

# External evaluation

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Strengthening Quality Infrastructure for Monitoring of the River Ganga II

## Final Report

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PTB | Section: Group Q.3

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This evaluation is an independent assessment. Its contents reflect the assessor's opinion which is not necessarily equivalent to PTB's view.

## Table of contents

<b>List of abbreviations</b> .....	<b>3</b>
<b>1. Summary</b> .....	<b>5</b>
<b>2. Introduction</b> .....	<b>8</b>
<b>3. Framework conditions and strategic approach of the project</b> .....	<b>10</b>
3.1. Framework conditions .....	10
3.2. Strategic approach of the intervention .....	11
<b>4. Evaluation methodology</b> .....	<b>13</b>
4.1. Evaluation design .....	13
4.2. Data sources; data quality .....	13
<b>5. Evaluation results</b> .....	<b>14</b>
5.1 Status of the transformation process (OECD/DAC) .....	14
5.1.1 Relevance .....	14
5.1.2 Coherence .....	17
5.1.3 Effectiveness .....	18
5.1.4 Efficiency .....	25
5.1.5 Higher-level development results .....	27
5.1.6 Sustainability .....	29
5.1.7 Summary of the intervention's contributions to the 2030 Agenda for Sustainable Development .....	31
<b>6. Assessment of specific evaluation questions</b> .....	<b>33</b>
<b>7. Learning processes and experiences</b> .....	<b>35</b>
<b>8. Recommendations</b> .....	<b>37</b>
<b>9. Annexes to the evaluation report</b> .....	<b>41</b>

## List of Abbreviations

Abbreviation	Full Form
<b>BMZ</b>	Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung (Federal Ministry for Economic Cooperation and Development, Germany)
<b>BOD</b>	Biochemical Oxygen Demand
<b>BIS</b>	Bureau of Indian Standards
<b>CPCB</b>	Central Pollution Control Board
<b>CW</b>	Capacity WORKS
<b>CWC</b>	Central Water Commission
<b>DC</b>	Development Cooperation
<b>DeGEval</b>	Deutsche Gesellschaft für Evaluation (German Association for Evaluation)
<b>DMEO</b>	Development Monitoring and Evaluation Office
<b>DO</b>	Dissolved Oxygen
<b>EUR</b>	Euro
<b>FC</b>	Financial Cooperation
<b>GIZ</b>	Deutsche Gesellschaft für Internationale Zusammenarbeit (German Agency for International Cooperation)
<b>IEC</b>	International Electrotechnical Commission
<b>IEWP</b>	Indo-European Water Partnership
<b>iKZE</b>	Intermittent Short-Term Expert (Interner Kurzeinsatz)
<b>ISO</b>	International Organization for Standardization
<b>JICA</b>	Japan International Cooperation Agency
<b>JRF</b>	Junior Research Fellow
<b>KfW</b>	Kreditanstalt für Wiederaufbau (German Development Bank)
<b>MOEFCC</b>	Ministry of Environment, Forest and Climate Change
<b>MU</b>	Measurement Uncertainty
<b>NABL</b>	National Accreditation Board for Testing and Calibration Laboratories
<b>NMCG</b>	National Mission for Clean Ganga
<b>NPL</b>	National Physical Laboratory
<b>NWQMP</b>	National Water Quality Monitoring Programme
<b>OECD-DAC</b>	Organisation for Economic Co-operation and Development – Development Assistance Committee
<b>OP</b>	Operational Plan
<b>PA</b>	Project Assistant
<b>PK</b>	Project Coordinator
<b>PTB</b>	Physikalisch-Technische Bundesanstalt (National Metrology Institute of Germany)
<b>QI</b>	Quality Infrastructure
<b>QCI</b>	Quality Council of India
<b>RTWQM</b>	Real-Time Water Quality Monitoring
<b>SC</b>	Steering Committee
<b>SDG</b>	Sustainable Development Goal
<b>SGR III</b>	Support to Ganga Rejuvenation III (GIZ Project)
<b>SMCG</b>	State Mission for Clean Ganga
<b>SPCB</b>	State Pollution Control Board

<b>Abbreviation</b>	<b>Full Form</b>
<b>STP</b>	Sewage Treatment Plant
<b>SuWaVi</b>	Sustainable Water Management and Wastewater Value Chains (GIZ Project)
<b>TC</b>	Technical Cooperation
<b>TG</b>	Technical Evaluator
<b>UK</b>	Uttarakhand
<b>UP</b>	Uttar Pradesh
<b>UPPCB</b>	Uttar Pradesh Pollution Control Board
<b>WQMP</b>	Water Quality Monitoring Programme
<b>WQMS</b>	Water Quality Monitoring System
<b>WRG 2030</b>	Water Resources Group 2030

## 1. Summary

This evaluation has been undertaken to assess the success of the bilateral cooperation project “**Strengthening Quality Infrastructure for Water Monitoring of the River Ganga – Phase II**”, implemented by the **National Metrology Institute of Germany (Physikalisch-Technische Bundesanstalt, PTB)** in cooperation with the **National Mission for Clean Ganga (NMCG)**. The project was commissioned by the **Federal Ministry for Economic Cooperation and Development (Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung – BMZ)** within the framework of the Development Programme *Sustainable Urban Development (SUD) in India*. The evaluation followed the standards of the **German Association for Evaluation (DeGeVal)** and applied the **OECD-DAC criteria** relevance, coherence, effectiveness, efficiency, impact, and sustainability. The assessment of the Capacity WORKS success factors strategy, cooperation, steering structure, processes, and learning & innovation has been integrated in the evaluation of the criterion effectiveness. The purpose was both to ensure accountability to BMZ and Indian partners and to enhance PTB’s institutional learning during project implementation.

### Context and Rationale

The project area covers the **Ganga River Basin**, inhabited by about 500 million people and supporting a dense network of settlements, industries, and farmlands. Despite significant investments under the Government of India’s *Namami Gange* programme and the involvement of multiple development agencies, the river still suffers from polluted river stretches. The lack of **reliable, quality-assured water-quality data** has been identified as a critical bottleneck for designing and enforcing targeted pollution-control measures. The PTB-NMCG partnership seeks to address this by building institutional and technical capacities for **credible, standardised water quality monitoring** aligned with national and international quality standards by the responsible laboratories of the State Pollution Control Boards (SPCB) in Uttarakhand and Uttar Pradesh

### Methodology and Process

A combined evaluation (phase II) and appraisal (phase III) mission to India took place from September 15<sup>th</sup> to 26<sup>th</sup> 2025 with site visits to the partner structures and other important stakeholders in Delhi, Patna, Kolkata, Dehradun and Lucknow, including virtual interviews with additional Indian, international and German stakeholders due to time constraints. The interviews with all relevant stakeholders have been carried out based on guiding questions, as developed per inception report dated August 14<sup>th</sup>, 2025.

It assessed progress against the project’s results framework, focusing on laboratory assessments, capacity-building, and the establishment of a quality-management network. Evidence was drawn from reports, monitoring data, and consultations with NMCG, NPL, SMCGs, SPCBs, and PTB staff. The findings informed a set of recommendations for a possible follow-on phase aimed at deepening institutionalisation, improving state-level outreach, and enhancing data-driven water-quality management.

### Key Findings and Recommendations

The evaluation concludes that the project has achieved **substantial progress in strengthening laboratory quality infrastructure** in the Ganga basin. Major recommendations include:

- Continuing NMCG as the **core implementing partner** with PTB’s technical lead;
- Strengthening **regional engagement** further through state-level partners such as SMCGs, SPCBs and their water quality monitoring labs in all five Ganga riparian states: Uttarakhand, Uttar Pradesh, Bihar, Jharkhand and West-Bengal
- Introducing a **Training-of-Trainers approach** for laboratory staff and set-up of intra-lab and inter-lab working groups to ensure capacity retention and increase sustainability despite staff fluctuation.

- Establishing **structured communication** with other Technical Cooperation (TC) and Financial Cooperation (FC) projects, the World Bank, and related donors to enhance complementarity.

### Assessment according to the OECD-DAC Criteria

Criterion	Evaluation of the criterion
1. Relevance	1.5
2. Coherence	1.5
3. Effectiveness	1.8
4. Efficiency	1.5
5. Impact	2
6. Sustainability	2
<b>Global assessment</b>	<b>1.7</b>

Relevance	<p><i>The project design is well aligned with Indian and BMZ priorities, addressing a clear capacity gap in reliable water-quality monitoring. It effectively responds to beneficiary needs and demonstrates resilience to contextual risks.</i></p> <p>Mark: 1.5</p>
Coherence	<p><i>The intervention shows good internal and external coherence, complementing GIZ's SuWaVi and SGR III modules and World Bank activities, though links to other donors could be expanded.</i></p> <p>Mark: 1.5</p>
Effectiveness	<p><i>Objectives on outcome and output level as measured by the indicators were mainly achieved or to be achieved until the end of the project.</i></p> <p>Mark: 1.8</p>
Efficiency	<p><i>Resources were used efficiently and complemented by strong partner contributions.</i></p> <p>Mark: 1.5</p>
Impact	<p><i>The project's contribution to higher-level environmental and policy impacts has been mainly indirect but sets a strong foundation for systemic improvements in data quality and decision-making.</i></p> <p>Mark: 2</p>
Sustainability	<p><i>Enhanced institutional capacities, especially laboratory accreditation and improved methods, create conditions for lasting benefits, though continued technical support is required for full self-reliance.</i></p> <p>Mark: 2</p>

**Overall Conclusion**

The project is assessed as highly relevant and effective, with efficient use of resources and a solid institutional foundation for future scaling. It has successfully established a culture of quality assurance in laboratory practices, improved methodological consistency, and strengthened Indo-German cooperation in the water quality monitoring domain. The follow-on project should consolidate gains by deepening state-level ownership, expanding training networks, and linking reliable data generation to regulatory enforcement and public disclosure. With these refinements, the initiative can play a transformative role in achieving measurable improvements in the Ganga River's water quality and in building a resilient national system for water quality monitoring.

## 2. Introduction

### Subject of the evaluation

Project title	'Strengthening Quality Infrastructure for Water Monitoring of the River Ganga II'
Programme	'Sustainable Urban Development in India'
Project (module) objective	The laboratories and authorities responsible for water monitoring in the Ganga catchment area in Delhi, Uttarakhand and Uttar Pradesh apply recognised quality assurance methods in data collection, evaluation and reporting.
Term	05/2023 -04/2026 (3 years)
Volume	1.000.000 EUR
Evaluation period	05/2023 (start of implementation) - 09/2025

The evaluation has been conducted in accordance with the standards of the German Association for Evaluation (*Gesellschaft für Evaluation*, DeGEval) and focused on the criteria of the Organization for Economic Cooperation and Development - Development Assistance Committee (OECD-DAC) relevance, coherence, effectiveness, efficiency, higher level development results (impact) and sustainability. The assessment of the Capacity WORKS success factors strategy, cooperation, steering structure, processes, and learning & innovation has been integrated in the evaluation of the criteria effectiveness. In addition, the evaluation guidelines of the Development Monitoring and Evaluation Office (DMEO) as part of the Draft National Evaluation Policy Framework (NEPF) of 2021, still under discussion, will be observed by the evaluation team throughout the evaluation process.

Source: [https://dmeo.gov.in/sites/default/files/2022-05/Monitoring\\_Evaluation\\_Studies\\_of\\_DMEO\\_Guidelines\\_2021.pdf](https://dmeo.gov.in/sites/default/files/2022-05/Monitoring_Evaluation_Studies_of_DMEO_Guidelines_2021.pdf)

In addition, the following specific questions have been assessed, as agreed upon in the preparatory meeting on July 17<sup>th</sup>, 2025, at PTB in Braunschweig:

- How to sustainably and continuously assure the trainings for laboratory and authorities after the end of the project?
- How well does our project fit in the Ganga Narrative?
- How visible is the project?

The objectives of this evaluation are twofold: (1) to comply with the rules of the National Metrology Institute of Germany (*Physikalisch-Technische Bundesanstalt*, PTB) to evaluate selected projects during its duration to assure accountability towards the Federal Ministry for Economic Cooperation and Development (*Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung*, BMZ) and the Indian cooperation partners and (2) to contribute to PTB's institutional learning.

The evaluation team was composed of the main evaluator (G) Dr. Kerstin Bark, who acted as team leader and was responsible for the evaluation design and implementation in line with the standards, and the technical evaluator (TG) Amita Bhaduri, who provided technical and content support. The evaluation team has been supported logistically and content-wise by the project team consisting of the project coordinator (PK) Lukas Nagel, Lieselotte Seehausen (EVA), the project assistance (PA) Nina Breuer, Uwe Miesner (Head of Section Q.32 - Asia), the local experts Dr. Swati Gupta and Pallavi Bishnoi as well as the intermittent German short-term expert (iKZE) Dr. Gerhard Rappold.

A combined evaluation (phase II) and appraisal (phase III) mission to India took place from September 15<sup>th</sup> to 26<sup>th</sup> 2025 with site visits to the partner structures and other important stakeholders in Delhi, Patna, Kolkata, Dehradun and Lucknow, barring a few meetings that were done in a virtual

mode. In a first round of interviews, the project outcomes and results have been discussed first with the complete project team and then again with all team members individually. The interviews/discussions with partners and other relevant stakeholders have been organised by the project team (see annexes 1 and 2; mission schedule and list of stakeholders) and carried out based on specific guiding questions (see annex 3). The evaluation findings have been presented to and discussed with partners and other stakeholders in the frame of a closing workshop on September 26, 2025. The evaluation mission was greatly enriched by field visits to selected laboratories, State Pollution Control Boards (SPCBs), and State Missions for Clean Ganga (SMCGs), which provided firsthand insights into the operational status, infrastructure, and quality management practices. These visits significantly deepened the understanding of ground realities and progress made under the project. The evaluators would like to highlight that all implementing partners on central, regional, and local level as well as other development projects have been very approachable throughout the mission and interested in an open discussion with the evaluation team. This being a strong indication for a well-embedded and widely recognized project.

The positive and negative learning experiences collected have served as a base for the appraisal of a follow-on project for the Technical Cooperation (TC) module "Strengthening Quality Infrastructure for Monitoring of the River Ganga III", which will begin in April 2026.

