simple set of questions are distributed to the participants to check their existing knowledge, awareness, attitude and skills. Pre-training impact assessment carried out before the training programme, helps in gauging the existent knowledge and attitude towards the Ganga River in different target groups of stakeholders.

7.1.2 Post training assessment

After the completion of the training programmes, post-training impact assessment was done. This assessment reflects the state of knowledge of the participants, awareness among them, and attitudinal shift, motivation level and behavioural changes after the training programme.

7.1.3 Analysis

Through the aforementioned assessments, we have not only found differences in attitudes, opinions and awareness levels before and after the provision of trainings, but also between the key stakeholder groups. During the pre-training assessment, the participants were assessed about the awareness of aquatic species found in the Ganga River. It was observed that majority of the stakeholders claimed to have observed Gangetic dolphins, followed by fishes, turtles and birds (Figure 24). However, it was found that the awareness of other species such as otters, snakes and amphibians were low. Only few of the Uttar Pradesh forest staff were aware about the presence of Gharial population in the Ganga River.

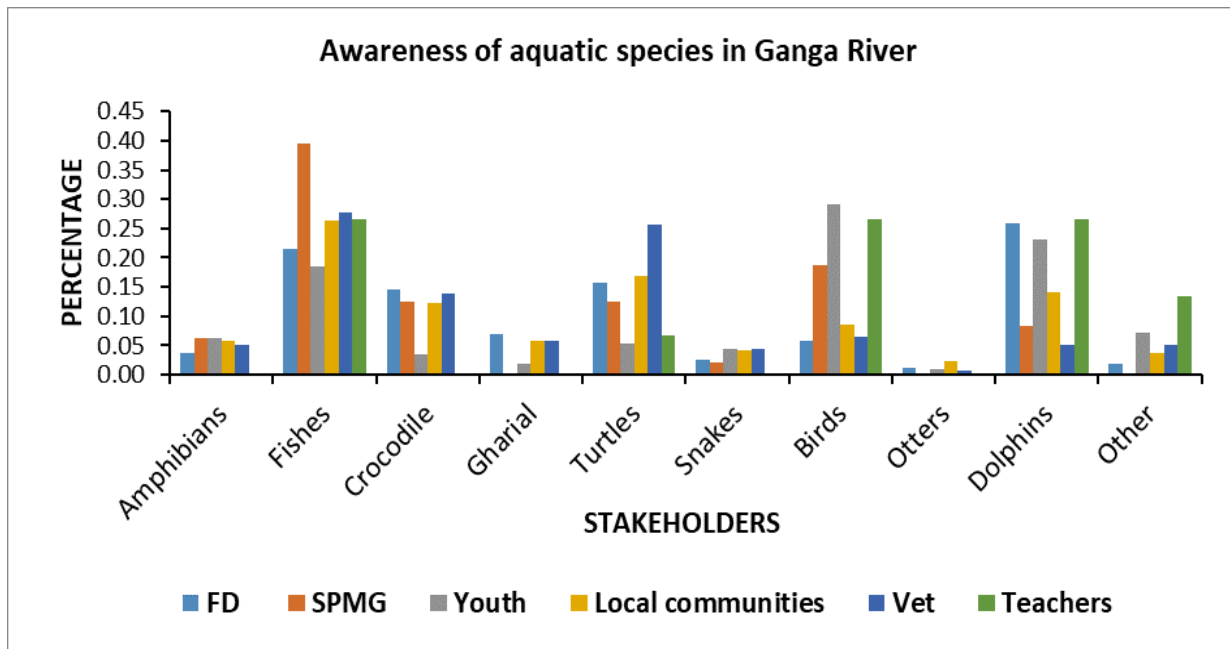


Figure 24: Awareness of aquatic species of Ganga River among stakeholders groups during pre-training assessment

There was also differences in the perceived threats to the river wherein majority of the stakeholders such as forest officials, college students and local communities saw industrial pollution and domestic waste being dumped in the river to be the major threat, respectively (Figure 25), whereas most of the SPMG officials and veterinarian stated cultural and religious activities were one of the major threats in the degradation of water quality and women scientists had the perception that the major threat to the Ganga river was due to indiscriminate dumping of solid waste and discharge of untreated industrial effluents into the sacred river.

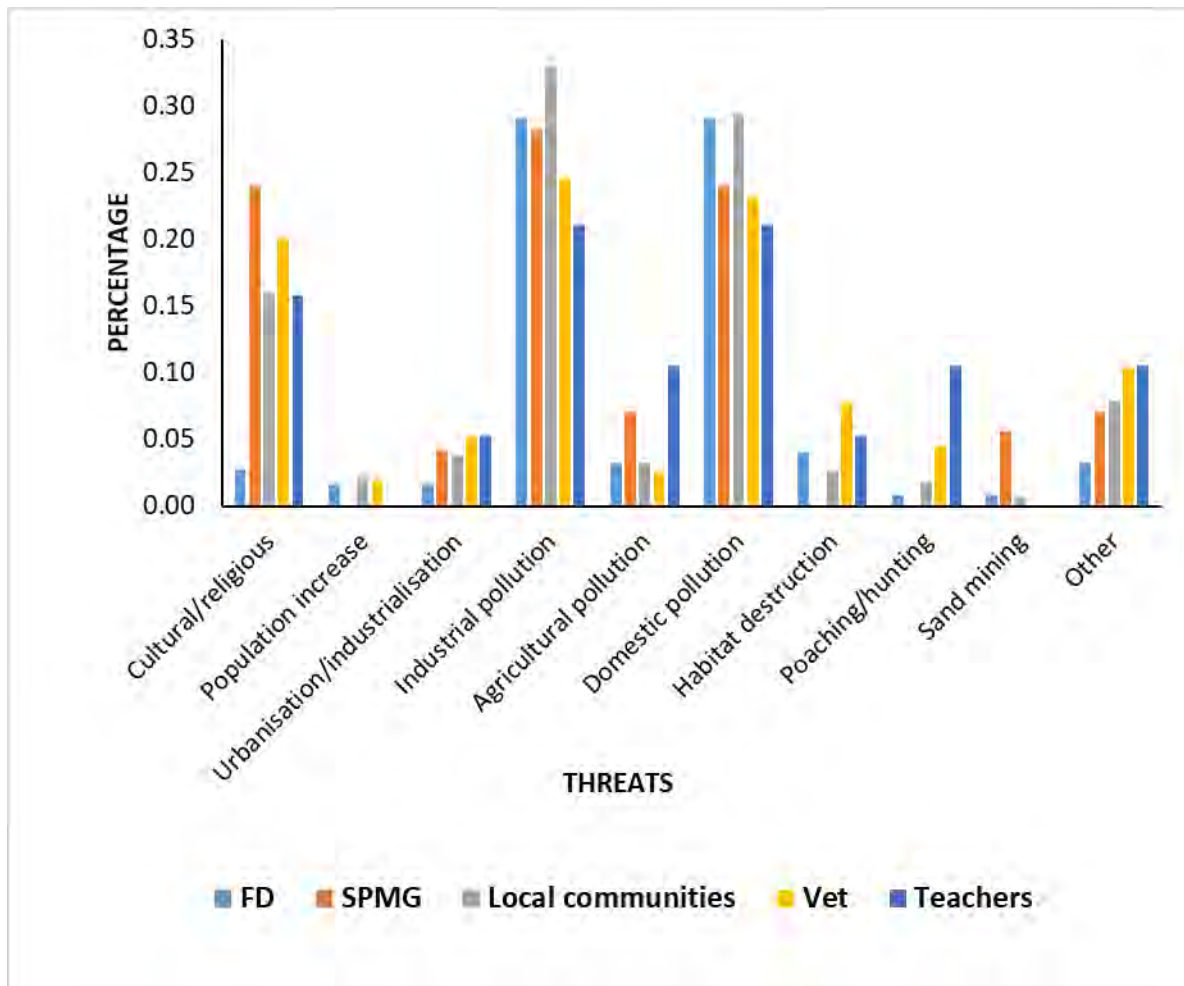


Figure 25: Threat assessment among stakeholders groups during pre-training assessment

During the pre-evaluation process, we found that most of the participants, suggests, the best steps to rejuvenate the river were to create and build awareness at local levels, and then controlling untreated industrial effluents and stopping domestic sewage from entering the river were equally important (Figure 26). For instance, 27% forest officials, 29% students and 36 % teachers thought building awareness about the conservation of biodiversity and its threats was the main step towards rejuvenation of the river, whereas 23% SPMG officials considered building awareness, controlling industrial effluents as well as domestic sewage discharge to be equally important.