### 3. Framework conditions and strategic approach of the project

#### 3.1. Framework conditions

**Situation in the intervention area:** As India's holiest river, the Ganga continues to hold immense cultural and spiritual significance. Its basin remains home to about 550 million people—over 40% of India's population. Despite sustained investments, the river continues to face severe pollution pressures arising from inadequately treated municipal and industrial wastewater, solid waste disposal, and diffuse pollution from agriculture and urban runoff. These pose grave threats to human health, ecosystems, and biodiversity. Vulnerable groups such as women, persons with disabilities, and members of lower castes continue to suffer disproportionately from the consequences of environmental degradation and poor water quality, affecting food security, livelihoods, and health outcomes. Although the recognition of the human right to water and sanitation has gained traction in national discourse, its realization remains uneven in the Ganga basin, particularly for socially and economically marginalized groups.

**Situation in the sector:** Since its launch in June 2014, the Government of India's flagship programme Namami Gange—implemented by the National Mission for Clean Ganga (NMCG)—has evolved significantly. The programme's financial outlay has expanded beyond the original 2.4 billion EUR commitment, with new sub-programmes focusing on riverine biodiversity, afforestation, and real-time water quality monitoring. Several international development partners, including the German Development Bank (KfW), the World Bank, and JICA, continue to co-finance infrastructure projects, particularly municipal sewerage networks, common effluent treatment plants, and sludge management systems across key Ganga states. Despite these advances, challenges persist. While water quality monitoring networks have expanded and the National Water Quality Assessment and Surveillance Programme have been strengthened, coordination between central and state agencies could be improved. Many laboratories continue to face constraints related to staff capacity, equipment calibration, and data management. The reliability and comparability of water quality data have improved in some regions but remain inadequate for basin-wide scientific analysis, modelling, and policy decisions.

**Changes in framework conditions since the previous evaluation:** Over the past three years, the framework conditions for Ganga River rejuvenation have evolved notably. The Namami Gange Mission has transitioned from a primarily infrastructure-oriented phase toward an integrated river-basin management approach that emphasises continuous water quality monitoring, ecological flow maintenance, and community participation. The National Ganga Council has become more active in reviewing state action plans, while several state-level Ganga committees have been institutionalised to oversee implementation. Moreover, digitalisation efforts—such as the One Water Data Platform and National Water Quality Dashboard—have enhanced data transparency and inter-agency coordination, though data quality gaps persist. There is also increased private-sector engagement in pollution abatement through public-private partnerships and industrial effluent treatment systems. Policy alignment with the National Water Policy 2024 (draft) and India's River Basin Management Bill has further strengthened the institutional framework. At the same time, growing climate variability and groundwater stress in the basin have made resilience-building and adaptive management more urgent than before, requiring stronger linkages between water quality monitoring, pollution load modelling, and basin-wide planning.

**Changes during project implementation:** Since the previous evaluation three years ago, the project's geographic and institutional scope has broadened. The initial focus on Uttarakhand (around 10 million inhabitants) and Uttar Pradesh (around 200 million inhabitants)—the state responsible for the largest share of municipal and industrial discharge into the Ganga has been consolidated and extended to more labs in UP in Phase II. This shift was made in consultation with NMCG and BMZ, given the strategic importance of strengthening Uttar Pradesh's monitoring capacities. Three regional

laboratories in Bareilly (UP), Moradabad (UP), and Dehradun (UK) achieved ISO/IEC 17025:2017 accreditation during implementation so far. Three more are expected to meet the ISO/IEC 17025:2017 requirements until the end of the project in April 2026, marking a significant step toward improved analytical reliability. Nonetheless, sustained support remains essential, including structured on-the-job training, mentorship, and periodic proficiency testing as well as inter-laboratory comparisons to ensure that the data generated are robust and actionable.

During the review period, partners at both central and state levels have demonstrated growing interest in adopting digital and real-time water quality monitoring systems in addition to the existing manual laboratories. Although, even within a fully digitalised monitoring framework, the role of laboratory-based testing remains indispensable. Real-time sensors measuring parameters such as pH, dissolved oxygen, biochemical oxygen demand (BOD), chemical oxygen demand (COD), and turbidity must be regularly calibrated and validated against reference samples analysed in accredited laboratories. Without this calibration, sensor drift and environmental fouling can quickly lead to inaccurate readings, compromising data reliability. Furthermore, many critical contaminants—including heavy metals, pesticides, pharmaceuticals, and other emerging pollutants—cannot yet be measured reliably through real-time sensors. Laboratory-based spectrometric, chromatographic, or titrimetric methods continue to be the only accurate means of quantifying such substances. From a regulatory standpoint, the Central Pollution Control Board (CPCB) and the Bureau of Indian Standards (BIS) require that compliance monitoring—particularly for consent-to-operate and effluent discharge norms—is based on validated laboratory data, not digital sensor feeds alone. Accredited laboratories operating under ISO/IEC 17025:2017 ensure quality assurance through traceability, reproducibility, and a documented chain-of-custody, all of which remain essential for legal defensibility and data credibility. In effect, digital monitoring systems do not replace laboratory testing but rather redefine its function—from routine sampling to calibration, validation, and forensic-quality assurance.

### 3.2. Strategic approach of the intervention

The **strategic approach** is based on a combination of system-related and technical advisory and training measures, which has been delivered in the frame of 3 outputs with the following objectives:

**Output 1** “The competent authorities responsible for monitoring the water quality of the river Ganga are strengthened in their competence to plan, implement and use monitoring programs”

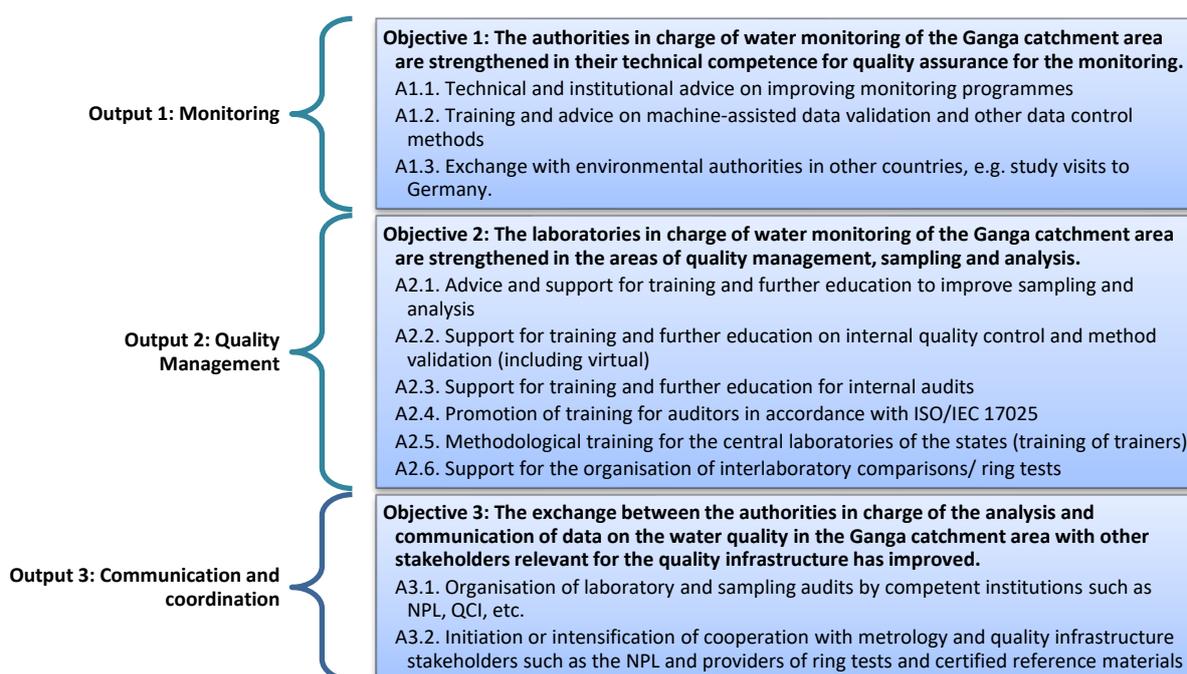
**Output 2** “The laboratories for monitoring the water quality of the river Ganga are strengthened in their competence in the areas of quality management, sampling and analysis”

**Output 3** “The competent authorities responsible for monitoring the water quality of the river Ganga increasingly coordinate among each other and with other stakeholders”

The **impact logic** of the project is based on the hypothesis, that the use of recognised standard quality infrastructure systems, instruments and methodologies will improve the monitoring of water quality of the river Ganga and lead to the generation of reliable, authentic, and credible data. The underlying **“theory of change”** is that quality assured data can be used for the accurate identification of the most important pollution sources with respect to their location as well as the quality and quantity of pollution. Only on this basis, appropriate and targeted pollution mitigation measures can be developed and implemented. The needed funds for the implementation of measures, as e.g. wastewater treatment plants, are available over the Namami Gange program and international development partners as World Bank and German FC (KfW).

Lack of quality data has been recognized by the partners (NMCG) as the most crucial bottleneck for devising scientifically backed and technology-driven rejuvenation measures. The PTB project caters to resolve this bottleneck effectively. Capacity development (CD) of the competent authorities responsible for water monitoring is considered as a crucial pre-requisite for the reduction of river water pollution to the benefit of the population concerned (target group).

The intended outcome of the project is that the laboratories and authorities responsible for water monitoring in the Ganga catchment area in Delhi, Uttarakhand and Uttar Pradesh apply recognised quality assurance methods in data collection, evaluation and reporting. Three outputs contributed to the achievement of this outcome objective. Output 1 “Monitoring” focused on strengthening the technical competences of the authorities in charge of water monitoring in the Ganga basin, mainly NMCG and SMCGs as well as CPCB and SPCBs for quality assurance in monitoring. Output 2 “Quality Management” focused on strengthening the laboratories in Uttarakhand and Uttar Pradesh in the areas of quality management, sampling and analysis. In Output 3 “Communication and Coordination”, the exchange between the responsible authorities and other stakeholders relevant for quality infrastructure, as NPL and QCI was supported an improved. As such, the three outputs contributed in a targeted way to achieving the outcome of the project.



A Capacity Development strategy was developed based on a SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis of the partner system, focusing on the development of individual competence, organisation, cooperation systems and enabling frameworks. This documented CD strategy summarises the needed capacity development measures, as on-site as well as online trainings in specific areas, study tours, etc., and limited provision of equipment/ instruments. For the development of recommendations and the identification of specific needs, lab assessments have been carried out. These recommendations were later implemented with NMCG’s approval and technical support from the project. Face-to-face interactions, and practical handholding training on the use of (new) instruments and implementation of Standard Operating Procedures (SOPs) was considered preferable over other modes of training.

## 4. Evaluation methodology

### 4.1. Evaluation design

The evaluation design considered the triangulation of data and methods. Information and data on the project implementation and results have been collected and assessed as follows:

(1) Review and analysis of project related documents, as e.g., project proposal with annexes to BMZ, capacity development strategy, stakeholder map, operational plan with result-based monitoring, progress reports, expert reports, partner documents, as policies, strategies, studies, sector analysis etc. The information in these documents has been assessed with respect to consistency and cross-checked in discussions with the project team, partners, and external experts.

(2) Structured interviews have been carried out with partners and stakeholders on their perception of the project implementation, results and challenges encountered as well as potential future opportunities. The interviews were based on specific individually adapted guiding questions (see annex 3). The outcomes have been analysed towards consistency and lessons learned and used in the report. The evaluation mission, including interviews and discussions in Delhi, Uttarakhand, Uttar Pradesh as well as Bihar and West-Bengal for the appraisal part, was conducted in a fully physical mode. The on-site visits to the SMCGs and the SPCB partner laboratories enabled direct observation of infrastructure, equipment functionality, and staff capacities, thereby allowing a more accurate assessment of the actual situation and progress achieved during project implementation.

(3) The preliminary evaluation results have then been discussed and crosschecked first with the project team and then with partners and stakeholders in a debriefing workshop on September 26, 2025.

As such a triangulation of data and methods have been assured.

A **strength** of this approach is the as such achievable triangulation of methods and data sources. The main **weakness** of the evaluation design is the enormous number of dimensions (18) and questions linked (54) in addition to the 3 specific evaluation questions, which are difficult to impossible to be covered fully during the data collection phase. This sheer number of aspects, which also often overlap, made it difficult to maintain focus and get to the heart of the project. Therefore, the focus was on treating relevant questions for the specific project, leaving some out with reason and summarising others where appropriate as well as answering them in one sentence.

### 4.2. Data sources; data quality

The evaluators had access to the relevant documents, which have been shared via PTBbox. Additional data and information have been provided by partners and project team anytime on request during the mission, so that the evaluators felt fully and comprehensively informed.

The basic documents - appraisal report, project proposal with annexes, implementation agreement, country specific information (BMZ), project and DC program progress report, minutes of meetings with partners (as steering committee and Water Resources Group 2030 networking meetings etc.), selected expert reports, Capacity WORKS documents (stakeholder map, steering structure, and processes) - are of good quality with respect to their content and significance.

The operational plan with its result-based monitoring system has been regularly up-dated and represents a good overview on the activities implementation and the results achieved.

## 5. Evaluation results

### 5.1 Status of the transformation process (OECD/DAC)

#### Marking scale for the evaluation of the OECD/DAC criteria

Evaluation	Grade	Description
very successful	1	very good result, far above expectations
successful	2	good result, entirely meets expectations
successful to a limited extent	3	satisfactory; results are below expectations, but mainly positive
rather unsuccessful	4	unsatisfactory result; below expectations; negative results prevail despite several positive results
mainly unsuccessful	5	negative results clearly prevail despite several positive partial results
entirely unsuccessful	6	the project has failed completely; situation has rather deteriorated

#### 5.1.1 Relevance

##### **Dimension 1: To what extent is the intervention’s design geared to country-specific, regional, and global policies and priorities of the partners and the BMZ?**

**Facts/ situation:** The following relevant policies and strategies have been identified as per project proposal and project documents:

**Country (India)-level:** (1) Namami Gange Flagship Program for Rejuvenation of the river Ganga, with a budget of around 3 billion EUR for the year 2025 (about 55 % more than in 2024) (2) the commitment to implement the SDG 6 “Water and Sanitation” of Agenda 2030 within the scope of the United Nations (3) Water Prevention and Control of Pollution Act (1974, amended in 2007) (4) India’s Water Vision 2047, which includes among others a recommendation on E-flow and water quality to be maintained for good river health (5) National Water Policy, 2012, and (6) National Water Quality Monitoring Programme (NWQMP).

**German Cooperation/ BMZ level:** (1) Water Strategy 08/2017 which comprises among others the intensification of water monitoring (2) Country Strategy India with focus on sustainable urban development, and (3) Ganga Narrative (2025), in which the monitoring surface water and wastewater discharge into the River Ganga is considered an important component to achieve the overall objective “Strengthening the climate resilience of populations threatened by water scarcity, water pollution and flooding in the Ganges basin by conserving and restoring water resources and ecosystems.”

**Analysis:** The project contributes to produce improved credible data for water quality monitoring of the river Ganga, which in-turn is the stepping-stone for developing effective programs and prioritised decision making for rejuvenation of the river under the Namami Gange Program. The project also, as such indirectly, contributes towards the enhancement of the water quality in the Ganga basin, as per SDG 6. The project is integrated in the sector coordination mechanism steered by NMCG (Water Act 1974). The improvement of water quality monitoring tends to achieve BMZ’s Water Strategy and country strategy for India through indirect contribution to the reduction of pollution and better river water quality leading to a sustainable urban development, as intended per Ganga Narrative.

**Conclusion and assessment:** It is evident that the project is very well aligned with global, Indian and BMZ strategies and priorities; thus, rated as very successful (1) for this dimension.

**Dimension 2: To what extent is the intervention's design geared to the needs and capacities of the target groups?**

**Facts/ situation:** As conceived in the project proposal and project documents, the target group of the project is the population of 500 million people, including vulnerable groups, in the Ganga basin suffering from water pollution. As intermediaries for reaching finally out to the target group, the implementing partners/ competent authorities in UK and UP (regional offices/ labs of the State Pollution Control Boards (SPCB) and the State Mission for Clean Ganga (SMCG) on regional level as well as NMCG and Central Pollution Control Board (CPCB) on central level) responsible for water quality monitoring of the river, have been identified. Their organisational capacities and technical competences must be strengthened for achieving an impact.

**Analysis:** During this evaluation, it was observed that the population in the Ganga basin can only be reached very indirectly by this very specific TC project focusing on the quality of water monitoring. There are gaps in the regional labs/ offices of the SPCBs and SMCGs in UK and UP.

**Conclusion and assessment:** The intervention's objectives are thus of limited relevance for the final target group (population), but high relevance for the intermediaries (implementing partners), making the intervention design successful (2).

**Dimension 3: To what extent is the intervention's design appropriately, realistically and plausibly geared towards achieving the intervention's objective?**

**Facts/ situation:** The project as per project proposal and project documents was structured around three key outputs:

- (1) Strengthening the technical competence of the authorities responsible for monitoring water quality in the Ganga basin, with a particular focus on enhancing quality assurance in monitoring processes.
- (2) Building the capacity of laboratories engaged in water quality monitoring within the Ganga basin, specifically in quality management, sampling, and analytical methodologies.
- (3) Improving communication and coordination between the authorities responsible for analysing and disseminating water quality data and other stakeholders within the broader quality infrastructure ecosystem.

**Analysis:** Based on interviews, cross-checks with partners and stakeholders, and a review of project documents and reports, the project design is found to be largely appropriate in its focus areas. The planned strengthening of competencies among the responsible authorities for water quality monitoring was both necessary and well-aligned with sectoral needs, confirming the relevance of this design element. Similarly, the envisaged enhancement of laboratory capacities and technical competences in quality management, sampling, and analysis was highly pertinent, given the existing gaps in analytical infrastructure and personnel skills at the time of project formulation.

The module objective indicators are only partially suitably to quantify the level of achieving the intended outcome. Indicators 1 and 2 measure important contributions to the achievement of the outcome objective and have been completely fulfilled. Indicator 3 is not really responding to the SMART criteria (specific, measurable, adequate, realistic and time-bound), being not very specific and comprising two levels (numerical and qualitative), which make it difficult to measure. For more details, see the summary table for dimension 1 in the effectiveness chapter.

**Conclusion and assessment:** The project has been designed appropriately, except indicator 3 regarding the networking between QI institutions and water quality monitoring stakeholders and is rated successful (2).

**Dimension 4: To what extent has the intervention's design responded to changes in the environment and adapted to the needs?**

**Facts/ situation:** Three major changes in the environment have been observed based on the project progress reports. The geographical focus of the module was strategically expanded in Uttar Pradesh at the request of project partners, reflecting both need and opportunity. The state faces more acute water pollution challenges than Uttarakhand, underscoring the urgency of establishing a reliable and continuous water quality monitoring system. At the same time, Uttar Pradesh possesses a comparatively stronger network of laboratories and monitoring infrastructure, making it a more feasible and sustainable environment for implementing systematic capacity development and quality assurance measures.

The project never aimed at taking a coordinating role itself. It only aimed at improving coordination and cooperation between the relevant authorities. And it did so quite successfully by employing exchange formats (e.g. NPL-NMCG exchange visit). The project underwent adaption to include gender sensitivity in several output indicators, and regional adaption of module indicator 2 based on the partner needs. The Central Water Commission (CWC) was included as a Steering Committee member. Also, there was smooth transition between project coordinators.

The training environment also underwent a significant transformation during the previous project period. Initially triggered by the COVID-19 pandemic, there was a rapid transition from conventional on-site capacity-building formats to virtual and online modalities. This shift has since evolved into a more deliberate strategy, with blended and webinar-based approaches now being institutionalised to reduce travel-related CO<sub>2</sub> emissions and overall training costs, while maintaining flexibility and wider reach for capacity development initiatives.

**Analysis:** Project activities—including laboratory assessments, training programmes, and the provision of analytical equipment—were efficiently planned and implemented, with a strategic focus on ten laboratories in Uttar Pradesh (Lucknow, Varanasi, Prayagraj, Kanpur, Bareilly, Moradabad, Bijnor, Bulandshahr, Ghaziabad and Muzaffarnagar) and four laboratories in Uttarakhand (Dehradun, Kashipur, Roorkee and Haldwani). This concentration of effort allowed for deeper technical engagement and measurable progress in strengthening quality assurance systems within the Ganga basin. Building on this foundation, activities are now being progressively extended to laboratories in Uttarakhand, ensuring broader geographic coverage and institutional integration.

The intervention remained well-aligned with evolving institutional structures, however, implementation modalities underwent adaptive adjustments in response to external circumstances. Training, communication, and networking activities also included virtual or hybrid formats, maintaining continuity of capacity development. Laboratory assessment visits were conducted by national experts, albeit in a limited capacity, ensuring essential technical oversight while balancing logistical constraints.

**Conclusion and assessment:** The project design has been adapted well to changes in the environment and rated to be very successful (1).

**Summarized evaluation**

The project was found to be geared well to the country, global and BMZ policies and priorities with direct and indirect impacts on the needs of identified target groups. The project has also been overall designed appropriately, catering to the needs of the beneficiaries. The project has demonstrated resilience to changes in the environment posing significant risks to the delivery of the project. Hence, the global assessment of the project for the relevance criterion is graded at 1.5 under this evaluation.

Criterion	Evaluation dimension	Weighting	Appraisal
Relevance	The intervention's design is geared to country-specific, regional and global policies and priorities of the partners and the BMZ.	25 %	1
	The intervention's design is geared towards the needs and capacities of the target groups	25 %	2
	The intervention's design is realistically and plausibly geared towards achieving the intervention's objective	25 %	2
	The intervention's design has responded to changes in the environment and adapted to the needs.	25 %	1
<b>Global assessment of the relevance</b>			1.5

### 5.1.2 Coherence

The “coherence” criterion refers to the intervention’s compatibility with other development interventions in the sector of the respective country/region.

**Dimension 1: Internal coherence: Within German development cooperation, to what extent was the intervention designed and implemented in a complementary manner, based on a division of tasks?**

**Facts/ situation:** The TC module (PTB) is part of the new DC-program “Indo-German engagement in the Ganga catchment area” consisting of altogether 5 modules: 2 more TC-modules: *Support to Ganga Rejuvenation III* (SGR), PN 2022.2134.9 (GIZ), *Support to India's Water Vision 2047* (SuWaVi), PN 2024.2129.5 (GIZ) and 2 FC modules (KfW). Close links consist to the TC-module SGR III, which supports NMCG in the design of regulations and standards for a better water management and SMCGs in the Ganga riparian states in the field of water quality analysis and the TC-module SuWaVi, which, was commissioned by BMZ in April 2025 and will work among others in two Ganga states (Bihar and Uttarakhand).

**Analysis:** The interviews with GIZ teams revealed that with them, there is an intended synergy mainly with respect to data quality to be improved by support of the PTB project and this homogenised data is then used by the GIZ project for the design of Ganga rejuvenation measures (especially in the Ramganga Basin). There is a contribution to the DC-program indicator 3b): “Hectares of catchment areas (including water bodies) subject to water monitoring in line with international standards”. It was also noted that regular (informal) exchange for coordination of activities over regular meetings of the project coordinators has been taking place which could be more formalised in the future.

The participation in DC-program meetings for progress monitoring and reporting to BMZ has also been recommended for enhanced coherence. No direct links were found to the two FC-modules (KfW) “Programme for the Development of Integrated Urban Infrastructure in Rishikesh” and the “Programme for environmentally friendly urban development in the states of the Ganges basin” which includes mainly the financing of sewerage infrastructure in Haridwar and Rishikesh. The investments are meant to complement the NMCG STP projects in UK, no investment in UP is foreseen.

**Conclusion and assessment:** The project is very well embedded in the DC program” Sustainable Urban Development” with relevant synergies to the TC project (GIZ) and no direct synergies with the FC Project (KfW); regular exchange is also assured in the frame of the DC Program, leading to a very successful (1) rating for this dimension.

**Dimension 2: External coherence: To what extent does the intervention’s design and implementation complement the partner's own efforts and is coordinated with other donors’ activities?**

**Facts/ situation:** The World Bank is one of the most important development partners/ donors in the Ganga region with its Second National Ganga River Basin Project (SNGRBP) with a total volume of one billion USD for 10 years. A major focus of the SNGRBP is addressing the pollution from untreated

domestic wastewater, which accounts for over 80% of the pollution load in the Ganga. The project finances sewage networks and treatment plants (STPs) in select urban areas to control pollution discharges, particularly extending coverage to towns along the Ganga's tributaries. The project includes an institutional development component aimed at strengthening the framework for Ganga River basin management, which specifically involves the CPCB. A key aspect is the Strengthening of Environmental Regulators (SER) sub-component. This aims to support capacity-building of the Central and State Pollution Control Boards by focusing on improving information systems, staff skills and laboratory accreditation and infrastructure facilities. This assistance supports the CPCB's mandate for Water Quality Monitoring (WQM) of the river Ganga, including the installation and operation of Real-Time Water Quality Monitoring (RTWQM) stations to measure parameters like Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD), and others. Activities also include upgrading the Water Quality Monitoring System (WQMS), comprehensive inventory of pollution sources, and strengthening environmental compliance monitoring. The PTB project collaborated closely with UN GEMS on developing the Moodle Course. They provided consultation on the appropriate approach, and the PTB team assisted them by providing insights into Indian stakeholders, challenges, and sources for obtaining public water monitoring data. The PTB project established partnerships with the Wildlife Institute of India (WII), the Australia Water Partnership (during Stockholm World Water Week), and the National Institute of Urban Affairs (NIUA) for its Urban River Management Plans (URMPs).

**Analysis:** Based on the interview with World Bank team and a review of meeting documents co-organised with their support, it can be established that on one hand, World Bank's credit line is spent by NMCG for financing of equipment and recruitment of staff for laboratories in the Ganga states, where the PTB project can support with specific CD/ trainings for lab staff. On the other hand, PTB participates in the World Bank stakeholder meetings for better alignment and coordination with other relevant actors in the sector.

**Conclusion and assessment:** The project aligns well with the World Bank Group and complements their activities in the sector. Hence the project has been rated as a successful (2) for this dimension.

### Summarized evaluation

The project was found to be internally and externally coherent with suitable alignment to German Development Cooperation and complementarity with other donors' activities (limited to the World Bank Group). The Global assessment of the coherence criterion for the Project is graded at successful (1.5).

Criterion	Evaluation dimension	Weighting	Appraisal
Coherence	Internal coherence: Within German development cooperation, the intervention was designed and implemented in a complementary manner, based on the division of tasks.	50 %	1
	External coherence: The intervention's design and implementation complement the partner's own efforts and are coordinated with other donors' activities.	50 %	2
Global assessment of the coherence			1.5

### 5.1.3 Effectiveness

The "effectiveness" criterion evaluates the extent to which the intervention has achieved its objective (at outcome level) – or is expected to achieve it by the end of its term.

**Dimension 1: To what extent has the intervention achieved its objective (at outcome level) according to the indicators agreed upon?**

**Facts/ situation:** Drawing from the project objectives and indicators as per result matrix, the project was conceptualised and 3 indicators on outcome level and 6 indicators on output level defined to measure the achievement of the project objective.

**Analysis:** After a careful review of the relevant project documents (project proposal, expert reports, meeting minutes, lab assessment procedures etc.) and multi-level discussions with the involved project team, the following achievements could be observed.

### 1) Outcome Level

<b>Module objective:</b> The laboratories and authorities in Delhi, Uttarakhand and Uttar Pradesh that are in charge of monitoring the water quality of the Ganges River apply recognized quality assurance methods for data acquisition, analysis and reporting.	
<b>Module objective indicators (05/2025, change offer)</b>	<b>Status/ progress 09/2025</b>
<p><b>Indicator 1:</b> Starting from 2023, the responsible authorities at national level, such as NMCG, will implement two recommendations per year (such as guidelines and standard operating procedures, gender-specific adaptations (for improving the work environment for female laboratory staff) for assuring the quality of water monitoring of the Ganges River in terms of data processing, use and reporting.</p> <p><i>Basic value:</i> 0 recommendations <i>Target value:</i> 6 recommendations in 3 years (2 per year)</p>	<p>Recommendations have been implemented in 6 categories: (1) Sampling, (2) Analytics, (3) Working conditions (gender-neutral), (4) Working conditions (female specific Labs), (5) Working conditions (female specific HR) and (6) Data management</p>
<p><b>Indicator 2:</b> The number of laboratories that work as per the requirements of an accreditation for ISO/IEC 17025 in terms of 12 (out of 25) parameters relevant for monitoring has increased to 14, out of which 12 are in Uttar Pradesh (UP) and 2 are in Uttarakhand (UK) .</p> <p><i>Basic value:</i> 9 laboratories (9 in UP, 0 in UK) <i>Target value:</i> 14 laboratories (11 in UP, 3 in UK)</p>	<p>11 laboratories (10 UP, 1 UK):</p> <p>in UP 1 more lab (Muzaffarnagar) will be accredited in October/ November (= 10 labs in UP)</p> <p>in UK needs analysis for 2 more labs (Roorkee and Kashipur) is on-going (= 3 labs in UK probably to be achieved until the end of the project phase)</p>
<p><b>Indicator 3:</b> 10 decision-makers of the authorities in charge of water monitoring can confirm with an example that they are able to make better decisions due to the connection with the quality infrastructure institutions.</p> <p><i>Basic value:</i> 0 decision-makers <i>Target value:</i> 10 decision-makers</p>	<p>8 decision-makers confirm to be able to make better decisions but only 2 provided tangible examples</p>

### 2) Output level

**The Output 1 objective is to strengthen the authorities in charge of water monitoring of the Ganga catchment area in their technical competence for quality assurance for the monitoring, with a special focus on female laboratory employees.**

The project successfully strengthened the water monitoring authorities in the Ganga catchment area by enhancing their technical competence for quality assurance, with a dedicated focus on female laboratory employees. All objectives were met as of September 2025: five specific recommendations for action were developed—including two focused explicitly on improving the working conditions for female laboratory staff—and four standardized methods for quality control in data processing were defined, covering data acquisition, management, validation, and sharing.