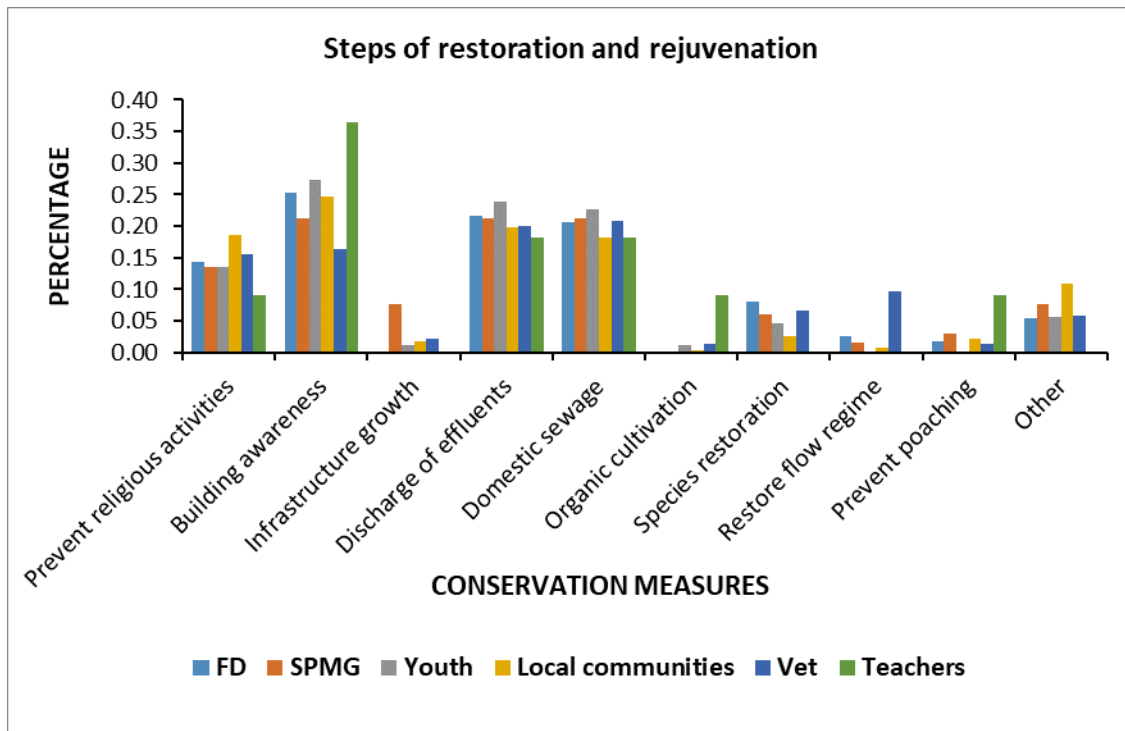
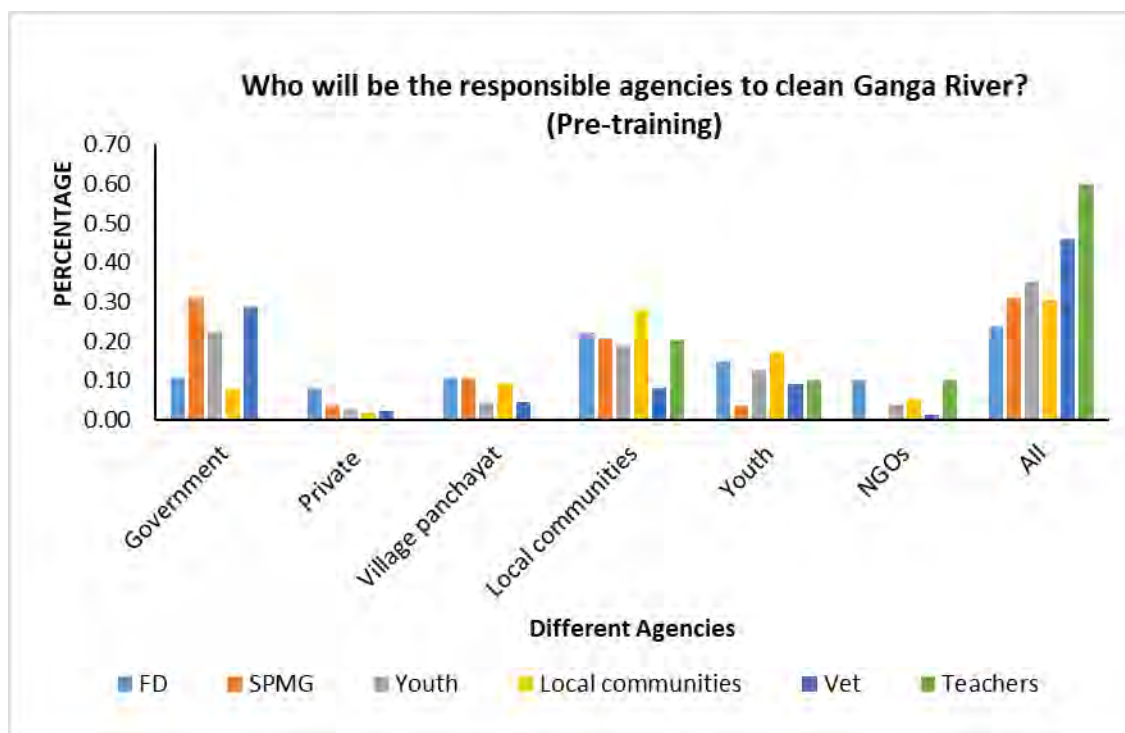


Figure 26: Pre training response of different stakeholders on various conservation measures for restoration of Ganga River

Prior to the workshop, the participants were asked to respond on the major role of the stakeholders played in the cleaning of the river and the conservation of its biodiversity, most of the stakeholder's responses were distributed for instance, 24% forest officials claiming that everyone was responsible for cleaning of the Ganga, and 22% claiming the responsibility lay with the government, whereas 31% SPMG officials claimed that cleaning the Ganga river would be a collective responsibility for every stakeholders, and 35% college students said the responsibility lay with everyone whereas only 22% said it was the government's responsibility. In short, most of them held the government responsible for cleaning the river, however many also said that it was local communities residing along the Ganga River to maintain cleanliness in and around Ganga River, and some of the participants stated it everyone's collective responsibility (Figure 27).



These statistics, however, had changed post-training assessment, there was, however, a consensus in terms of the responsible agencies who needs to take up a major role in the restoration and rejuvenation of the river and the conservation of its biodiversity, most of the stakeholders thought it was to be a collective effort on the part of everyone (Figure 28).

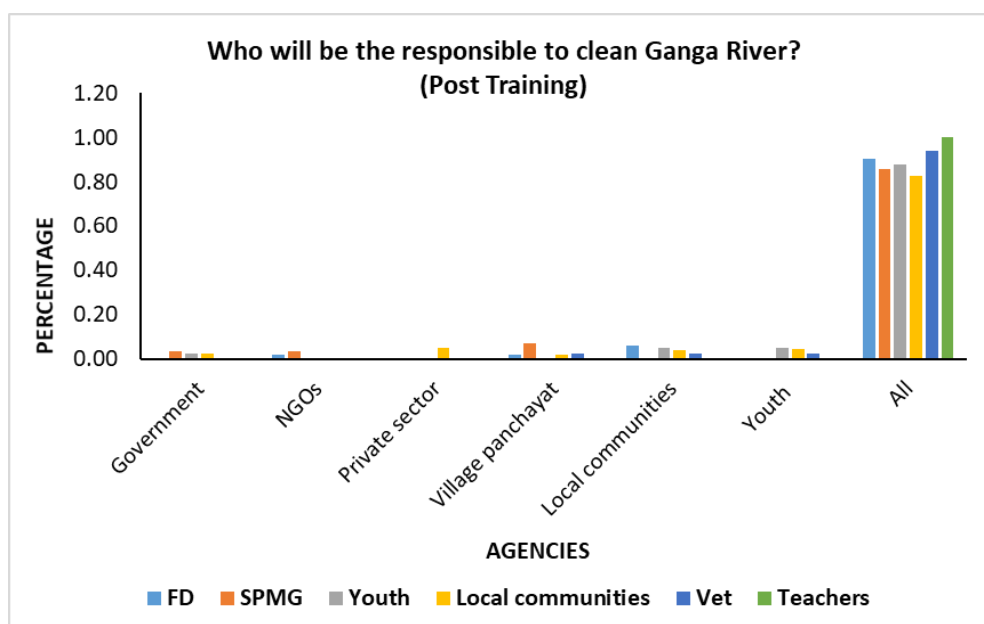


Figure 28: Post training assessment of different stakeholders to clean the Ganga River

Majority of the participants such as forest official, SPMG official, veterinarian, teachers, youth and local people highlighted, the major threats that are affecting the ecological restoration of Ganga River are decrease in biodiversity, water pollution and change in the water flow and depth regime (Figure 29).

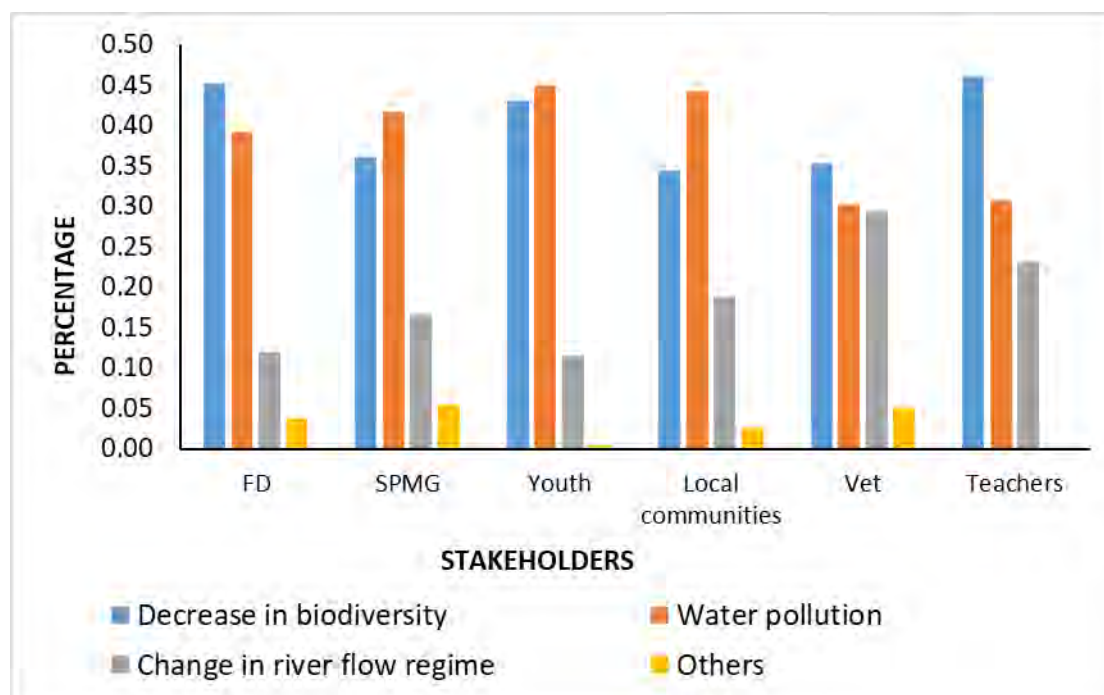


Figure 29: Perception of threats of Ganga River among stakeholders groups during post training assessment

The awareness level of increase and decrease of biodiversity of the Ganga River were checked among the stakeholders groups. Majority of the participants claimed that fishes had seen the maximum increase in populations, followed by amphibians, whereas Gangetic dolphin populations had seen the maximum decline in populations followed by otters and fishes due to increase in water pollution (Figure 30 and 31).

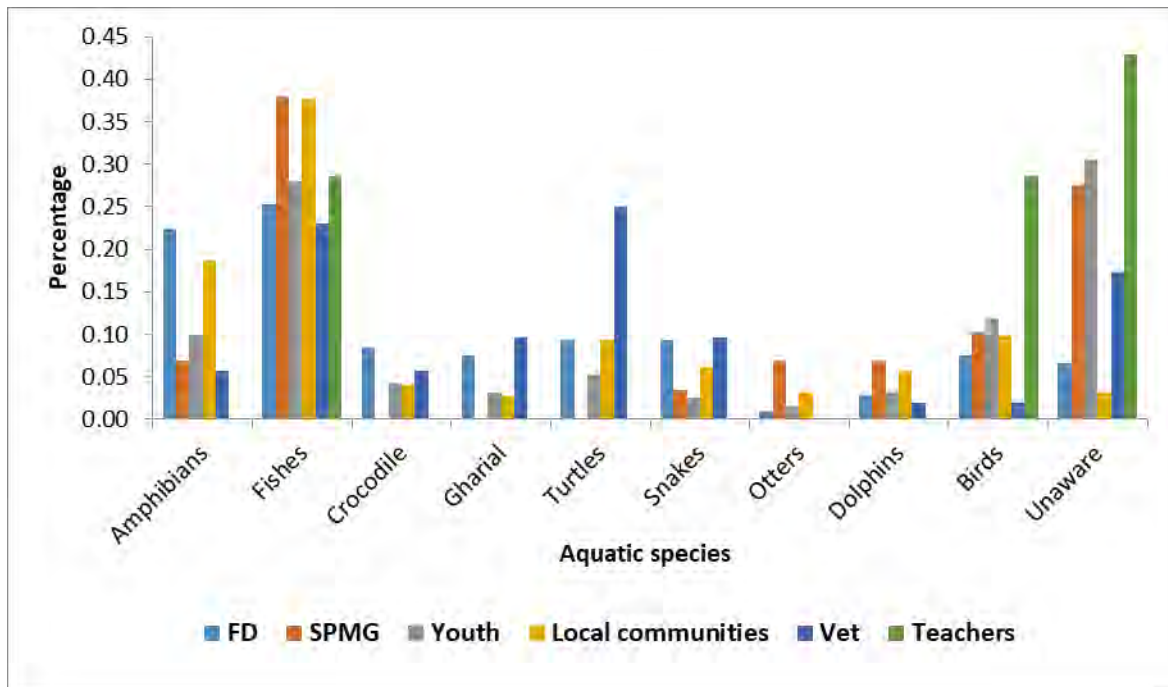


Figure 30: Perception of increase of biodiversity among stakeholders groups during Post training assessment

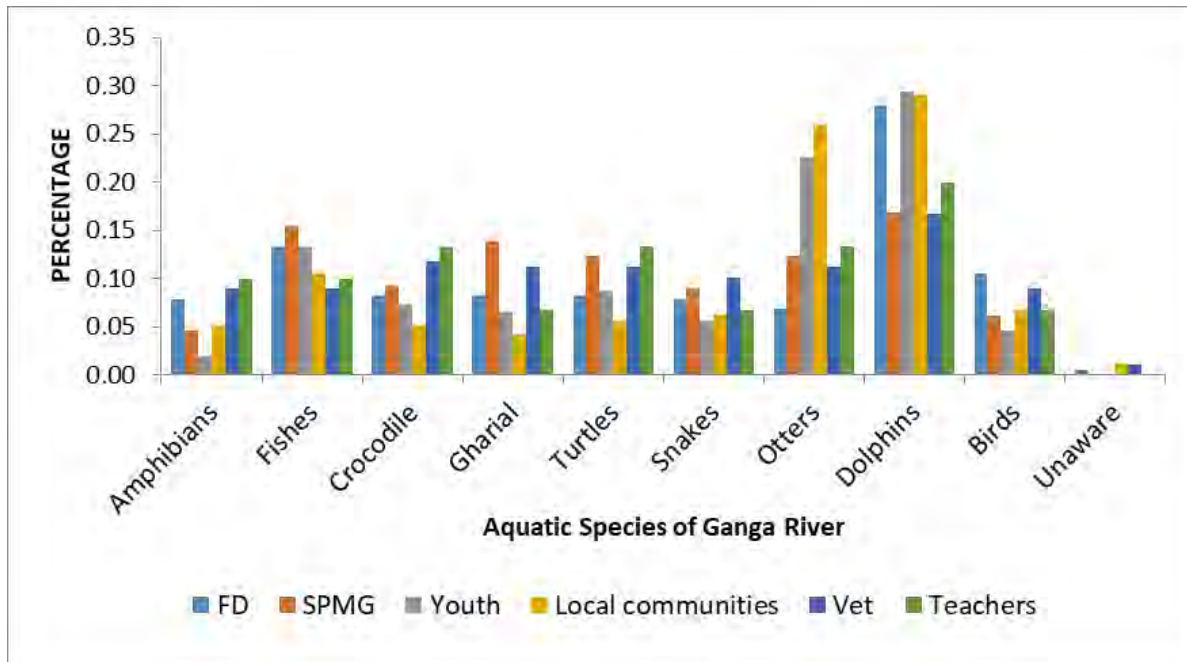


Figure 31: Perception of decrease of biodiversity among stakeholders groups during Post training assessment

7.2 Carry forward activities

The quality and effectiveness of the training imparted was analyzed and the outcomes of capacity building programmes were evaluated in terms of what actually happened as a result of training. This monitoring and evaluation process act as critical indicators of the past trainings while planning future activities to ensure efficacy and sustainability of the training imparted.

A total of 158 respondents were evaluated through a semi-structured e-questionnaire survey and the quantitative data were analyzed using descriptive statistics. It was found that almost every respondent $\approx 85\%$ has benefited from the training programmes. The training evaluation response was calculated, 61% of the trained participant had responded that training was very effective and useful (Figure 32). Around 10 % sent back the questionnaire without the filling up the information and details.