**The project's objective for Output 2 is to strengthen the laboratories in charge of water monitoring in the Ganga catchment area in the key areas of quality management, sampling, and analysis.**

Significant progress has been made toward this goal as of September 2025: the target for Indicator 2.2 was successfully met with the number of laboratories demonstrating metrological expertise through proficiency tests increasing from eight to 14. However, the training for six experts (including two women) to become ISO 17025 Lead Implementers (Indicator 2.1) is still pending, with the training scheduled for November 2025, though this is considered achievable within the project's duration.

**The objective for Output 3 is to improve the exchange between water quality analysis and communication authorities in the Ganga catchment area and other relevant quality infrastructure stakeholders.**

Progress toward this goal is ahead of schedule as of September 2025: the target of six training/audits on metrology and quality management for State Pollution Control Board laboratories (Indicator 3.1) was surpassed, with five trainings implemented and two more scheduled for October and November 2025, bringing the total to seven. In addition two gender trainings have been implemented in Uttarakhand and Uttar Pradesh. Regarding Indicator 3.2, which targets five contributions on metrology and quality infrastructure topics, two contributions have been submitted so far via metrology training events (MV trainings), with several key sessions and high-level visits, including one visit of NMCG to the National Physical Laboratory (NPL) in September 2025. More exchange formats are planned for the upcoming months to meet the remaining targets.

**Conclusion and assessment:** The indicators are partially unsuitable for measuring the objective's achievement because they are not always measurable or ambitious enough to reflect real progress.

Outcome Indicator	Status/Progress (10/2025)	Degree of Fulfilment	Appraisal (A-C)*	Justification
<b>Indicator 1: Recommendations implemented by responsible authorities at the national level (Target: 6 in 3 years).</b>	Recommendations have been implemented in all 6 categories: (1) Sampling, (2) Analytics, (3) Working conditions (gender-neutral), (4) Working conditions (female specific Labs), (5) Working conditions (female specific HR) and (6) Data management	100 %	A	This module level indicator is measuring an important contribution to the achievement of the outcome objective and has been completely fulfilled.
<b>Indicator 2: Number of laboratories working per ISO/IEC 17025 requirements for 12 parameters. (Target: 14 labs (11 UP, 3 UK)).</b>	11 laboratories achieved (10 UP, 1 UK). 1 more UP lab expected soon. Needs analysis ongoing for 2 UK labs (Roorkee and Kashipur), which would reach the target of 14.	79 % (11 out of 14) achieved in October 2025. The target is likely to be met or nearly met by the end of the project phase.	A	The target value is very likely to be achieved by the end of the project phase, as an additional UP lab is imminent, and the UK labs are in the final preparation stage. It measures an important contribution to achieving the module objective.
<b>Indicator 3: 10 decision-makers can confirm better decisions due to connection with quality infrastructure institutions. (Target: 10 decision-makers with an example).</b>	8 decision-makers from NMCG, CPCB and SPCB have confirmed that they are able to make better decisions during a training session conducted in August 2025 in Lucknow. Although only 2 gave a tangible example.	80 % (8 out of 10 decision-makers) achieved on the numerical count, but the critical qualitative component ("with an example") was only fulfilled to 20 % (2 examples)	B	The indicator is not really SMART. It is not very specific and comprising two levels (numerical and qualitative), which make it difficult to measure.

\* Appraisal: A = adequate indicator; B = slight objections; C = poor indicator, to be revised if applicable

### Rationale for Degree of Fulfilment Calculation

- *Indicator 1:* The target is 6 recommendations. 6 have been implemented. (100 %).
- *Indicator 2:* The target is 14 laboratories. 11 are currently achieved. (79 %). Given the high confidence in achieving the rest (imminent UP lab and advanced UK needs analysis), 100 % are probable until the end of the project.
- *Indicator 3:* The numerical count is 8 decision-makers out of a target of 10, which is 80 %. However, the qualitative aspect ("example given") was limited (only 2) and furthermore difficult to measure: What is an

example proving that the stakeholders can make better decisions and having as such an impact on the achievement of the outcome objective.

The project will achieve its objectives by fulfilling 2 out of the 3 outcome indicators completely and 1, which was not adequate (B) to a limited extent (80 % / 20 %). Hence the project has been rated very successful (1) for this dimension of effectiveness criterion.

**Dimension 2: To what extent have the intervention’s activities, inputs and outputs considerably contributed to achieving the intervention’s objective (at outcome level)?**

**Facts/ situation:** The project successfully delivered a range of training events. This included two in-person trainings on Analytical Method Validation (MV) in Uttarakhand (Dehradun, 26 participants) and Uttar Pradesh (Lucknow, 22 participants). Six on-site trainings were conducted by the Quality Council of India (QCI) across Lucknow and Dehradun, covering ISO/IEC 17025, Risk Management, Measurement Uncertainty, and Internal Audit, with participant numbers ranging from 21 to 34. Additional specialized trainings included one session on Measurement Uncertainty (MU) in Lucknow (18 participants), one on the Water Quality Monitoring Program (WQMP) in Delhi (13 participants), and two Data Management trainings in Delhi (16 and 24 participants). In terms of digital outreach, five webinars were held on various topics, including Microplastics and Water Safety Plans. Two workshops on gender mainstreaming were carried out.

Facts/ situation (activities and inputs implemented as per operational plan)	Analysis (interviews and cross-check with partners and other stakeholders, study of project documents, reports etc.)	Conclusion and assessment (by the evaluation team)
MV Training in Uttarakhand and Uttar Pradesh	Two trainings were conducted on Analytical Method Validation (MV) at Dehradun (26) and Lucknow (32) Recommendations for improving water quality monitoring developed (expert reports)	<i>Participants successfully trained/ received certificates for the ISO 17025 training</i> <i>Number of participants in online trainings and webinars limited: training success hard to measure</i>
QCI trainings: ISO/IEC 17025:2017 – Risk Management Requirements & Implementation in Laboratories Uncertainty of Measurement and Decision Rule as per ISO/IEC 17025:2017 Laboratory System and Internal Audit as per ISO/IEC 17025:2017	There were a total of six QCI trainings on-site (Lucknow (34, 34), Dehradun (24, 21, 24) and Lucknow (24))	
MU Training (UPPCB)	One training on Measurement Uncertainty was held; Lucknow (18)	
Training WQMP	One training on Water Quality Monitoring Program (WQMP) was conducted; Delhi (13).	
Data management	Two trainings conducted (Delhi (16, 24))	
Webinars	A total of five webinars were held on topics ranging from Laboratory Management to Microplastics and Water Safety Plans; (Online (33), Online (31) and Online (20)).	
Workshops	2 workshops on gender mainstreaming carried out, one in UK and one in UP. 9 Workshops delivered by Watershed Monitoring (Delhi): <b>April 2023-</b> 1) Optimize data acquisition, validation and managing from Real-time monitoring stations, field work and laboratories. 2) Optimize the planning and execution of field work. 3) Identify the optimal strategy of adding additional sampling sites for Real-time and Manual Monitoring. <b>Oct 2023-</b> 4) Determine and assess monitoring objectives. 5) Establish sampling frequency & recurrence.	

Facts/ situation (activities and inputs implemented as per operational plan)	Analysis (interviews and cross-check with partners and other stakeholders, study of project documents, reports etc.)	Conclusion and assessment (by the evaluation team)
	6) Plan quality control & assessment. <b>July 2024-</b> 7) Classify water bodies 8) Delimit the watershed subject to the WQMP 9) Select & classify water quality parameters	
Limited equipment and instruments, including laptops purchased or under procurement process	procured	

**Conclusion and assessment:** The in-person trainings, specifically the MV and ISO 17025 trainings, were successful, evidenced by participants being successfully trained and receiving certificates. Furthermore, the trainings resulted in the development of recommendations for improving water quality monitoring via expert reports. The project's strategy to enhance technical competence through face-to-face training was highly effective, delivering high-quality training and tangible outputs (certificates and recommendations). The project has been graded as good (2) for this dimension of the effectiveness criterion.

**Dimension 3: To what extent has the quality of the intervention’s implementation considerably contributed to achieving the intervention’s objective (at outcome level), based on the capacity WORKS success factors?**

**Facts/ situation:** The following (mandatory) Capacity WORKS (CW) instruments have been used/ applied:

- Stakeholder map: documented
- Steering structure and processes: not documented as per CW Manual, follow-up mainly done over NMCG and state level actors directly with subsequently following up via the steering committee
- Results and impact model: documented as part of the WiMo
- Operational planning for medium-term and result-based monitoring, using among others Stackfield keeping track of activities regularly done, aside the “WiMO” sheet, which is up-dated once a year together with the annual progress report to BMZ
- Capacity WORKS self-assessment: filled out by the PTB team (no partners) in May 2025
- Instead of a full-fledged SWOT analysis, a training needs assessment focused on individual (competence) has been carried out for all labs (one initial SWOT done at the beginning of the current phase)
- Developed from this a list of trainings, webinars, lab assessments etc. to address the needs identified instead of a full-fledged CD strategy on all four level

**Conclusion and assessment:**

**1. Strategy:** The project strategy has been developed together with the main implementing partners, NMCG (central level) and the SMCGs as well as the SPCB’s in UK and UP (state level). As the project is focused on individual competence capacity development of laboratory staff by providing trainings, webinars and workshops, a needs assessment was used as appropriate approach to define their training needs and respond to them in a customised way, instead of a full-fledged CD strategy. The contribution of these CD measures to achieving the project’s objective have been regularly reviewed, shared with the partners and adapted if needed in a participatory process during updating the OP.

## 2. Cooperation

A **stakeholder map** has been established and documented at the start of the project. Based on this map, the relevant partners for the implementation of the project have been identified. These are mainly the competent authorities involved in water quality monitoring of the river Ganga on central (NMCG) and state level (SPCB's regional offices/ labs) in Uttarakhand and Uttar Pradesh, who benefitted directly from the capacity development measures implemented. Capacity development has been supported by QI institutions as NPL providing technical expertise and consultancy.

### Communication and cooperation:

- Regular meetings with NMCG (via telephone nearly daily; meetings at least one a week, often more) for discussing activities, operational tasks as workshops etc.
- Regular meetings with NPL, at least once per month depending on needs
- In UK and UP regular meetings and discussions with the SPCB's for the coordination of activities (weekly to monthly depending on the needs) and regular meetings on request with the SMCG's, activity based
- Regular activity-based visits to/ meetings with the laboratories, as e.g. lab assessments and trainings (lightly lower interaction as with the SPCB's)
- Regular meetings with GIZ (SGR III) for coordination; the local expert has an office in the GIZ; GIZ facilities are used for workshops etc.

## 3. Steering Structure

For the steering of the project, a **steering committee** (SC) was set-up. Members of this committee are, besides NMCG (in the lead, convoking the meetings) PTB, NPL, CPCB, CWC, UPPCB, UKPCB, UKSMCG, UPSMC and NPL as regular members.

In the SC meetings, realised once a year, progress and activities implemented (Operational Plan and WiMo) are shared and discussed. The outcomes of the strategic discussions, as lessons learned, need for adaptation etc. are documented in the form of minutes of meeting to be shared with all implementing partners of the project.

## 4. Processes

The following processes are taking place in close coordination with partners:

- Steering processes: Steering committee meetings once a year; Regular bilateral meetings with project partners to discuss project progress and support needs; Weekly "jours fixes" (team calls); Ongoing output and impact monitoring and annual reporting to BMZ
- Core processes: Expert visits to regional labs conduct trainings; Regular visits of the project management team; Support processes; Regular backstopping with project partners by the local project representative; Ongoing exchange within the project team; Logistics and financial administration, organised as per needs

Steering, core and support processes have been implemented by and large as planned and are considered as appropriate allowing adjustments to achieve the overall objectives.

## 5. Learning and Innovation

The main learning objectives defined in the project are:

- Qualification of central and regional labs in all aspects and steps of water quality monitoring, as: sampling, transportation & storage of samples, analysis with processing, evaluation and publication of data, among others with the objective to prepare them for accreditation. Sample analysis remains a central component of PTB expert's laboratory visits. The project's training programs and workshops have thoroughly covered crucial analytical topics, including

Measurement Uncertainty, Method Validation, and Data Management. Furthermore, a dedicated webinar on laboratory management strategies was conducted, ensuring that every essential aspect was addressed.

- The ability of the partners to steer and implement the project have been strengthened by the establishment of a steering committee and mechanism (see “steering”) and the introduction of clear working and cooperation processes (see “processes”).
- The use of lessons learnt was supported by regular documentation (in the form of expert, lab assessment and training reports) and monitoring of their use in the frame of result-based-monitoring system of the project.
- The online learning platform MOODLE has been extended for India to online trainings on sampling and chemical analysis for water (two 14 days courses) to be offered via NMCG in the follow-up phase of the project.

**Conclusion and assessment:** The application of the Capacity WORKS tools has been successfully adapted to the current project conditions, meaning that the five success factors were “well observed and implemented” through consistent bilateral coordination and targeted training efforts. This robust technical implementation directly contributed to achieving the project’s laboratory accreditation outcomes. This dimension hence rated successful (2).