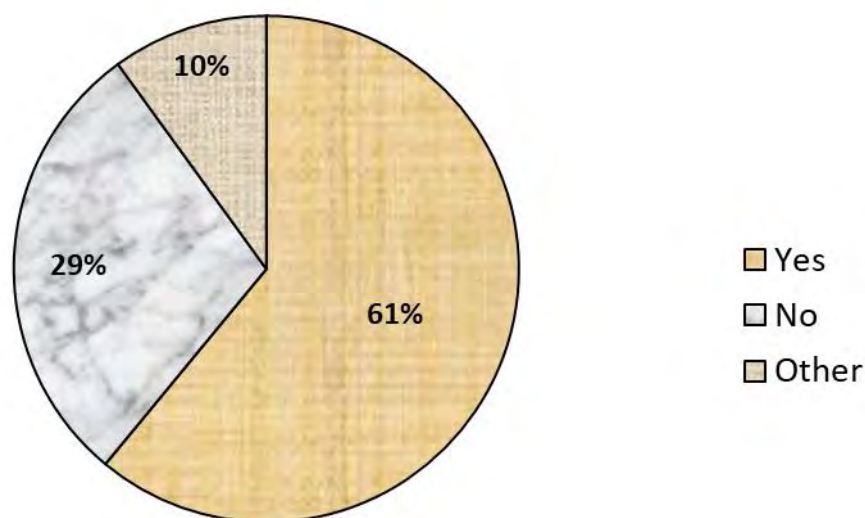


Figure 32: Evaluation of carry forward activities conducted by the trained participants

Of the 158 respondents, 80% of trained participant had carried forwarded the activities in their respective states. Further, it was investigated what are the types of activities, they carry forwarded, it was found that, more than 40 % of the trained participants spread the awareness of biodiversity of Ganga aqualife conservation through workshops, visual presentations, documentaries and various forms of interactive cultural events and nukkad

natak, awareness rallies and conducting drawing, painting, poster, slogan writing competitions etc. Approximately, $\approx 34\%$ of the respondents had trained more people (Figure 33) after obtaining training programmes under WII-NMCG project such as hands on training on counting techniques of aquatic species of Ganga River, safe handling and release of species, waste segregation techniques etc. Remaining 20% of trained participants had self-implemented in their day to day life.

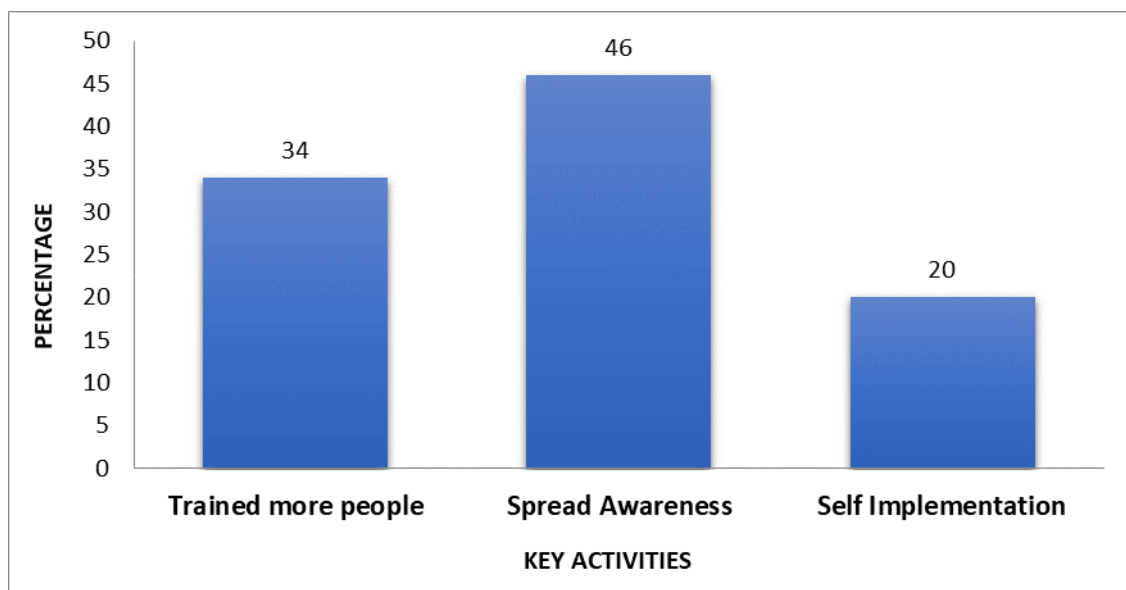


Figure 33: Evaluation of various activities conducted by the trained participants

Subsequently, the respondents were asked to cite reasons for not carrying forward the activities, 39 % of the participants, responded that though they want to carry forward the activities but there were no adequate responses from the communities (Figure 34). Around 19% of the respondents highlighted that training was insufficient and 28% highlighted that they don't have any resources for conducting training programmes at individual level.

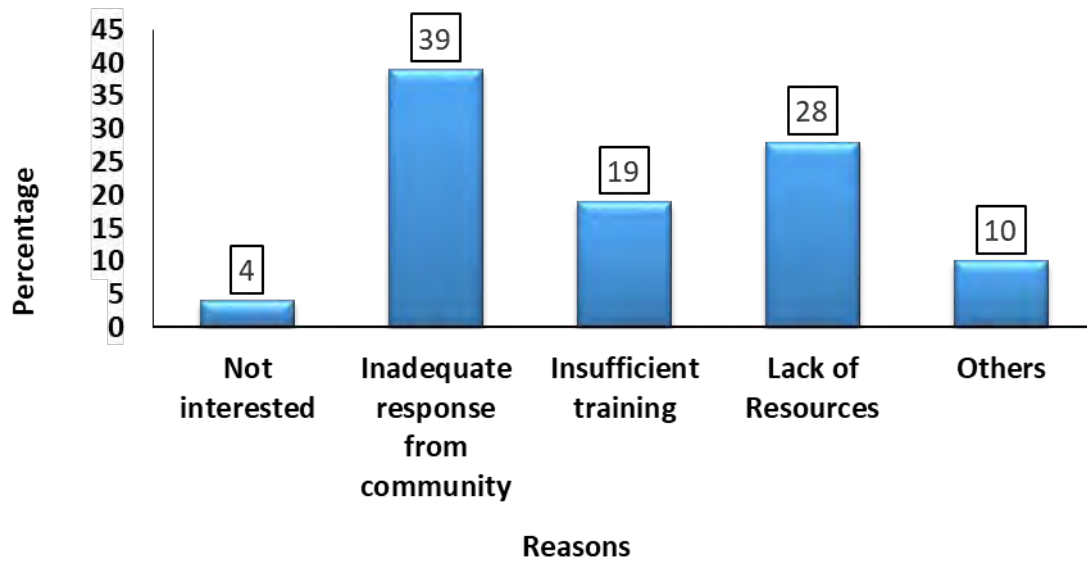


Figure 34: Evaluation of reasons for not carrying forward activities after obtaining training programme



CHAPTER 8 DISCUSSION

Since its conception of capacity building programme from 2017 onwards, the component dealing with 'Capacity Building of Forest Department and other Stakeholders' has successfully conducted ten (N=10) National level workshops (Annexure II), nine (N=9) State level workshops, 120 (N=120) sensitization programmes including nukkad natak, awareness rally, cultural events, wall and slogan painting, nature walk, plantation, cleanliness drives etc. More than 12000 stakeholders comprising of personnel of the Forest and veterinary departments, different line agencies, university professors, youth, school teachers and students, religious groups and local communities have been sensitized.

8.1 LINK BETWEEN ACTIVITIES AND OBJECTIVES

The effort being carried out under the 'Capacity Building of Forest Department and other stakeholders' focuses on the fulfilment of the three main objectives of the component *viz.* development of training material for the capacity building of the different stakeholders; identification of selected individuals from the Forest Department of Ganga states and establishment of spearhead team and their training programmes; development of the capacities of multiple stakeholders involved in the conservation of Ganga River and its biodiversity.

Trainings were delivered according to different target groups (Annexure III) and delivered in four modules at the five Ganga states (Annexure IV a-d). Capacity building exercises have been conducted to accomplish the main objective of the component, the first step was to establish the spearhead teams of State Forest Department to participate in different aspects of biodiversity conservation and carry forward the activities after the completion of the project. Consequently, the training programmes, awareness and sensitization events, and various outreach programmes were organised and conducted in order to develop the capacities of key stakeholders involved in the conservation of the Ganga and its biodiversity. The training curriculum and manuals have been utilised for developing and implementation of training programmes and ensures a science-based aquatic species restoration plan for Ganga, by involving multiple stakeholders and also provides an insight to the stakeholders

to comprehend its significance from the ecosystem perspective. Training materials have been developed in print as well as electronic media to act as the source of information and knowledge for wide circulation at different institutions and organizations.

The training programme achieves the outcome by promoting and facilitating the transfer of information and skills, ultimately to strengthen the organizational capabilities. This aligns with project objectives to offer its target groups access to knowledge and expertise in a manner that differentiates master trainer from other participants. Mobilization activities have been designed and implemented in different aspects of biodiversity conservation with support from spearhead team. As a result, the trained cadre assists various activities such as sensitization programmes, conservative awareness, plantation and cleanliness drives etc. The effort has been highly successful in showcasing the role that stakeholders play at the grassroots levels and provide them a pathway to engage meaningfully in river restoration programmes.

8.2 Capacity building and synergies with forest departments

The forest department being the administrative, technical, manpowered and supreme authority in managing the protected areas along the stretches of the Ganga River and having a legal hold in the management of threatened aquatic species found in it, therefore, it is imperative to involve Forest Department of the Ganga states as one of the important stakeholders. In this line, the WII-NMCG training team had established the spearhead team comprising of Forest officials in five Ganga states. The goal was to create training of the trainers (ToTs) in different aspects of biodiversity conservation for monitoring of Ganga aqualife, conservation and management of the riverine species along the Ganga River.