**Dimension 4: To what extent has the intervention leveraged potentials of unintended positive results and reacted to risks and/or the occurrence of (unintended) negative results?**

**Facts/ situation:** This dimension assesses the project’s ability to capitalize on unexpected positive opportunities and its responsiveness to unintended negative risks. The intervention has successfully leveraged unexpected methodological potentials but demonstrated limitations in reacting to a key sustainability risk related to staff turnover. The project observed an unintended positive development: the introduction of real-time water quality monitoring as an additional methodology. This was done at the request of the NMCG, alongside the expanded use of the Moodle online platform. A major negative situation identified was the high rate of staff turnover/changes in personnel in the regional laboratories and offices, which poses a significant threat to the sustainability of the capacity development measures and trainings provided. Furthermore, the evaluation considered the potential unintended negative impact of polluting industrial production relocating to regions outside the Ganga basin to avoid stricter environmental regulations, but this effect did not occur.

**Analysis:** The analysis confirms the positive potential of the new methodologies. The new real-time water monitoring stations, which are intended to be financed through the World Bank credit line, might contribute to delivering more credible data and will actively engage staff who have been trained by the PTB project. Regarding the sustainability risk, the analysis traced the high staff turnover to the fact that the main participants in the trainings were often Junior Research Fellows (JRFs), who typically do not remain with the laboratories for extended periods. The potential, but non-materialized, negative industrial relocation impact confirms that stricter environmental norms did not, in this instance, cause the expected adverse social and environmental side effects in other regions.

**Conclusion and Assessment:** The project demonstrated effective agility by successfully integrating new methodologies like Moodle. This action capitalized on an unintended positive potential and contributed to the monitoring system. However, the intervention showed limitations in reacting to the critical issue of staff changes (JRF turnover). Since the project’s core investment is in training personnel, the inability to implement measures to retain trained staff jeopardizes the long-term benefit and sustainability of the capacity development activities. Therefore, while positive results were leveraged, the failure to mitigate the significant risk to sustainability leads the evaluation team to conclude that the reaction to risks and the leveraging of potential were successful, and the dimension is rated as good (2).

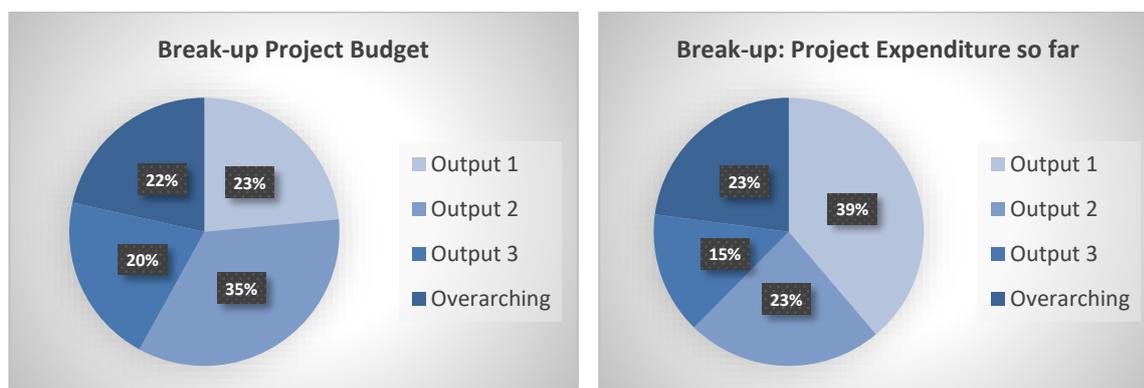
### Summarized evaluation

Criterion	Evaluation dimension	Weighting	Appraisal
<b>Effectiveness</b>	The intervention has achieved its objective (at outcome level) according to the indicators agreed upon.	25 %	1
	The intervention's activities, inputs and outputs have considerably contributed to achieving the project's objective (at outcome level).	25 %	2
	The quality of the intervention's implementation has considerably contributed to achieving the intervention's objective (at outcome level).	25 %	2
	The intervention has leveraged potentials of unintended positive results and reacted to risks and/or the occurrence of (unintended) negative results.	25 %	2
Global assessment of the effectiveness			1.8

#### 5.1.4 Efficiency

Since it is very difficult, if not impossible, to assess the monetary value of the impacts of a technical cooperation project that is essentially implementing capacity development measures, the evaluation of its efficiency will focus on the generic appraisal of the production and the allocation efficiency.

The proposed project budget of approximately 1,000,000 EUR is allocated across four main areas: Output 1, Output 2, Output 3, and Overarching costs (which typically cover management, administration, and non-specific project activities). The distribution is as follows (pie chart).



The distribution of the actual spending highlights a strong concentration in Output 1, which consumed the largest portion of the actual costs, largely driven by the high expenditure on External Personnel. In contrast, Output 2 and Output 3 are significantly behind their proposed budgets, although the activities have been completely implemented. This was mainly due to considerable partner contributions, mainly by NPL, as the in-kind provision of PTs (Output 2) and trainings (Output 3).

Up to now, about 78 % of the (1,000,000 EUR) is spent (actual expenditures) and about 16 % are planned to be spend in the remaining project duration ("obligos"). Materials & Construction only represented negligible amount of under 1 % of the project budget. This means that the finances of the project have been very well managed ("precision landing").

**Dimension 1: To what extent can the use of resources by the intervention be deemed reasonable with regard to the outputs achieved (production efficiency)?**

**Facts/ situation:** The project is implemented by a small project team, composed of international personnel (a part-time project coordinator, a part-time project assistant, and an intermittent short-term expert), working mainly from Germany with regular visits to India and a national team consisting of two part-time national experts (one technical and one managerial). Furthermore, the project benefitted from the contribution of two focal persons/ project coordinators for implementation provided by NMCG and NPL at no cost. The project also involved the implication of qualified consultants/ partners, such as a technical expert from NPL and training providers, to implement capacity-building measures like lab assessments and trainings, mainly in person/ hybrid mode.

**Analysis:** The small project team working virtually to a high extent is contributing to cost-efficiency in the delivery of outputs and products. The provision of implementation support by NMCG and NPL through focal persons at no cost represents an in-kind contribution by the partners, which facilitates the project budget. The use of external expertise was also deemed cost-efficient, as the engagement of consultants and partners was based on tender procedures, allowing the choice of the best price-performance ratio for the services to be delivered. The additional use of virtual/digital formats for capacity development was also confirmed to be very cost-efficient.

**Conclusion and Assessment:** Based on the resource allocation and management practices, the evaluation team concludes that the resources used were reasonable with respect to the outputs delivered. The use of a lean project structure, leveraging pro bono support from key government partners (NMCG and NPL), and employing competitive tendering for consultants collectively underscore the project's focus on economic resource use. In particular the considerable in-kind contributions by NPL contributed to a high efficiency, with an overall rating of very successful (1) for this dimension.

**Dimension 2: To what extent can the use of resources by the intervention be deemed reasonable regarding the achievement of the intervention's objective/outcome (allocation efficiency)?**

**Facts/ situation:** The project's resource strategy was supported by external funding and partner contributions. It primarily relied on the use of equipment provided via other sources such as the NMCG (Namami Gange funds) and World Bank loans. Partner contributions were a significant input, including the release of staff for organizational and technical assistance, their participation in Capacity Development (CD) measures/ trainings, and the provision of lab spaces and venues for meetings. The project also maintained a focused cooperation with implementing partners, concentrating specifically on a limited number of regional laboratories of the SPCB's in UK and UP. Furthermore, all relevant partners and stakeholders were included in the steering of the project as members of the Steering Committee.

**Analysis:** The analysis confirms the cost-effective approach. The near-zero provision of instruments/ equipment by the project itself contributes to an achievement of the objectives in a cost-efficient way. The estimated partner contributions are substantial, amounting to about 180,000 EUR, which represents nearly 20 % of the total project budget. The deliberate focus on a limited number of implementing partners and regional labs contributed to a cost-efficient achievement of objectives. The participative steering and coordination involving all members of the Steering Committee was also found to contribute to the achievement of objectives in a cost-efficient manner. Also, the achievement of objectives will be possible due to the likelihood of spending the entire project budget by the project end.

**Conclusion and Assessment:** The evaluation concludes that the project's resources were used to a significant extent (around 80 % till end of September 2025) with respect to the objectives achieved. Also, the strategy of leveraging external resources (equipment from NMCG/ World Bank) and securing significant partner financial contributions (nearly 20 % of the budget) ensured strong

allocation efficiency for the resources that were spent. Therefore, the project gets an overall rating of successful (2) for the allocation efficiency criterion.

### Summarized evaluation

Criterion	Evaluation dimension	Weighting	Appraisal
Efficiency	The use of resources by the intervention is deemed reasonable with regard to the outputs achieved (production efficiency).	50 %	1
	The use of resources by the intervention is deemed reasonable with regard to the achievement of the objective/outcome (allocation efficiency).	50 %	2
Global assessment of the efficiency			1.5

### 5.1.5 Higher-level development results

This criterion shows the extent to which the intervention has contributed or is expected to contribute to overarching and relevant positive as well as negative development changes which are not part of its direct sphere of responsibilities (intervention's objective). Due to the high level at which the overarching effects lie (impact), it is often not possible to make a reliable causal assignment of cause and effect (attribution). Nevertheless, the projects contribute to the achievement or realisation of the impacts (contribution). This contribution was therefore plausible. In other words, it was checked whether it appears plausible that the project has contributed to the overarching effects (impact).

#### Dimension 1: To what extent have the intended higher-level development changes taken place or are expected to take place in the near future?

**Facts/ situation:** The intended higher-level development changes, as per module proposal and operational plan, are primarily social and environmental. These include the improvement of human health, environmental sustainability, and economic prosperity by providing better access to clean water and good management of freshwater ecosystems. Specifically, the project aims for the rejuvenation of the Ganga River by reducing pollution through targeted protection and prevention measures.

**Analysis:** Effective pollution abatement measures are needed to realize the improvements in human health, living conditions, and the environmental conditions of the Ganga. While funds for the identification and implementation of these needed projects are available through the Namami Gange program and international development partners, reliable (quality assured) water monitoring data are urgently needed to identify targeted pollution abatement measures as well as allow for monitoring their effectiveness. The evaluation notes a critical limitation: a technical cooperation (TC) project of limited scale cannot directly and measurably contribute to the implementation of these higher-level development changes, as monitoring of the water quality as such can't directly contribute to the reduction of pollution.

**Conclusion and Assessment:** The project makes an indirect contribution to achieving the higher-level development changes. This contribution is made by facilitating the identification and intended implementation of effective investment projects for Ganga rejuvenation through the provision of reliable data. However, given the project's limited scale and its inability to directly measure these higher-level outcomes, the contribution to the intended impact is assessed as successful (2).

#### Dimension 2: To what extent have the results achieved by the intervention (at outcome level) contributed to the intended or implemented higher-level changes.

**Facts/Situation:** The intended impacts, as outlined in the module proposal, relate to both social and environmental objectives. The project aims to contribute to SDG 6 of the Agenda 2030 ("Access to clean water and good management of freshwater ecosystems"). Achieving this is considered essential

for human health, environmental sustainability, and economic prosperity, leading to an improved quality of life and health protection for the population. Environmentally, the project's goal is to contribute to the protection and rehabilitation of the Ganges by providing more reliable, focused, and meaningful data for water quality monitoring. This data is needed for identifying main sources of pollution and developing targeted protection and prevention measures, such as the planning and construction of sewage/effluent treatment plants.

**Analysis:** Correct and reliable (quality assured) water monitoring data are an indispensable prerequisite and basis for identifying, developing, implementing, and monitoring effective pollution abatement measures for the rejuvenation of the river Ganga. Funds for these large-scale abatement measures are available through the Namami Gange program and international development partners like KfW and the World Bank. However, the analysis highlights a critical limitation: a technical cooperation (TC) project of limited scale cannot directly and measurably contribute to the implementation of the higher-level development changes, but only to the data quality which informs those changes.

**Conclusion and Assessment:** The evaluation concludes that the results achieved by the intervention (at the outcome level) make an indirect contribution to the intended rejuvenation of the river Ganga and the improvement of its water quality (SDG 6). Because the project provides a crucial, quality-assured data basis that enables larger investment projects, the contribution is assessed as successful (2).

**Dimension 3: To what extent has the intervention contributed to positive and not to negative unintended higher-level development changes?**

After careful review of project documents and stakeholder consultations, it was observed that no positive or negative unintended higher-level development changes have been observed during the evaluation process nor mentioned by the interview partners. Hence this dimension is assessed as successful (2).

**Summarized evaluation**

Overall, it can be determined that the contribution of the project towards the intended and unintended higher-level developmental changes has been majorly indirect. Therefore, the global assessment of the higher-level development results through the project has been graded as successful (2).

Criterion	Evaluation dimension	Weighting	Appraisal
<b>Higher-level development results</b>	The intended higher-level development results have taken place or are expected to take place.	25 %	2
	The results achieved by the intervention (at outcome level) have contributed to the intended or implemented higher-level results.	50 %	2
	The intervention has contributed to positive and not to negative unintended higher-level development changes.	25 %	2
Total assessment of the higher-level development results			2

### 5.1.6 Sustainability

The “sustainability” criterion evaluates whether the intervention’s benefits at outcome level and the higher-level development changes are long term and will perdure even after assistance has ended.

#### **Dimension 1: To what extent do the partners, target groups and organizations involved have the capacities required to ensure that positive results are continued?**

**Facts/ situation:** An assessment of capacities across three levels confirms a moderate baseline of individual expertise. At the level of individual competences, a large number of partner organization employees already possess long-term, practical experience in water analysis, but there are persisting gaps in sampling, selective gaps in analysis (depending on the parameter) and moderately severe gaps in data validation and reporting. The presence of young professionals who are motivated to expand their knowledge post-training creates a positive environment for assimilating the project’s technical trainings. While recognizing that organizational development presents evolving managerial structures and a need for infrastructural upgrades, the core technical team is strong following the PTB project. At the level of strengthening the system, the project operates within the complex, multi-stakeholder environment of Ganges River monitoring, indicating a large, mature system that is receptive to quality infrastructure interventions.

**Analysis:** The analysis confirms the project’s success in leveraging existing human capital. The series of capacity development measures implemented successfully added specialized qualifications to the already experienced lab staff, which establishes a strong and secure basis for sustainability at the individual level. The project’s focused scope, by necessity, targeted the most impactful area: technical quality. The complexity of the systemic issues—involving numerous stakeholders and evolving competences—is appropriately acknowledged as a macro-level governance challenge that is correctly beyond the mandate and limited scope of this technical cooperation project. This strategic focus on transferable, individual-level skills is validated as the most efficient path to success.