The impact of the training is visible through the enhanced synergies between departments, agencies and local communities, all committed to conserve and restore the biodiversity of the Ganga River. These trained spearhead teams have been coordinating the site level training and education programmes in their respective states. They are carrying out training and ecological survey activities on their own such as population count of Gangetic river dolphin in Bihar, monitoring of turtle at Varanasi and migratory bird survey at Sahibganj, Jharkhand and training on ecological monitoring of rivers and wetlands in West Bengal. Subsequently, this trained spearhead team has been executing important activities with the

involvement of local youth like training other frontline staffs, creating awareness, conducting sensitization programmes and also executing field duties like plantation and cleanliness drive etc.

The WII-NMCG team in collaboration with trained spearhead team have mobilized key stakeholders comprising of frontline staff, different line agencies, local youth, *Ganga Praharis*, teachers, students, religious groups, local communities, veterinarians, representatives of NGOs etc. and carried forward the training and sensitization programmes at their respective states. A total of 7 trainings and 30 sensitization programmes in collaboration with spearhead team were conducted in which 5495 participants were sensitized and 422 participants were trained (Annexure V). Among these, the Serampore College in West Bengal and ISKCON temple Committee, at Mayapur, West Bengal has initiated Ganga conservation activities and cleanliness drives.

8.3 Creating awareness through capacity building programme

Various methodologies have been adopted in order to spread awareness among masses, as well as in order to aid the capacity building efforts. These methodologies include interactive trainings and workshops, publications, documentaries and short films, audio/visual presentations, and various forms of interactive cultural events. State-level training and sensitization workshops (n=120) was conducted with multiple stakeholders to develop their capabilities in conducting various awareness activities such as slogan writing, wall painting, awareness rallies, drawing, painting, poster, waste segregation techniques, hands on training on rescue and handling of species in distress and other interactive sessions related to biodiversity and cleanliness of Ganga River.

Local youth are also trained to conduct the awareness activities along the banks of the Ganga River to impart the information of indicator species so that communities, especially the youths and children can know the significance of biodiversity conservation of Ganga River. Teachers from private and government schools were sensitized about the Ganga biodiversity conservation concerns through various workshops and formal interactions. Frontline professional's viz. representatives from NGO's, media personnel, line workers were imparted awareness programmes on knowledge of species monitoring and counting

method to ensure sustainability and effective implementation of conservation efforts. Thus, orientation programmes were conducted with interested stakeholders that include further training on biodiversity using citizen science techniques.

8.4 A growing space for citizen science engagement and transparency

One of the aims of the component 'Capacity Building of Forest Department and other Stakeholders' was to produce a team of trained cadre and imbibe strong leadership qualities among the trained participants so that they can lead the conservation programmes in the field. This has resulted in a huge success by this trained cadre taking a lead in carrying out the activities at multiple levels with multiple stakeholders independently. Involvement of local youth with different capacities is the most critical element of river conservation process, during planning, execution and monitoring phases.

A cadre of youth was empowered through training and capacity building programmes. Pool of trained individuals was used as a citizen scientist in helping in ecological survey & monitoring. Some of the trained individuals are recruited as *Ganga Praharis*. *Ganga Praharis* was selected for diverse training programmes based on their interest and education qualification. These youths are sensitized and updated with the latest information on Ganga aqualife through celebrations of national and international days of importance with special reference to aquatic fauna and key biodiversity found in the Ganga River.

The majority of trained youth are capable of assisting various survey teams, interested individuals are being attached to the research and training institutes. The efforts suggest that such programmes result in change in attitudes of stakeholders and also provide them a pathway to engage meaningfully in the efforts to restore the Ganga river ecosystem. Though a large number of people went through this programmes, we have just skimmed the surface and showed the usefulness of the effort which needs to be continued.

CHAPTER 9 FUTURE ENDEAVOURS

The training programmes will have to be done in a decentralized manner to ensure the long-term sustainability of this effort, for which spearhead teams created in Phase I of the project shall be expanded to cover the entire basin. Forest departments of the Ganga basin states will be requested to nominate members for the spearhead teams. After receiving the nomination, national level spearhead team trainings will be organized. These trained spearhead teams coordinate the site level training and education programmes in their respective states. The upcoming phase of the trainings aims to be strengthened in identified sites along the main stem Ganga River and extend to the selected tributaries, wetlands in the basin, and up-scale the programmes to basin level for aquatic biodiversity conservation to ensure sustainability of the river conservation efforts.

The future work plan also includes the establishment of the spearhead teams comprising of professors, teachers, Local youth, *Ganga Praharis* etc. to other states in the Gangetic basin and trains them in different aspects of biodiversity conservation. Successful implementation of any training and capacity building programmes requires strong support from HR, involvement and ownership by line workers, and commitment from senior management. The capacity building programmes of key stakeholders adopted during Phase I will be escalated and strengthened. The effort will also focussed on the development of the capacity of frontline forest officials, field veterinarians in rescue and rehabilitation of aquatic fauna in distress, university professors and students, local communities, including the *Ganga Praharis* for reporting and managing emergent situations and other stakeholders and trained in field methodologies for undertaking required ecological surveys, river and wetland management. Sensitization workshops will be organized for multiple stakeholders in the basin for community based conservation and conservation education.

The *Bal Ganga Praharis* programmes would be upscale to basin level. Several activities will be designed and conducted for *Bal Ganga Praharis* based on their age groups. Ganga Knowledge Corners will be developed at selected sites and will act as a centre to conduct regular awareness activities and a platform to conduct regular dialogue under the *Bal Ganga Prahari* programme.

ANNEXURES - RESOURCES

Annexure I: List of training materials for capacity building programmes

S. No.	Training Knowledge product	Category	Significance
1	Training approach & curriculum	Manual	This curriculum provides information about the syllabus and key approaches for developing and implementation of training programmes for multiple stakeholders in Biodiversity Conservation of Ganga River.
2	Monitoring Field Guide	Manual	The monitoring field guide was especially developed to train the frontline officials and youth in the techniques of biodiversity monitoring and data collection methods.
3	Water conservation approaches for <i>Bal Ganga Praharis</i>	Booklet (Hindi and English)	This booklet mainly focused on water conservation approaches for school children, how to empower younger generation to save and conserve water.
4	<i>Hamari Janhvi</i>	Booklet	A book of poems informs children regarding the biodiversity and key species of Ganga.
5	Training plan for stakeholder	Brochure	The brochure provides complete information regarding formulation and implementation of training programmes.
6	Training database for Capacity building programmes	Brochure	This brochure provides training database for stakeholders developed as a single point source to disseminate training information of capacity building programs in different aspects of biodiversity conservation to a wider audience.
7	Ganga Biodiversity Calendar	Brochure (Hindi and English)	The “Ganga Biodiversity Calendar” for <i>Bal Ganga Praharis</i> is designed to inculcate awareness in school children about the conservation of biodiversity of Ganga River through celebration of special events and days annually.
8	Biodiversity of Ganga River	Poster	The poster gives the overall distribution of Biodiversity in the Ganga River.
9	Mobilization of youth for Biodiversity conservation	Poster	The poster highlights the awareness activities and mobilization of youth for sustainable conservation of biodiversity of the Ganga River.
10	Building the Foundation: <i>Bal Ganga Praharis</i>	Poster	The poster aims to highlight the <i>Bal Ganga Prahari</i> programmes and involvement of school children in the initiatives of biodiversity conservation of the Ganga River.

11	<i>Kya Tum Jante ho...</i>	Poster	A poem on Ganga River and its cultural values.
12	<i>Ganga ke geet...</i>	Poster	A song on Ganga Biodiversity.
13	<i>Bacchon ka akhbar</i>	Newspaper (Editions I to X; May 2018 to Dec. 2019)	Children Newspaper on Ganga Biodiversity printed bimonthly.
14	Say No to Single use plastic (I & II)	Pamphlets	The pamphlet gives the information regarding the hazardous effects of single use plastic and its impact on biodiversity.

Annexure II: Different level of workshops at five Ganga States

S. No.	Programmes	Title	Target Group	Total
1	National Training	First National training Workshop For Spearhead Team of the Ganga River states on "Biodiversity Conservation and Monitoring of Aquatic Species of Ganga River"	Forest officials	10
		Second National training Workshop for Spearhead Team of Ganga States on "Biodiversity Conservation and Monitoring of aquatic species of Ganga River"	Forest officials	
		National training course on "Biodiversity Conservation" for Women scientist and technologist	Women Scientist and Technologist	
		National training course on "Eco-development Planning for Biodiversity conservation" for lateral entrants of Ganga River states.	Forest officials	
		National training course on "Management of Wetlands and River Conservation" for lateral entrants of Ganga River states.	Forest officials	
		National training course on "Biodiversity Conservation" for Scientist and Professors.	Scientist & Professors	
		National Training Workshop for College and University Teachers of five Ganga States on "Biodiversity Conservation and Ganga Rejuvenation"	Professors & Lecturers	
		National training course on "Eco-development planning for Biodiversity conservation of Uttarakhand Forest Department"	Forest officials	

		National Training course on "Management of Wetlands and River Conservation of Uttarakhand Forest Department"	Forest officials	
		National Training course on "Biodiversity Conservation" for Scientist, Technologist & Professors	Scientist, Technologist & Professors	
2	State level Training	State level training workshop for Post graduates on Biodiversity conservation of Ganga river and its habitat at Uttarakhand	Graduates and Post-Graduates	9
		State level training workshop for forest officials on "Biodiversity Conservation and monitoring techniques of aquatic species of Ganga River" at West Bengal	Forest officials	
		State level training workshop for officials of NAPS and frontline staff of forest department on "Aquatic species conservation and Ganga Rejuvenation at Uttar Pradesh	Forest officials & NAPS officials	
		State level training workshop for youth on "Methodology of baseline survey of indicator species of Ganga River" at Dehradun, Uttarakhand	Post-Graduates	
		State level training workshop for frontline staff at Sahibganj, Jharkhand on "Biodiversity monitoring techniques of aquatic species of Ganga River"	Forest Officials, Ganga Praharis & Media Personnel	
		State level training workshop for youth and NGO's on "Biodiversity monitoring of indicator species of Ganga River" at Sahibganj, Jharkhand	Youth & NGOs	
		IBM- Design thinking workshop at Uttarakhand	Youth & Entrepreneur	
		State level training workshop for forest officials on Biodiversity monitoring of Ganga aqualife at Bhagalpur, Bihar	Forest officials	
		State level training workshop for Ganga Praharis on Biodiversity monitoring and Rescue of Ganga aqualife at Bhagalpur, Bihar	Ganga Praharis	

Annexure III: Number of participants trained under four Modules of Ganga biodiversity conservation

Modules	Forest Department	Scientist/ professor	NGOs	Line agencies	Media personnel	Total
Biodiversity Monitoring	227	54	5	0	10	*296
Wetland and River Conservation	219	39	5	15	10	*288
Participatory Management	212	39	5	0	10	*266
Conservation Education	207	39	5	0	10	*261
*These are overlapping in terms of trained numbers, since most people were trained on all the four modules.						

Annexure IV: Programme schedules of four Modules designed for Ganga biodiversity conservation

IV (a) Wetland and River Conservation

<i>PROGRAMME SCHEDULE</i>	
MODULE 1: WETLAND AND RIVER MANAGEMENT	
Day-1	
0900-0915	Registration
0915-0930	Pre Training Assessment
0930-1000	“Biodiversity Conservation and Ganga Rejuvenation”- Project Overview
1000-1015	Objective of the workshop
1015-1045	Tea Break and Group Photo
1045-1145	Wetland definition and classification: Wetland values and functions
1145-1300	Wetland degradation and loss
1300-1400	Lunch
1400-1500	Status of wetland conservation in India
1500-1530	Tea
1530-1700	Exercise for developing conservation strategy for wetlands – Describing a wetland
1700-1730	Group discussion

Day 2	
0930-1030	Monitoring of wetlands
1030-1100	Case study on ecology of inland wetlands of Gangetic plains
1100-1300	Monitoring of River variables
1300-1400	Lunch
1400-1530	Ecology of rivers and streams
1530-1600	Tea
1600-1700	Exercise for developing conservation strategy for wetlands-Identifying problems and issues
1700-1730	Group discussion
Day 3	
0930-1030	Case study on Assessment of environmental flow in context of aquatic species conservation
1030-1100	Tea
1100-1300	Onsite problem solving-Wetland pollution monitoring and control
1300-1400	Lunch
1400-1500	Application of remote sensing for wetland management
1500-1530	Tea
1530-1630	Exercise for developing conservation strategy for wetlands - Setting objectives
1630-1730	Group discussion
Day 4 & Day 5: Field Visit	
Day 6	
1000-1100	Post Training Assessment
1100-1300	Valedictory
1300-1400	Course Lunch

IV (b) Biodiversity monitoring and Ecological Survey

PROGRAMME SCHEDULE
MODULE 2: BIODIVERSITY CONSERVATION
Day 1

0900-0915	Registration
0915-0930	Pre-Training Assessment
0930-0945	Inaugural Address
0945-1030	Project Biodiversity Conservation and Ganga Rejuvenation: An overview
1030-1100	Workshop Objectives
1100-1130	Tea
1130-1245	Monitoring of Aquatic Invertebrates
1245-1300	Group discussion
1300-1400	Lunch
1400-1500	Monitoring of Fish
1500-1600	Monitoring of Amphibians and Snakes
1600-1615	Tea
1615-1715	Monitoring of Turtles
1715-1800	Group discussion
Day 2	
0730-0830	WII Nature Trails - Monitoring of Aquatic and Riparian Vegetation
0900-0930	Tea
0930-1030	Monitoring of Water Quality and Eco-toxicology
1030-1130	Eco-toxicology Lab visit
1130-1230	Monitoring of Otters
1230-1300	Group discussion
1300-1400	Lunch
1400-1500	Forensic Lab: Biological Sample Collection and Genetic Monitoring
1500-1515	Tea
1515-1615	Measuring and Monitoring of River Variables
1615-1730	Monitoring of Waterbirds
Day 3 & Day 4: Field Visit	
Day 5	
0930-1030	Monitoring of Gangetic Rivers Dolphin
1030-1100	Tea
1100-1200	Monitoring of Crocodilians
1200-1300	GIS Mapping techniques with reference to Ganga Basin
1300-1400	Lunch
1400-1500	GIS- Lab visit
1500 onwards	Local field visit
Day 6	
1000-1100	Post Training Assessment
1100-1300	Valedictory
1300-1400	Course Lunch

IV (c) Participatory Management and Community Involvement

PROGRAMME SCHEDULE	
MODULE 3: PARTICIPATORY MANAGEMENT	
Day 1	
0900-0915	Registration
0915-0930	Pre Training Assessment
0930-1000	Inaugural session
1000-1030	“Biodiversity Conservation and Ganga Rejuvenation”- Project Overview
1030-1045	Objective of the workshop
1045-1115	Tea Break and Group Photo
1115-1215	Community Participation in Conservation of Ganga River
1215-1300	Sustainable Livelihood Opportunities: Site Specific Livelihood Strategies for People Dependent on the Ganga River
1300-1400	Lunch
1400 onwards	Field Visit to Model Villages
Day 2	
0930-1030	Team Building of “Biodiversity Conservation and Ganga Rejuvenation”
1030-1100	Tea
1100-1300	Group activity Part 1: Community Linkages with Ganga River
1300-1400	Lunch
1400-1530	Group activity Part 2: Stakeholder Analysis
1530-1600	Tea
1600-1700	Eco-development-Path ahead: Group deliberations and future recommendations
1700-1730	Group discussion
Day 3 & 4:- Field Visit	
Day 5	
1000-1100	Post Training assessment
1100-1300	Valedictory
1300-1400	Course Lunch

IV (d) Conservation Education

PROGRAMME SCHEDULE	
MODULE 4: CONSERVATION EDUCATION	
Day 1	
0900-0915	Registration
0915-0930	Pre training Assessment
0930-1000	Inaugural Session
1000-1030	Overview and Progress of the Project
1030-1100	Objective of the workshop
1100-1130	Tea

1130-1230	Ganga-The vibrant River: social, cultural and ecological significance
1230-1300	Group discussion
1300-1400	Lunch
1400-1500	Biodiversity of the Ganga River
1500-1530	Tea
Day 2	
0930-1030	Conservation Education: A tool for Eliciting Public Support
1030-1100	Tea
1100-1230	Web of life- Group activity
1230-1300	Group discussion
1300-1400	Lunch
1400 onwards	Field visit to Zoological Garden
Day 3	
0930-1030	Identifying Stakeholders for Conservation Education
1030-1100	Tea
1100-1200	Group Activity on Designing Education Materials
1200-1300	Group discussion
1300-1400	Lunch
1400 onwards	Visit to Nature Interpretation Centers
Day 4	
1000-1100	Post Training Assessment
1100-1300	Valedictory function
1300-1400	Course Lunch

Annexure V: Carry forward conservation activities with spearhead team of State Forest Department and WII-NMCG team

S. No.	State	Title	No. of participants trained	Target Group	Year	Total No. of activities with Spearhead Team
Training						
1	Uttar Pradesh	Training workshop for officials of NAPS and frontline staff of forest department on "aquatic species conservation and Ganga Rejuvenation from 1st to 2nd February 2018	62	NAPS Officials, Forest Officials, Ganga Praharis, School students	2018	1

2	Bihar	State Level Training Workshop for Ganga Praharis on “Biodiversity Monitoring and Rescue and Rehabilitation Techniques of Aquatic Species of Ganga River” on 22nd and 23rd June, 2019 at Bhagalpur, Bihar.	65	Ganga Praharis, Forest Officials	2019	2
3		State Level Training Workshop for Forest Officials on “Biodiversity Conservation And Monitoring Techniques Of Aquatic Species of Ganga River” on 20th and 21st June, 2019 at Bhagalpur, Bihar.	36	Forest Officials		
4	Jharkhand	Training workshop for youth and NGO's on “Biodiversity monitoring of indicator species of Ganga River”, Sahibganj college, Sahibganj, Jharkhand 28th to 30th April, 2018	137	College Students, Media, Professors, NGOs	2018	2
5		State level training workshop for frontline forest staff, Ganga praharis and media personals at Sahibganj, Jharkhand on “Biodiversity Conservation and monitoring techniques of aquatic species of Ganga river” Sahibganj, Jharkhand from 25th to 27th April 2018	57	Forest Officials, Ganga Praharis, Media		
6	West Bengal	State level training workshop for forest officials of West Bengal on “Biodiversity	39	Forest Officials	2017	2