**Conclusion and Assessment:** The evaluation concludes that the successful strengthening of individual technical skills and the positive foundation built within the technical staff make the long-term application of the project’s results highly probable. The technical capacity has been demonstrably enhanced, securing the human element essential for accurate water monitoring data. The systemic and organizational challenges, while noted, represent the target environment for future, larger-scale policy interventions, which can now be guided by the project’s successful quality infrastructure data. The overall assessment is therefore rated as successful (2), having fully achieved its objectives within the scope of its capacity development mandate.

#### **Dimension 2: To what extent has the intervention considerably contributed to the capacity of partners, target groups and other organizations involved to continue the positive results?**

**Facts/Situation:** The intervention implemented several contributions across different capacity levels to sustain positive results. For individual competences, it included the implementation of a series of on-site and online trainings for laboratory staff. At the level of organizational development, the project focused on developing a series of customized recommendations and Standard Operating Procedures (SOPs) based on lab assessments in Uttarakhand (UK) and Uttar Pradesh (UP), which successfully resulted in the accreditation of three regional labs in UP. To address strengthening of the system, the project contributed to better coordination of the different stakeholders involved in Ganga water quality monitoring and the integration of quality infrastructure actors in the sector through participation in network meetings, and organization of Steering Committee meetings.

**Analysis:** The analysis confirmed that the individual trainings were appreciated by lab staff and their superiors. However, the long-term effect of these trainings remains uncertain, primarily due to the high staff turnover. The customized recommendations and SOPs were highly appreciated by the labs and deemed rather implementable. Regarding the systemic level, the analysis recognized that the contribution of a small TC project to overall coordination can only be limited, as sector coordination is fundamentally a governmental responsibility.

**Conclusion and Assessment:** Despite the capacity development measures taking effect only to a limited extent due to high staff turnover, the evaluation concludes that the participating labs are strengthened sustainably by the accreditation obtained. The accreditation serves as a formal institutional adjustment that secures quality standards beyond the project's lifespan. Therefore, the capacity contribution is assessed as successful (2).

### **Dimension 3: To what extent are the results of the intervention durable?**

**Facts/Situation:** The project faced several risks and benefited from a major potential. Key risks included the political risk that the Namami Gange programme might be scaled back or discontinued. Implementation risks included systems limitations of national and federal authorities to coordinate technical content and organizational matters, and the limitation in capacity of national and federal states to physically equip laboratories with measurement instruments. A significant risk for long-term anchoring was the high staff turnover (particularly in federal authorities and laboratories), which jeopardizes the established performance capacity of the laboratories and the assurance of permanent, sustainable quality. This was compounded by a potential lack of awareness among partners regarding the importance of reliable data for sound environmental policy decisions. On the positive side, the rejuvenation of the Ganga is a priority for the Indian government, demonstrated by considerable investments in the scope of the Namami Gange Program.

**Analysis:** The analysis revealed that the political risk concerning the Namami Gange programme was negated, as the opposite happened; the programme was even expanded. The implementation risk posed by high staff turnover was attributed to the very limited permanent staff in the labs, partially due to only one-year contracts paid through NMCG programs, modest pay, and the high workload of Junior Research Fellows (JRFs), which leads to low retention post-trainings. To address this, the development of an online learning platform is underway. The risk of high staff turnover not materializing for long-term anchoring was not fully assessed; however, despite coordination concerns with CPCB, the awareness of partners for the importance of reliable data is high. The corruption risk was not analysed, and the potential for Ganga rejuvenation remains still very valid.

**Conclusion and Assessment:** The evaluation concludes that the project adapted well to emerging risks and potentials. Despite the ongoing challenge of high staff turnover and issues with low staff retention (addressed by the new online learning platform), the project successfully navigated the political landscape (expanded Namami Gange programme) and leveraged the high priority of the government's investment program. Therefore, the project's capacity to deal with risks and potentials is assessed as successful (2).

For the long-term sustainability of the results, the following points can be considered:

- **Institutionalization of quality:** Accredited laboratories are now structurally embedded in the QI system, creating a mandate for them to retain accreditation.
- **Permanent synergy:** The strong networking established between QI institutions and water monitoring actors ensures lasting collaboration.
- **Long-term training value:** Training value persists, likely exceeding current estimates, although staff turnover remains a factor.
- **Knowledge repository:** The Moodle course offers a durable, accessible learning resource.
- **Standardized procedures:** The validated methods developed by an international expert ensure the permanence of improved quality practices.
- **Sectoral gender network:** The inter-state gender network provides a sustained mechanism for gender focus.

### Summarized evaluation

Criterion	Evaluation dimension	Weighting	Appraisal
Sustainability	The partners, target groups and organizations involved have the capacities required to ensure that positive results are continued.	33.33 %	2
	The intervention has considerably contributed to the capacity of partners, target groups and other organizations involved to continue the positive results.	33.33 %	2
	The results of the intervention are durable.	33.33 %	2
Total assessment of the sustainability			2

### Summarised evaluation all criteria

Criterion	Criterion assessment	Evaluation	Description
1. Relevance	1.5	very successful	very good result, above expectations
2. Coherence	1.5	very successful	very good result, above expectations
3. Effectiveness	1.8	successful	good result, entirely meets expectations
4. Efficiency	1.5	very successful	very good result, above expectations
5. Impact	2	successful	good result, entirely meets expectations
6. Sustainability	2	successful	good result, entirely meets expectations
Global assessment	1.7	successful	good result, entirely meets expectations

#### 5.1.7 Summary of the intervention's contributions to the 2030 Agenda for Sustainable Development

The intervention's contribution to the 2030 Agenda for Sustainable Development is substantial, primarily by establishing a quality infrastructure foundation that enables larger, funded investment programs to successfully achieve their goals.

#### Universality, Shared Responsibility, and Accountability

The project's contribution to the 2030 Agenda, specifically to Sustainable Development Goal 6 (SDG 6)—"Access to clean water and good management of freshwater ecosystems"—is indirect yet highly scalable. The primary output—**generating reliable, authentic, homogeneous, and credible water quality monitoring data** for the Ganga basin—is an indispensable prerequisite for developing and implementing effective large-scale programs for Ganga rejuvenation. This data is crucial for leveraging the extensive credit lines and investment projects offered by the Namami Gange programme and international development agencies like the World Bank and KfW.

The project demonstrates strong accountability through the efficient utilization of existing systems and structures. This includes:

- Leveraging external funding mechanisms (Namami Gange funds and World Bank loan) for equipment, ensuring the project's resources are focused on technical expertise.

- Utilizing partner contributions at no cost, such as focal persons from the NMCG and NPL, lab spaces, and venues for meetings.
- Implementing the measure in a clear division of labour with other partners, such as the GIZ (SGR III) project, which complements the intervention by supporting NMCG in designing regulations and standards for water management.
- Joint systems for monitoring, learning, and accountability are primarily facilitated through the annual Steering Committee meetings and regular bilateral engagement with the NMCG.

### **Interplay of Economic, Environmental, and Social Development**

The intervention pursues a holistic approach to sustainable development, with objectives covering all three dimensions. The project objectives intend to achieve (a) improvement of human health, environmental sustainability, and economic prosperity by a better access to clean water and a good management of freshwater ecosystems (social and economic) and (b) rejuvenation of Ganga by reducing pollution via targeted protection and prevention measures (environmental). The environmental results achieved (generation of reliable data for targeted protection measures) are the most tangible and direct contribution. This environmental result creates a positive interaction with the social and economic dimensions:

- The reliable data feeds into high-level, prioritized decision-making for developing large-scale abatement programs.
- This, in turn, ensures better access to clean water and a cleaner environment for the population in the Ganga basin, thereby supporting long-term social and economic upliftment.

The TC project's limited scale, however, means it cannot directly and measurably contribute to the social and economic upliftment of the target group. Critically, the potential for a negative unintended interaction—the relocation of polluting industrial production to regions outside the Ganga basin—has not materialized, confirming that the stricter environmental standards did not cause adverse social or environmental side effects elsewhere.

### **Inclusiveness/ Leave No One Behind**

While the project is essentially technical in nature and does not report a broad, direct impact on particularly disadvantaged or vulnerable groups, it does address the principle of inclusiveness through explicit efforts to promote gender equality within the target organizations.

- **Positive Contribution:** The project's objectives included the development of gender-specific adaptations for improving the work environment for female laboratory staff. These adaptations are crucial for addressing a vulnerable group within the workforce and are consistent with international norms. The project also had conducted in 2025 two gender workshops on gender mainstreaming in Uttarakhand and Uttar Pradesh to further institutionalize these changes.
- **Building Resilience:** By prioritizing capacity development (trainings, accreditation) for laboratory staff, the project helps build the resilience of these institutions, which benefits all employees, including women and young professionals. However, the high staff turnover, particularly of Junior Research Fellows (JRFs), remains a sustainability risk that disproportionately affects young professionals, necessitating the development of an online learning platform to mitigate this.

## 6. Assessment of specific evaluation questions

### How to sustainably and continuously assure the trainings for laboratory and authorities after the end of the project?

The sustainability and continuity of training for laboratories and authorities after the project's end should be ensured through a multi-tiered institutional and capacity-building approach centred around *Training-of-Trainers (ToT)* and *inter-laboratory learning systems (working groups)*, as identified and proposed for the follow-on project in the appraisal part of the mission.

**Training-of-Trainers (ToT) Approach:** A ToT model can be introduced for laboratory personnel to ensure that knowledge and skills are retained within the institutions despite staff turnover — a major risk identified during the evaluation. Master trainers from SPCBs (e.g., UPPCB, UKPCB) should be trained intensively by PTB experts on ISO/IEC 17025:2017, Measurement Uncertainty, Analytical Method Validation, and internal audit procedures. These master trainers would then cascade the training within their own institutions and to other state laboratories, ensuring self-reliance and reducing dependence on external consultants. The ToT process should also include training modules hosted on MOODLE (as already developed in the project), allowing refresher sessions and onboarding of new staff even after project closure.

**Institutionalised Working Groups:** The evaluation highlights the need to formalise intra-lab and inter-lab working groups to promote ongoing peer learning, calibration standardisation, and inter-comparison. Intra-lab working groups within each SPCB laboratory should focus on continuous quality management, calibration schedules, and internal audits. Inter-lab working groups — facilitated by NMCG or CPCB — should conduct annual inter-laboratory comparison (ILC) exercises across the Ganga riparian states. This ensures methodological consistency, proficiency testing, and shared troubleshooting. The NPL can act as the national reference laboratory, providing external quality control and technical backstopping. To ensure sustainability, the report recommends embedding the training and capacity development mechanisms into existing institutional frameworks rather than project-based arrangements.

### How well does the project fit in the Ganga Narrative?

The proposed Technical Cooperation (TC) module is part of the ongoing Development Cooperation programme “German–Indian Engagement in the Ganges River Basin” (Ganga Narrative). The overarching objective of this programme is to enhance the resilience of populations in the Ganges River Basin who are affected by water scarcity, pollution, and flooding, through the protection and restoration of water resources and ecosystems. The TC module contributes to this goal by ensuring more reliable and standardised water quality monitoring across the basin. This will enable a better-informed and more targeted response to water and environmental pollution issues, as well as provide clearer tracking of the effectiveness of remedial interventions.

The follow-up TC module should continue to work in close coordination with the other TC components of the development cooperation programme, as identified and proposed for the follow-on project in the appraisal part of the mission.

1. **“Support to Ganga Rejuvenation III (SGR III)” (PN 2022.2134.9):** This module aims to improve the application of integrated river basin management (IRBM) by responsible agencies at national and state levels, incorporating international best practices. Under SGR III, a River Basin Management Plan (RBMP) and detailed District Ganga Plans have already been prepared for the Ramganga sub-basin and approved by the National Mission for Clean Ganga (NMCG). These plans include recommendations for optimising water quality monitoring strategies—particularly the strategic siting of sampling stations—to ensure more precise tracking of pollution sources. The proposed PTB TC module will provide the technical expertise and training needed to

operationalise these recommendations in the laboratories responsible for monitoring (e.g. Kashipur in Uttarakhand, Moradabad and Bareilly in Uttar Pradesh). This cooperation will establish the technical groundwork for developing and implementing targeted pollution reduction measures, leading to measurable improvements in river water quality.

2. **“Support to India’s Water Vision 2047 (SuWaVi)” (PN 2024.2129.5):** This module seeks to advance the convergent implementation of India’s Water Vision 2047, with a focus on enhancing water security and climate resilience for vulnerable rural communities in selected states. Two of these states—Uttarakhand and Bihar—also serve as partner states for the proposed PTB TC module. Within this framework, water security encompasses both the quantity and quality of available water. Strengthened water quality monitoring, supported by the PTB TC module, will generate improved and timely data that can guide decision-makers in designing interventions for water supply safety. This will also contribute to protecting communities from health risks, ensuring that contaminated sources are detected early and excluded from use for drinking or irrigation purposes.

The follow-on TC module (PTB) complements the broader Ganga Narrative by ensuring scientific robustness and traceability in water quality data—thereby reinforcing the effectiveness, accountability, and long-term impact of all related TC and FC interventions in the Ganga basin.

### **How visible is the project?**

The project enjoys high visibility within its immediate partner ecosystem, particularly among the institutions directly involved in water quality monitoring and quality infrastructure (QI) — such as the National Mission for Clean Ganga (NMCG), State Missions for Clean Ganga (SMCGs), State Pollution Control Boards (SPCBs), and the broader laboratory community in Uttarakhand and Uttar Pradesh. Within these circles, the project is widely recognised for its technical credibility, practical training programmes, and contribution to achieving ISO/IEC 17025:2017 accreditation for several regional laboratories. Partners have acknowledged that PTB’s support has significantly enhanced laboratory competence, data reliability, and inter-agency collaboration. The project is also seen as a trusted technical reference for implementing quality assurance systems in the Ganga basin, with strong ownership at both national and state levels.

However, the project’s visibility beyond the core technical and institutional partners remains limited. Its profile is comparatively low among the wider public, academia, civil society, and media — groups that could benefit from or amplify its outcomes. Public outreach and strategic communication have not been a central focus. There has been limited dissemination of success stories, lab accreditation milestones, or training outcomes through broader channels such as social media, policy briefs, or environmental networks.