		Conservation and monitoring techniques of aquatic species of Ganga River” from 21st to 22nd December 2017.				
7		Training cum sensitization workshop for the youth on "Ecological monitoring techniques of aquatic species of Ganga river" on 19th December 2017	26	College Students		
Total			422			7
SENSITIZATION						
1	Uttarakhand	Wildlife Week Celebration Across The Ganga States of Ganga River” from 2nd to 8th October, 2019	407	School students and Teachers	2019	7
2		Sensitization Workshop on “Forest Fire Management to save the biodiversity of Uttarkashi Forests” on 22nd May, 2019.	48	Forest Officials, Local communities and Ganga Praharis	2019	
3		“International Day for Biological Diversity” celebration across Ganga River States on 22nd May, 2019.	48	Forest Officials, Local communities and Ganga Praharis	2019	
4		“World Migratory Bird Day” celebration across Ganga states on 11th May, 2019.	36	School students and Teachers	2019	
5		Earth Week celebration across Ganga states on 22nd – 28th April 2019	458	School students and Teachers	2018	
6		Wildlife Week Celebration from 2nd to 7th October 2018.	210	School students and Teachers	2018	

7		World Environment Day across Ganga States on 5th June 2018	314	Forest Officials, Local communities, Ganga Praharis, NGOs, school students, teachers	2018	
8	Uttar Pradesh	Wildlife Week Celebration Across The Ganga States of Ganga River” from 2nd To 8th October, 2019	284	School students, teachers, local communities, Ganga Praharis	2019	7
9		“International Day for Biological Diversity” celebration across Ganga River States on 22nd May, 2019.	40	local communities, Ganga Praharis	2019	
10		“World Migratory Bird Day” celebration across Ganga states on 11th May, 2019.	44	School students, teachers, Ganga Praharis, Local communities	2019	
11		Earth Week celebration across Ganga states on 22 nd – 28 th April 2019	875	School students and Teachers, local communities	2019	
12		Consultation Workshop For Media Personnel on “Role Of Media In Biodiversity Conservation Of The Ganga River” on 28 th January, 2019 at Narora, Bulandshahr, UP.	19	Media personnel	2019	
13		Wildlife Week Celebration from 2nd to 7th October 2018.	336	Local communities, Ganga Praharis, school	2018	

				students		
14		World Environment Day across Ganga States on 5th June 2018	557	Local communities, Ganga Praharis, School students	2018	
15	Bihar	Wildlife Week Celebration Across The Ganga States of Ganga River” from 2nd To 8th October, 2019	110	School students, teachers, Ganga Praharis	2019	6
16		“International Day for Biological Diversity” celebration across Ganga River States on 22nd May, 2019.	16	School students, Teachers, Ganga Praharis	2019	
17		“World Migratory Bird Day” celebration across Ganga states on 11th May, 2019.	83	Teachers, School students, Ganga Praharis	2019	
18		Earth Week celebration across Ganga states on 22nd – 28th April 2019	557	School students, Teachers, Ganga Praharis	2018	
19		Wildlife Week Celebration from 2nd to 7th October 2018.	58	Ganga Praharis, Forest Officials	2018	
20		World Environment Day across Ganga States on 5th June 2018	82	Ganga Praharis	2018	
21	Jharkhand	Wildlife Week Celebration Across The Ganga States of Ganga River” from 2nd To 8th October, 2019	107	School students, teachers, Ganga Praharis	2019	4
22		Earth Week celebration across Ganga states on 22nd – 28th April 2019	455	School students, teachers, Ganga Praharis	2019	
23		World Environment Day across Ganga	19	Ganga Praharis,	2018	

		States on 5th June 2018		Forest Officials		
24		World Earth day celebration on 22nd April 2018	37	School students, Teachers, Forest Officials, Ganga Praharis	2018	
25	West Bengal	Wildlife Week Celebration Across The Ganga States of Ganga River” from 2nd To 8th October, 2019	20	School students, Ganga Praharis, Teachers	2019	6
26		Consultation Workshop on “Role of various Stakeholders in Ganga Aqualife Conservation” at Serampore College, West Bengal on 8th February, 2019.	114	NGOs, Forest Officials, University students, Professor,	2019	
27		Meeting with Spiritual leader ISKCON, Mayapur, West Bengal on “Integrating The Spiritual Value In Ganga Biodiversity Conservation” on 7th February, 2019.	3	Religious Group	2019	
28		Community Mobilization in collaboration with Spearhead team of West Bengal Forest Department and Ganga Praharis at Nayachar, Nadia, West Bengal on 6th february, 2019.	38	Local communities, Forest Officials, Ganga Praharis	2019	
29		World Environment Day across Ganga States on 5th June 2018	71	School students, Ganga Praharis, Teachers	2018	
30		Community mobilization for religious and cultural groups on “Biodiversity	49	Local communities, Religious Group	2017	

		Conservation and Ganga Rejuvenation” on 24th December 2017				
Total			5495			30

OBJECTIVE 1: To develop training materials for different capacity building programmes on the Ganga biodiversity conservation for future use.

Proposed	Achieved	Outcome
- Develop prototypes of training programmes and materials for further replication PROPOSED OUTPUT - Training material to be used by spearhead teams designed	16 training need assessment workshops with different target groups organised to design the training materials. - Training curriculum developed. - Training materials such as field guide manual, booklet developed. - Awareness materials such as brochures, posters, pamphlets developed.	Manuals ➤ Training approach and curriculum ➤ Monitoring Field Guide Booklets ➤ Water conservation approaches for <i>Bal Ganga Praharis</i> (English & Hindi) ➤ <i>Hamari Janhvi</i>-A book of poems inform children regarding the biodiversity and key species of Ganga. Brochures ➤ Training Plan for stakeholders ➤ Training Database for capacity building programmes ➤ Ganga Biodiversity Calendar (English & Hindi) Posters ➤ <i>Kya Tum Jante ho...</i> ➤ <i>Ganga ke geet...</i> ➤ Biodiversity of Ganga River ➤ Mobilization of youth for Biodiversity conservation ➤ Building the Foundation: <i>Bal Ganga Praharis</i> Pamphlets ➤ Say No to Single use plastic-I ➤ Say No to Single use plastic-II Newspaper ➤ <i>Bacchon ka akhbar</i>: Editions I to X; May 2018 to Dec. 2019. Training Database ➤ Training database developed as a single point source to disseminate training information to a wider audience.
Remarks: 100% target achieved		

OBJECTIVE 2: Identification and establishment of spearhead teams in the five Ganga states, consisting of selected forest staff and local youth, and to train them in different aspects of biodiversity conservation and methodologies for survey of the indicator species.

Proposed	Achieved	Outcome
- Establishment of spearhead teams comprising of forest department personnel in five Ganga states. - Training of spearhead teams in different aspects of biodiversity conservation. - Training of local youth in methodologies for survey of indicator species. PROPOSED OUTPUT - Spearhead teams for three representative sites established and trained. - A pool of 100 youth trained for methodology of baseline survey of indicator species through spearhead teams spread over a period of three years.	- Spearhead teams comprising of 7-21 forest officials established in five Ganga states. - Total 73 members of spearhead teams trained at two National level training programmes. 307 youth trained in Biodiversity monitoring, Wetland and river conservation, Community involvement and Conservation education.	- The WII-NMCG training team collaboration with spearhead team conducted 7 trainings and 30 sensitization programmes in which >5000 participants were mobilized and 422 participants were trained comprising of frontline staff, line agencies, local youth, <i>Ganga Praharis</i>, teachers, students, religious groups, local communities, veterinarians, representatives of NGOs etc. and carry forward the conservation efforts. - Trained youth deployed at field stations assisting various survey teams and forest departments in ecological surveys, biodiversity monitoring, and community engagement and awareness. - Trained and interested individuals being attached to research and training institutes as per their qualifications and choice. - Pool of trained individuals is carrying out citizen engagement activities. - Monitoring and evaluation process act as critical indicators of the past trainings while planning future activities to ensure efficacy and sustainability of the training imparted.
Remarks: 100% targets achieved. In some cases, targets were over achieved due to multiplier effect of training programmes, on demand from NMCG and State Forest Departments and other stakeholders such as universities and colleges. In some places part of the logistic support was provided.		

OBJECTIVE 3: To develop capacity of forest officials and other stakeholders for monitoring of Ganga Aqualife, management planning of wetlands, community involvement and conservation education.