To enhance external visibility, the evaluation suggests that the follow-up phase could include a targeted communication strategy — for instance, preparing bilingual information materials, showcasing best practices at Ganga Utsav and Namami Gange forums, and producing short video profiles of laboratories achieving accreditation. Strengthening linkages with universities, media outlets, and policy think tanks could also help position the project as a national reference point for quality-assured environmental monitoring.

## 7. Learning processes and experiences

The project yielded significant operational and strategic insights, particularly concerning the challenges of capacity development and sustainability within large-scale government initiatives in India.

### Lessons learnt during the project

The primary lessons learned centre on project strategy, efficiency, and sustainability.

- **Accreditation as a Sustainability Anchor:** A key lesson is that focusing the capacity development strategy on achieving formal accreditation (e.g., ISO standards) for partner laboratories is the most effective way to lock in quality and ensure sustainable results. The accreditation of three regional labs in Uttar Pradesh provides an institutional anchor that survives the endemic problem of staff turnover.
- **Strategic, but Narrow Focus is Effective:** The project demonstrated that a small Technical Cooperation (TC) project can maximize its effectiveness by maintaining a narrow, high-quality technical focus (individual competence/lab skills) that is crucial to the success of a much larger national investment program (Namami Gange).
- **Risk of Reliance on Informal Steering:** While intensive informal bilateral cooperation with the NMCG was necessary for day-to-day operation, the infrequency of the formal Steering Committee (SC) limited the project's ability to gain the high-level political backing required to overcome systemic challenges.
- **High Staff Turnover can undermine Training:** The project confirmed that the high turnover of staff, especially Junior Research Fellows (JRFs) on short contracts, poses the single greatest threat to the sustainability of the project. Solutions must be built around continuous, accessible knowledge platforms, not just one-off trainings.

### Knowledge gained that can be transferred to other PTB projects

The project developed and validated several tools and strategies highly transferable to other PTB projects operating in environments with weak organizational capacities and high staff mobility.

- **Hybrid Capacity Development Model:** The successful combination of on-site technical lab assessments and hands-on training (for initial skill development) with virtual formats and the MOODLE online learning platform (for continuous learning and knowledge retention) is a proven, cost-efficient model for scaling knowledge transfer.
- **Leveraging Partner Resources for Efficiency:** The use of a lean PTB team complemented by cost-free focal persons/project coordinators provided by key partners (NMCG, NPL) demonstrated exceptional cost efficiency, which can be replicated to reduce overhead while increasing partner ownership.
- **Integration with Investment Finance:** The project's success in immediately leveraging its quality-assured data output to feed into major investment pipelines (World Bank, Namami Gange) validates the strategy of positioning QI as the crucial stepping stone for large-scale financial cooperation projects.
- **Proactive Risk Mitigation (MOODLE):** The development of a digital learning solution in response to the high staff turnover risk is a transferable model for mitigating sustainability threats in capacity building.

### Challenges and solutions for the project that could also affect other projects

The challenges faced in the Ganga II project are common across development cooperation in rapidly industrializing economies, particularly in the water and infrastructure sectors.

Challenge Faced	Project/Internet Context	Transferable Solution
High Staff Turnover	Endemic issue linked to temporary contracts (JRFs) and low government retention rates, jeopardizing trained capacity (Project/Internet).	<b>Digital Knowledge Platform (MOODLE):</b> Shift core knowledge delivery to accessible online platforms that are independent of individual personnel changes.
Administrative and Procurement Delays	Infrequent organizational steering and administrative delays	<b>Stronger Formal Steering:</b> Require the high-level Steering Committee (SC) to meet <i>more frequently</i> and use its political weight to directly resolve systemic administrative bottlenecks.
Coordinating Complex Sector	The sheer number of diverse stakeholders (CPCB, SPCBs, NMCG, IITs, NGOs) with often unclear/overlapping mandates complicates coordination (Project/Internet).	<b>Strategic Coherence &amp; Formal Alignment:</b> Actively participate in existing state-level forums (like State Ganga Councils) as an observer to ensure technical input is integrated into high-level policy and investment decisions.

### Topics that require further discussion and on which an internal PTB exchange of experience could be encouraged

The evaluation highlights two critical areas where a broader internal PTB exchange is warranted to optimize future project design:

1. **Retention Strategies for Local Experts:** A discussion on how PTB can move beyond just training to actively influence the retention of local talent. This could involve exploring models where training is tied to mandatory partner commitments (e.g., minimum contract length post-training) or building local **Training-of-Trainer (ToT)** capacities to scale training efforts locally.
2. **Optimizing Formal Steering Structures:** An exchange on how to design mandatory and productive high-level Steering Committees. The focus should be on shifting SCs from being mere reporting forums to being **strategic, decision-making bodies** with clear, binding mandates to overcome partner administrative friction.

## 8. Recommendations

### Recommendations to Partners (NMCG, CPCB, SPCBs, NPL)

#### 1. Maintain the Core Partnership

**Justification:**

Project consistency and institutional leadership rely on sustained collaboration between the National Mission for Clean Ganga (NMCG) and the National Physical Laboratory (NPL). Changes in leadership or implementing partners during ongoing phases could disrupt coordination, reporting, and quality assurance processes.

**Recommendation:**

Continue with NMCG and NPL as the primary implementing and technical partners to ensure coherence in project governance, knowledge management, and quality control. Establish a joint review mechanism (biannual) for strategic alignment and to monitor deliverables across project phases.

**Priority:** High

#### 2. Empower State-Level Entities

**Justification:**

Effective on-ground implementation and sustainability depend on the operational capacity and ownership of State Mission for Clean Ganga (SMCGs) and State Pollution Control Boards (SPCBs). Current engagement levels vary across states, leading to uneven quality and data reporting standards.

**Recommendation:**

Strengthen institutional capacity of SMCGs and SPCBs through targeted technical assistance, dedicated state coordination cells, and integration of water quality monitoring responsibilities into state budgets. Develop state-level implementation roadmaps aligned with the national water quality monitoring strategy.

**Priority:** High

#### 3. Expand the Scope

**Justification:**

Currently, project coverage is limited to select river labs and states, constraining regional representation. Expanding to all five Ganga basin states—Uttarakhand, Uttar Pradesh, Bihar, West Bengal, and Jharkhand—will enhance representativeness, data comparability, and cross-state learning.

**Recommendation:**

Gradually expand project activities (lab assessments, trainings, and equipment provision) to cover all five basin states under a uniform framework. Align expansion with river basin-based coordination mechanisms and incorporate state-specific challenges (e.g., arsenic in Bihar, industrial pollution in UP, sediment load in Uttarakhand).

**Priority:** Medium–High

#### 4. Scale Training

**Justification:**

Sustainability of technical improvements depends on the availability of well-trained personnel. Current

reliance on ad-hoc training limits capacity retention. A structured Training-of-Trainers (ToT) model will enable replication, standardisation, and long-term institutionalisation of skills.

**Recommendation:**

Conduct ToT programmes for all laboratories supported by PTB, ensuring that each state develops a pool of certified trainers. Engage with other training institutions (CPCB Academy, NEERI,) to build an inter-institutional knowledge base. Incorporate digital learning modules for continuous professional development.

**Priority:** High

## 5. Ensure Ongoing Quality

**Justification:**

Periodic lab assessments are crucial to maintaining credibility and comparability of data. Some labs exhibit declining quality control over time due to equipment downtime or personnel turnover. Without routine re-assessments, quality assurance gaps may re-emerge.

**Recommendation:**

Implement regular laboratory quality assessments at least once every 12 months, with mandatory follow-up visits for labs receiving corrective action notes. Develop a Quality Improvement Dashboard to track compliance and improvement trends across all labs.

**Priority:** High

## 6. Focus on a Pilot Area

**Justification:**

Demonstration pilots are critical for translating monitoring data into management action. Concentrating efforts on a pilot stretch—such as the Ramganga river—provides an opportunity to test integrated Water Quality Management (WQM) strategies linking data, enforcement, and community outreach.

**Recommendation:**

Implement a comprehensive pilot on the Ramganga river stretch covering: (a) enhanced real-time monitoring; (b) integration of pollution abatement and enforcement actions; and (c) evaluation of public disclosure and citizen engagement mechanisms. Document learnings to replicate across other sub-basins.

**Priority:** Medium

## 7. Maximize Utilization of the Moodle Platform

**Justification:** The Moodle online learning platform is a cost-efficient and scalable solution to the staff turnover risk. Its utilization is key to securing sustainable training that is independent of individual mobility.

**Recommendation:** NMCG should be **actively involved by PTB who would be in managing the new Moodle platform** as the official, mandatory system for continuous professional development for all water quality monitoring staff, ensuring sufficient budget allocation for licensing and content management in future phases.

**Priority:** Medium

**Deadline:** Ongoing

## Recommendations to Project Team

### 1. Adopt a Hybrid Training Approach

**Justification:**

The project's success depends heavily on maintaining laboratory competency across diverse institutional setups. Sole reliance on either in-person or online training has limitations: physical sessions are resource-intensive, while virtual formats may lack hands-on skill reinforcement. A balanced hybrid model ensures technical proficiency, flexibility, and resilience to disruptions (e.g., travel restrictions, staff turnover).

**Recommendation:**

Institutionalise a hybrid training framework combining on-site technical lab assessments and practical demonstrations with virtual capacity-building modules. Mobilise international experts and leverage digital platforms (e.g., e-learning portals, webinars) to enhance reach and standardisation. Integrate a post-training evaluation system to measure skill retention and practical application.

**Priority:** High

### 2. Engage Actively at the State Level

**Justification:**

Effective implementation of water quality initiatives requires continuous alignment with state-level governance mechanisms. Participation in State Ganga Councils allows the project team to provide technical inputs, identify bottlenecks, and influence policy and planning decisions directly. Currently, engagement at this level has been intermittent, limiting visibility and feedback loops.

**Recommendation:**

Ensure regular participation in State Ganga Councils and related coordination platforms to track project progress, share updates, and gather state-specific feedback. Designate nodal representatives for each basin state to sustain engagement, supported by facilitation from NMCG. Produce state-specific engagement briefs summarising key updates and technical recommendations.

**Priority:** High

### 3. Enhance Internal Communication

**Justification:**

Fragmented communication between Technical Cooperation (TC) modules—such as SGR III and SuWaVi—can lead to duplication, inconsistent reporting, and missed opportunities for synergy. A coordinated communication framework would strengthen knowledge sharing, build a cohesive narrative, and increase visibility of collective results under the broader Indo-German cooperation umbrella.

**Recommendation:**

Formalise coordination mechanisms between the project and other TC modules through joint meetings, shared workplans, and communication templates. Develop a unified internal newsletter or dashboard summarising activities, milestones, and lessons learned across all related projects. Encourage cross-module technical exchanges and periodic learning events.

**Priority:** Medium–High

#### 4. Increase Visibility and Knowledge Exchange

**Justification:**

While the project has produced strong technical outcomes, external visibility remains limited. Communicating these achievements at high-level events like the International Expert Workshop on Water Quality (IEWP) can enhance credibility, attract new collaborations, and strengthen India's profile in international water quality management. Broader dissemination also ensures the project's sustainability beyond its funding cycle.

**Recommendation:**

Develop a strategic communication plan to present project achievements at key national and international forums (IEWP, India Water Week, Stockholm World Water Week). Create concise knowledge products—fact sheets, case studies, infographics—and disseminate them through both Indian and global knowledge-exchange platforms. Integrate visibility targets into the project's annual work plan.

**Priority:** Medium

#### Recommendations to the International Cooperation Department

**Strengthen Inter-Module Cooperation Requirements**

**Justification:** While coherence was present, a more formal and coordinated approach ensures greater impact and unified political messaging.

**Recommendation:** Formally mandate and establish **clear working and communication processes** (including joint meetings and reporting on synergies) between all co-located PTB and GIZ modules (e.g., Ganga II, SGR III, SuWaVi) to maximize coherence and reduce overlap.

**Priority:** Medium

#### Recommendations to the evaluation unit of Working Group Q.01

- For small TC projects, revise the efficiency criterion to place greater weight on allocation efficiency (leverage of external/partner resources) and cost-efficiency in delivery (use of virtual formats) relative to total budget expenditure.
- **Standardize data requirements for efficiency assessment:** Since it is very difficult, if not impossible, to assess the monetary value of the impacts of a technical cooperation project that is essentially implementing capacity development measures in the quality infrastructure sector, the evaluation of its efficiency should focus on the generic appraisal of the production and the allocation efficiency. This should also include a breakdown of costs per output and a comparison of the planned budget with the budget actually spent.