Proposed	Achieved	Outcome
Capacity building of Forest officials and other	*227 Forest officials; 54 scientists/professors; 5 representatives from	305 forest officials from State Forest department of five Ganga

stakeholders in four modules viz: ➤ Monitoring of Ganga aqualife. ➤ Wetland and river conservation. ➤ Participatory management. ➤ Conservation education. • Sensitization programmes for school children. PROPOSED OUTPUT • 300 officers from Forest departments will be trained for management planning of wetlands and aquatic habitats.	NGOs; 10 Media personnel trained in biodiversity monitoring. • *219 Forest officials; 39 scientists/professors; 5 representatives from NGOs; 10 Media personnel; 15 line agencies trained in wetland conservation. • *212 Forest officials; 39 scientists/professors; 5 representatives from NGOs; 10 media personnel trained in community involvement. • *207 Forest officials; 39 scientists/professors; 5 representatives from NGOs; 10 Media personnel trained in conservation education. • 64 schools brought under the <i>Bal Ganga Praharis</i> programme.	states trained in four modules. • 736 participants trained and >12000 sensitized in different stakeholders. • 10 National level training programmes, 9 State level training workshops and 120 sensitization programmes conducted. • Training impact assessment conducted for >5000 trainees/participants. • ≈80% of trained participant carried forward conservation activities on Ganga aqualife conservation. Out of these, >40% helped in creating awareness through workshops and various forms of interactive events. While ≈34% trained more people on biodiversity monitoring. • Training impact assessments suggest that such programmes result in change in attitudes of stakeholders and also provide them a pathway to engage meaningfully in the efforts to restore the Ganga river ecosystem.
Remarks: 100% target achieved *These are overlapping in terms of trained numbers, since most people were trained on all the four modules.		

Annexure VI: Abbreviations

ABBREVIATIONS	
Additional Principal Chief Conservators of Forests	APCCFs
Assistant Conservators of Forests	ACFs
Beat Officers	BO
Block Development Officers	BDOs
Central Pollution Control Board	CPCB
Chief Conservators of Forests	CCFs
Chief Wildlife Wardens	CWLWs
Conservator Forests	CFs
Deputy Conservators of Forests	DCFs
Deputy Range Officers	DROs
Deutsche Gesellschaft fur Internationale Zusammenarbeit	GIZ
District Collectors	DCs
Divisional Forest Officers	DFOs
Eco-development Committees	EDCs
Field Directors	FDs
Forest Department	FD
Forest Development Agencies	FDAs
Global Positioning System	GPS
Head of Department	HODs
Human Resource	HR
Ministry of Environment, Forests and Climate Change	MoEF&CC
Narora Atomic Power Station	NAPS
National Mission for Clean Ganga	NMCG
Non-Governmental Organization	NGOs
Participatory Forest Management Committees	PFMCs
Principal Chief Conservator of Forests	PCCFs
Protected Area	PA
Range Forest Officers	RFOs
Section Officers	SOs
State Forest Development Agencies	SFDAs
State Pollution Control Board	SPCB
State Programme Management Group	SPMG
Uttar Pradesh	UP
Veterinarian	Vet
Wildlife Institute of India	WII

REFERENCES

- Alaerts G. J. (2009) Knowledge and capacity development (KCD) as tool for institutional strengthening and change. In: Alaerts GJ, Dickinson N (eds) *Water for a changing world—developing local knowledge and capacity*. Delft.
- Bassi, N., Kumar, M. D., Sharma, A., Pardha-Saradhi, P. (2014) Status of wetlands in India: a review of extent, ecosystem benefits, threats and management strategies. *Journal of Hydrology: Regional Studies*, 2, 1-19.
- Bernhardt, E. S., Palmer, M. A., Allan, J. D., Alexander, G., Barnas, K., Brooks, S., Galat, D. (2005) *Synthesizing US river restoration efforts*.
- Bonney, R., Ballard, H., Jordan, R., Mc. Callie, E., Phillips, T., Shirk, J., Wilderman, C. C. (2009) *Public Participation in Scientific Research: Defining the Field and Assessing Its Potential for Informal Science Education*. A CAISE Inquiry Group Report. Online Submission.
- Brinson, M. M., Malvárez, A. I. (2002) Temperate freshwater wetlands: types, status, and threats. *Environmental conservation*, 29(2), 115-133.
- Brookes, A., & Shields Jr, F. D. (1996) *River channel restoration: guiding principles for sustainable projects*.
- Crain, R., Cooper, C., Dickinson, J. L. (2014) Citizen science: a tool for integrating studies of human and natural systems. *Annual Review of Environment and Resources*, 39.
- Fleming, I. A. (1994) Captive breeding and the conservation of wild salmon populations. *Conservation Biology*, 8(3), 886-888.
- Gusset, M., Lowry, R. (2014) *WAZA magazine 15: towards effective environmental education*. Gland, Switzerland: WAZA Executive Office.
- Harris, C. Stephens, M. (1988) A combined corner and edge detector. In *Alvey vision conference Vol. 15, No. 50*, pp. 10-5244.
- Hough, J. (2006) Developing capacity. In M. Lockwood, G. L. Worboys, A. Kothari (Eds.), *Managing protected areas: A global guide* (1st ed.). (pp. 164-192) London, UK: Earth scan.
- Irwin, A. (1995) *Citizen science: a study of people expertise and sustainable development*. Routledge, London.
- Kirkpatrick, D. (1996). Great ideas revisited. Techniques for evaluating training programs. Revisiting Kirkpatrick's four level model. *Training and Development*, 50, 54–59.
- Kondolf, G. M. (1995) Five elements for effective evaluation of stream restoration. *Restoration ecology*, 3(2), 133-136.
- Leidel M., Niemann S., Hagemann N. (2012). Capacity development as a key factor for integrated water resources management (IWRM): improving water management in the Western Bug River Basin, Ukraine. *Environmental Earth Science*, 65:1415–1426 DOI 10.1007/s12665-011-1223-5

Malcolm S. K., Elwood F. H. III, Richard A. S. (2005) *The Adult Learner: The definitive classic in adult education and human resource development*. 8th Edition by Butterworth-Heinemann. ISBN 0750678372.

Malmqvist, B., Rundle, S. (2002) Threats to the running water ecosystems of the world. *Environmental Conservation*, 29(2), 134-153.

MEA: Millennium Ecosystem Assessment (2005). *Ecosystems and Human Well-Being: Synthesis*. Washington, DC: Island Press.

Nienhuis, P. H., Leuven, R. S. E. W. (2001) River restoration and flood protection: controversy or synergism? *Hydrobiologia*, 444(1-3), 85-99.

Nordeco & Denr (2001) *Biodiversity Monitoring System Manual for Protected Areas*. Second edition. Denr, Manila, and Nordeco, Copenhagen.

Palmer, M. A., Bernhardt, E. S., Allan, J. D., Lake, P. S., Alexander, G., Brooks, S., Galat, D. L. (2005) Standards for ecologically successful river restoration. *Journal of applied ecology*, 42(2), 208-217.

Reed, M. S., Dougill, A. J., & Baker, T. R. (2008) Participatory indicator development: what can ecologists and local communities learn from each other. *Ecological Applications*, 18(5), 1253-1269.

Richards, C., Blackstock, K. L., Carter, C. E. (2004) *Practical Approaches to Participation SERG Policy Brief No. 1*. Macauley Land Use Research Institute, Aberdeen.

Schultz, F., Utz, S., & Göritz, A. (2011) Is the medium the message? Perceptions of and reactions to crisis communication via twitter, blogs and traditional media. *Public relations review*, 37(1), 20-27.

Shields Jr, F. D., Copeland, R. R., Klingeman, P. C., Doyle, M. W., & Simon, A. (2003) Design for stream restoration. *Journal of Hydraulic Engineering*, 129(8), 575-584.

Stringer, L.C., Reed, M.S., Dougill, A.J., Rokitzki, M., Seely, M. (2007) Enhancing participation in the implementation of the United Nations Convention to Combat Desertification. *Natural Resources Forum* 31, 198–211.

Tockner, K., Stanford, J. A. (2002) Riverine flood plains: present state and future trends. *Environmental Conservation*, 29(3), 308-330.

Voinov, A., Bousquet, F. (2010) Modelling with stakeholders. *Environmental Modelling & Software*, 25(11), 1268-1281.

Younge, A., Fowkes, S. (2003). The Cape Action Plan for the Environment: overview of an eco-regional planning process. *Biological Conservation*, 112(1-2), 15-28.

BUILDING A LASTING LEGACY

- Constitution of spearhead teams has generated a pool of trained cadre of frontline forest officials
- Trained cadre taking a lead in carrying out the activities at multiple levels with multiple stakeholders independently
- Pool of trained individuals is used as a citizen scientist in helping in ecological survey & monitoring
- Trained youth have mobilized various stakeholders for successful biodiversity monitoring and carry forward the activities in their respective states

KEY MESSAGE

Capacity and skill development of human resources is one the important means to Conserve Biodiversity.

GACMC

Ganga Aqualife
Conservation
Monitoring Centre

Wildlife Institute of India

Post Box #18,
Chandrabani
Dehradun-248001
Uttarakhand, India
t.: +91 135 2640114-15,
+91 135 2646100
f.: +91 135 2640117

Quick Link

http://wii.gov.in/nmcg_training_database