## **9. Annexes to the evaluation report**

**Annex 1 - Mission schedule**

**Annex 2 - List of stakeholders**

**Annex 3 - Guiding questions**

**Annex 4 - Impact logic**

## Annex 1 - Mission schedule

**PROJECT EVALUATION + APPRAISAL MISSION- INDIA GANGA**

 14<sup>TH</sup>- 27<sup>TH</sup> SEPTEMBER 2025

Date	Time	Activity and people involved (purpose of the meeting)	Location / Comment
<b>Sun</b> <b>Sept 14</b>		<u>Arrival in Delhi</u> <i>Kerstin Bark, Amita Bhaduri, Lukas Nagel, Pallavi Bishnoi, Dr. Swati</i>	Delhi
<b>Mon</b> <b>Sept 15</b>	11:00AM	<i>Meeting at the Hotel (Kerstin, Lukas)</i> <i>Amita, Swati come directly to NPL/NMCG</i>	Hyatt, Delhi
	12:00	Evaluation Interviews with NPL and NMCG	NPL-India
	01:00	Lunch	
	02:00-06:00PM	Appraisal: presentation and discussion of the concept note  QI Exchange Workshop on PT and lab visit	NPL-India
	03:00	In parallel: Embassy (Karin Blume) PTB Team (Pallavi and Lukas)	
<b>Tue</b> <b>Sept 16</b>		<u>Meetings with stakeholders for appraisal</u>	Delhi
	10h00	CWC	
	11h30	Internal team work on the appraisal at GIZ	
	05h30 pm	Alok Jain (National Skills Development Coop., NSDC; former director QCI)	Delhi
<b>Wed</b> <b>Sept 17</b>		<u>Meetings with stakeholders:</u>	GIZ, Delhi
	10:00AM	GIZ (SGR III + SuWaVi)	
	12h00	Worldbank Ganga project - online	
	05:00PM	Leave for the airport; Travel to Patna, Bihar	Patna
<b>Thu</b> <b>Sept 18</b>	10:00AM-12:30PM	<u>Meeting BSPCB, SMCG-Bihar (TBC)</u>	Patna, BSPCB Office
	19:25-20:40PM	Travel to Kolkata, WB	Kolkata
<b>Fri</b> <b>Sept 19</b>	09:30AM	<u>Meeting WB-PCB, SMCG-WB (TBC)</u>	Kolkata, WBPCB Office
	-11:30		
	14:30-19:30PM	Travel to Dehradun	Dehradun

<b>Date</b>	<b>Time</b>	<b>Activity and people involved (purpose of the meeting)</b>	<b>Location / Comment</b>
<b>Sat Sept 20</b>	10:00AM  PM	<u>Evaluation &amp; Appraisal interviews with SPMG-UK (needs TBC via mail)</u>  <u>Internal work and reporting</u>	Dehradun
<b>Sun Sept 21</b>		<u>Day off</u>	Dehradun
<b>Mon Sept 22</b>	10:00AM  02:00PM  06:30PM	<u>WII visit + Evaluation &amp; Appraisal Interviews with UKPCB Central Lab (via E-Mail TBC)</u>  Lukas and Swati Travel to Delhi  <i>Amita and Kerstin</i> Travel to Lucknow	Dehradun  Delhi  Lucknow
<b>Tue Sept 23</b>	10:00AM  19:00- 20:15PM	<u>Meeting UPPCB, Central lab visit, SMCG-UP (via E-Mail TBC):</u>  <i>Amita, Kerstin and Pallavi</i>  <i>Amita and Kerstin</i> Travel to Delhi	UPPCB Lucknow   Delhi
<b>Wed Sep 24</b>	10:00AM	<u>Internal work and catching up missed interviews (online)</u>	Delhi
<b>Thu Sep 25</b>	10:00AM  11:00AM	<i>Amita and Kerstin: Internal Debriefing</i>  <u>PTB Team: Implementation Workshop with NMCG and partners (Hybrid)</u>	Delhi  NMCG, Delhi
<b>Fri Sep 26</b>	10:30AM	<u>Debriefing with NMCG and partners (Hybrid)</u>	Metropolitan Hotel, Delhi
<b>Sat Sep 27</b>		<u>Flight to Germany</u>  <i>Kerstin and Lukas</i>	

## Annex 2 - List of stakeholders

Organisation/ Institution	Position/ Function	Location
National Mission for Clean Ganga (NMCG)	Partner (Director Technical and Nodal Officer (Focal Point))	Delhi
National Physical Laboratory (NPL)	Partner	Delhi
Central Pollution Control Board (CPCB)	Scientists	Delhi
Central Water Commission (CWC)	Partner	Delhi
Quality Council of India (QCI)	Consultant	Delhi
National Skills Development Cooperation (NSDC)	Consultant	Delhi
State Project Management Group (SPMG) Uttarakhand	Chairman and scientists	Dehradun
State Mission for Clean Ganga (SMCG) Uttar Pradesh	Chairman and scientists	Lucknow
State Pollution Control Board (SPCB) Uttarakhand	Laboratory Head and regional Officers	Dehradun
State Pollution Control Board (SPCB) Uttar Pradesh	Chief Environmental Officer and Regional Officers	Lucknow
German Embassy	Donor	Delhi
GIZ	Donor	Delhi
Worldbank	Donor	Delhi

### Annex 3 - Guiding questions/ Interview guidelines on OECD-DAC criteria

#### Relevance: Are we doing the right thing?

**Dimension 1:** To what extent is the intervention's design geared to country-specific, regional, and global policies and priorities of the Indian partners and the BMZ?

- To what extent are the objectives of the project geared to the partners' strategies, policies, and priorities (e.g. national strategies or development plans like Nationally Determined Contributions or Adaptation Communications to the National Adaptation Plans of the Paris Agreement)?
- To what extent are the relevant political and institutional framework conditions considered in the project's design?
- To what extent is the project's design geared to the German DC program, the BMZ's country strategy and the BMZ's sectoral concepts?

**Dimension 2:** To what extent is the intervention's design geared to the needs and capacities of the target groups?

- To what extent are the intervention's objectives aligned with the development needs and capacities of the involved and benefitting individuals, groups or organisations)?
- To what extent are the intervention's objectives and design geared to the needs and capacities of particularly disadvantaged and vulnerable beneficiaries and stakeholders (individuals, groups, and organisations)? Intersectional Analysis with respect to groups, a differentiation can be made by age, income, gender, ethnicity, etc.?

**Dimension 3:** To what extent is the intervention's design appropriately, realistically and plausibly geared towards achieving the intervention's objective?

- To what extent is the intervention's design appropriate and realistic (in terms of technical, organisational, and financial aspects)?
- To what extent is the intervention's design sufficiently precise and plausible (in terms of the verifiability and traceability of the system of objectives and the underlying assumptions)?
- To what extent is the intervention's design based on a holistic approach to sustainable development (interaction of the social, environmental and economic sustainable development goals)?

**Dimension 4:** To what extent has the intervention's design responded to changes in the environment and adapted to the needs?

- To what extent has the intervention's design responded appropriately to changes in the environment (risks and potentials) during the implementation?

**Coherence: Are we internally and externally coherent?**

**Dimension 1 “internal coherence”:** Within the German development cooperation, to what extent was the intervention designed and implemented in a complementary manner, based on a division of tasks?

- Within German development cooperation, to what extent is the intervention designed and implemented (in the country/region) in a complementary manner, based on the division of tasks?
- To what extents have synergies been leveraged?
- To what extent is the intervention consistent with international and national norms and standards to which German development cooperation is committed (e.g., human rights)?

**Dimension 2 “external coherence”:** To what extent does the intervention’s design and implementation complement the partner’s own efforts and are coordinated with other donors’ activities?

- To what extent does the intervention complement and support the partner’s own effort (principle of subsidiarity)?
- To what extent have the intervention’s design and implementation been coordinated with other donors’ activities?
- To what extent has the intervention’s design been geared to the use of existing systems and structures (of partners/other donors/international organisations) for implementing the activities? To what extent are these systems and structures used?
- To what extent are common systems (together with partners/other donors/international organisations) used for M&E, learning and accountability?

**Effectiveness: Do we achieve the project objectives?**

**Dimension 1:** To what extent has the intervention achieved its objective (at outcome level) according to the indicators agreed upon?

- To what extent has the intervention reached or is the intervention expected to reach its objective by the end of the term? Assessment based on the indicators agreed upon.

**Dimension 2:** To what extent have the intervention’s activities, inputs and outputs considerably contributed to achieving the intervention’s objective (at outcome level)?

- To what extent have the defined inputs been delivered, and the outputs agreed upon been achieved? To what extent have the beneficiaries used the benefits and results achieved by the intervention and thus contributed to achieving the intervention’s objective (central question of the criterion)?
- Can the outputs be accessed equally by the target group (e.g. despite physical limitations, discrimination, financially)? To what extent has the project goal been achieved regarding especially disadvantaged or vulnerable groups (possible disaggregation by income, gender, age, income)?

- Were there external or internal factors that had a decisive influence on the achievement/non-achievement of the intervention's agreed objective?

**Dimension 3:** To what extent has the quality of the intervention's implementation considerably contributed to achieving the project's objective (at outcome level)?

Assessment of the quality of steering and implementation of the intervention (including the partners' participation and contributions) in terms of the achievement of objectives, based on the assessment of the capacity WORKS (CW) success factors:

**CW - Strategy factor**

- Has the project strategy (results model and module proposal chapter 5.1) been developed in a joint process with the project partners and there is a common understanding of the intended results and the theory of change?
- Does the project use an explicit capacity development (CD) strategy to reach its results with activities on all levels of capacity development (person, organization, society)?
- Is the project strategy for achieving the project's results known to the partners and relevant actors and is implemented jointly?

**CW - Cooperation factor** (Possible duplication with: Coherence criterion)

- Are all actors whose contributions are necessary to achieve the project's result and objective contributing well to the implementation of the project?
- Do the partners and relevant stakeholders know their role in the project and make respective contributions to achieve the project's results?
- Does the project have purposefully and successfully shaped the communication and cooperation relationships between PTB, partners and relevant actors?

**CW - Steering structure factor**

- Does the steering structure reflect the relevant actors and interests and is the exchange efficient (number and duration of meetings, type of exchange and communication, etc.)? Possible duplication with coherence criterion "external coherence" Question 3.
- In the steering structure, are appropriate strategic discussions held, and decisions are based on regularly updated results-based monitoring data that tracks the degree of achievement of project objectives?
- Does the steering structure provide appropriate impulses to achieve the project objective and provide the project with the necessary political backing to ensure that necessary changes to achieve the results can occur in the partner system?

**CW - Processes factor**

- Do processes that occur independently of the project in its context (sector) have been analysed (using a process map) and the links with project processes were clearly delineated (e.g. contributions of the project)?
- Are appropriate processes established within the project (e.g. cooperation processes, learning processes, supporting processes, steering processes)?

- Do cooperation partners contribute to interfaces between relevant processes and stakeholders to increase the overall performance?
- Do the cooperation partners (both political and implementing partners) make the necessary organisational and institutional adjustments (e.g. change processes) to achieve the agreed results and objective?

#### **CW - Learning and innovation factor**

- Does the project promote technical and institutional innovations within the partner system?
- Are learning objectives and corresponding changes in the partner system (organizational level, cooperation between actors, quality infrastructure (QI) system, etc.) defined and agreed upon with the management level of the respective stakeholders and the politically responsible individuals?
- Are learning experiences discussed with the relevant stakeholders, documented and disseminated/used in an appropriate way (knowledge management)?

**Dimension 4:** To what extent has the intervention leveraged potentials of unintended positive results and reacted to risks and/or the occurrence of (unintended) negative results?

- To what extent can unintended positive results of the intervention be identified or foreseen? What potential benefits arise from positive unintended results?
- To what extent can unintended negative direct results of the intervention be identified or foreseen? What potential risks arise from unintended negative direct results?
- Has the intervention appropriately monitored and promoted positive direct results? Has the project responded appropriately to risks and (if applicable) the occurrence of negative results?

#### **Efficiency: Have the project's goals been achieved economically?**

##### **Description of inputs**

- *How much of the project budget was spent (actual costs) on each output (if appropriate, a pie chart can be created)?*
- *To which other project-specific categories could the budget be attributed? (e.g., project components: central metrology services, regional metrology services, laboratories, accreditation, private sector).*

**Dimension 1:** To what extent can the use of resources by the intervention be deemed reasonable regarding the outputs achieved (production efficiency)?

- To what extent could the achieved outputs have been delivered using fewer financial resources (minimum principle)? Consideration of the individual budget items.
- To what extent could the intervention's results (at output level) have been increased by using the financial resources differently (maximum principle)? Consideration of the individual budget items.
- Were the outputs (products, investment goods and services) produced on time and within the planned time frame?

**Dimension 2:** To what extent can the use of resources by the intervention be deemed reasonable regarding the achievement of the project's objective/outcome (allocation efficiency).

- To what extent could the achieved results have been delivered using fewer financial resources (minimum principle)?
- To what extent could the results (at outcome level) have been maximized using the same amount of financial resources (maximum principle)?

**Higher level development results (impact): Do we contribute to achieve overall development impacts?**

**Dimension 1:** To what extent have the intended higher-level development changes taken place or are expected to take place in the near future?

- To what extent can the higher-level development changes to which the intervention will/is designed to contribute be identified/foreseen?
- To what extent can the higher-level development changes (social, economic, environmental dimensions and the interactions between them) be identified/foreseen at the level of the intended beneficiaries? (Specify time frame where possible.)
- To what extent are there positive interactions or trade-offs between social, economic, and environmental changes? To what extent has the intervention contributed to higher-level development results at the level of particularly disadvantaged or vulnerable groups?

**Dimension 2:** To what extent have the results achieved by the intervention (at outcome level) contributed to the intended or implemented higher-level changes?

- To what extent has the project plausibly contributed to the identified and foreseeable higher-level development changes (core question for evaluation)? Which internal and external factors were decisive for the achievement/non-achievement of the intervention's intended development changes?
- To what extent did the intervention serve as a model or achieve broad-based impact? To what extent has the intervention contributed to structural or institutional changes (e.g., for organizations, institutions, systems, and regulations)?

**Dimension 3:** To what extent has the intervention contributed to positive and not to negative unintended higher-level development changes?

- To what extent has the intervention contributed to positive and not to negative unintended higher-level development changes?
- To what extent has the intervention contributed to negative unintended higher-level development changes? Are there negative trade-offs between the impacts of the economic, social, and environmental dimensions? Has the project taken adequate measures to prevent or counter the negative impacts and trade-offs?

**Sustainability: Are the positive results sustainable?**

**Dimension 1:** To what extent do the partners, target groups and organizations involved the capacities required to ensure that positive results are sustainable?

- To what extent do the beneficiaries and stakeholders (partners, target groups and organizations) have the institutional, human, and financial resources as well as the willingness (ownership) required to sustain the positive results of the intervention over time (once assistance has ended)?
- To what extent do the partners, target groups and organizations have the required capacities (e.g., mandate, access to information, resources, power and influence, organization level, etc.) to successfully counteract existing or foreseeable risks (resilience)?

**Dimension 2:** To what extent has the intervention considerably contributed to the capacity of partners, target groups and other organizations involved to continue the positive results?

- To what extent and how has the intervention contributed to the beneficiaries and stakeholders (partners, target groups and organizations) having the institutional, human and financial resources as well as the willingness (ownership) required to sustain the positive results of the intervention over time even after assistance has ended and, if applicable, to alleviate the negative results?
- To what extent and how has the intervention contributed to strengthening the resilience of the partners, target groups and organizations involved? To what extent are particularly disadvantaged groups (these may be broken down by age, income, gender, ethnicity, etc.) among those?

**Dimension 3:** To what extent are the results of the intervention durable?

- To what extent can the results of the intervention - under the prevailing conditions - be deemed sustainable (Core question for evaluation)?
- Which risks and potentials having emerged in the context of the intervention can secure the project's benefits in the long term? How probable is it that these factors will really occur? Has the project addressed those factors appropriately?

**Specific evaluation questions**

- ✓ How to sustainably and continuously assure the trainings for laboratory and authorities after the end of the project?
- ✓ How well does our project fit in the Ganga Narrative?
- ✓ How visible is the project?

## Annex 4 – Impact logic (German)

### Stärkung der Qualitätsinfrastruktur zum Gewässermonitoring des Ganges II in Indien Projektnummer 2021.2172.1

