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1 Introduction

In 2014 the Indian Government approved the “**Namami Gange Programme**”, as an integrated conservation mission, to accomplish the objective of effective abatement of pollution, conservation and rejuvenation of the Ganga. The thrust of the actions is on river basins with a focus on the Ganga basin. A holistic and integrated strategic approach that addresses the entire river basin and considers not only the problem of the sewage generated by human settlements but also other pressure factors such as industry, irrigation water withdrawal, hydropower utilisation, solid waste discharge and bank degradation has yet to be implemented in the Ganga Basin. The country’s national institutions have recognised the problem and have developed integrated solutions, but these have not yet been translated into practical planning, coordination and steering mechanisms with the states being involved in the effort. Moreover, international experiences with integrated approaches to river basin management, gathered by the EU for example, can be built upon in India.

The **National Mission for Clean Ganga, NMCG**, has been developing an integrated planning approach to overcome shortcomings of coordination and exchange within Indian river basins. The approach developed is called the “**River Basin Planning and Management Cycle**” (RBM Cycle). It integrates international and European experiences with basin management. The RBM Cycle approach has been applied to the Tapi River Basin as well as the Ramganga River Basin to date. The RBM cycle approach initiates a structured dialogue and hence realizes an integrative river basin planning process that integrates national, state and regional institutions and their expertise.

As part of its support to the Government of India, and on behalf of the German Government, the German Technical Cooperation Agency GIZ implements a bilateral cooperation project “Support to Ganga Rejuvenation” (SGR). The SGR project, in conjunction with the India-European Union (EU) Water Partnership (IEWP) cooperates with the Namami Ganga Programme to enable stakeholders at national and state levels to apply integrated approaches for River Basin Management (RBM), whilst benefiting from EU approaches and experiences; namely the Water Framework Directive (WFD) and thus, allowing the transfer of technical, scientific and administrative experience from German and European river-cleaning programmes (e.g. Rhine, Danube, Elbe) to the Ganga.

To strengthen the approach of the RBM Cycle, the National Mission for Clean Ganga, NMCG, supported by GIZ, has supported the development of **a training programme on River Basin Planning and Management Cycle**. The RBM cycle training programme was developed and implemented in India in 2019-2020, partly in virtual formats due to the Covid-19 crisis. The RBM cycle trainings were followed by a training of trainers (ToT) programme in 2020 (virtual) and in 2022 (in India/ Pune). The trainings were developed and carried out on behalf of NMCG and GIZ by AHT GROUP AG, an international consultancy based in Germany as lead, and The Energy and Resources Institute (TERI), an Indian research institute.

This “Didactical handbook on RBM Cycle trainings” will give an overview of the RBM Cycle trainings, the existing material and practical information to carry out RBM Cycle trainings in India. With the didactical handbook and digital material provided, further RBM cycle trainings can be organized.

2 The RBM Cycle Training Concept

2.1 The River Basin Planning and Management (RBM) Cycle

Water management is crucial for sustainable development and needs to be considered for most of the 17 Sustainable Development Goals. As a principle or process for sustainable water management, the approach of Integrated Water Resource Management is widely acknowledged as defined for example by Global Water Partnership (GWP 2000).

“Integrated Water Resources Management (IWRM) is a process which promotes the coordinated development and management of water, land and related resources in order to maximise economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems and the environment.”

To implement IWRM, an iterative planning and management cycle has been proposed (GWP 2017). The IWRM process is organized by **basins or watersheds**: Since management measures on water use influence each other in those basins, their integration is necessary within basin boundaries. Examples for river basin management range from America and Australia over Asia to Europe and Africa.

In the European Union, the Water Framework Directive (EU WFD 2000) is calling for integrative basin management by a mandatory process for all EU member states. After a preparatory phase, three management cycles of six years were foreseen until 2027 to improve water management across European rivers. For each management cycle, a management plan has to be published, integrating the diverse authorities and institutions that influence water management in each respective basin (EC 2023).

The **Indian River Basin Planning and Management Cycle (RBM Cycle)** was built upon the experiences of the EU WFD, however, it was adapted to the Indian context.

The RBM Cycle consists of an inner technical cycle which was complemented by an outer cycle addressed towards decision-making. The inner cycle symbolizes the steps in the iterative river basin planning and management process. Those steps can also be implemented in parallel, since time and institutions required for those steps vary.

The **RBM cycle steps** involve (i) a clear governance and coordination structure, (ii) the basin characterization (sub-basin, key water management issues, pressure/impact analysis), (iii) the design/adaptation of monitoring networks and programmes, (iv) the assessment of water quality and quantity, and (v) the management and implementation of water management plans and programmes of measures, including review and revision (see Figure 1: Scheme of the RBM Cycle).

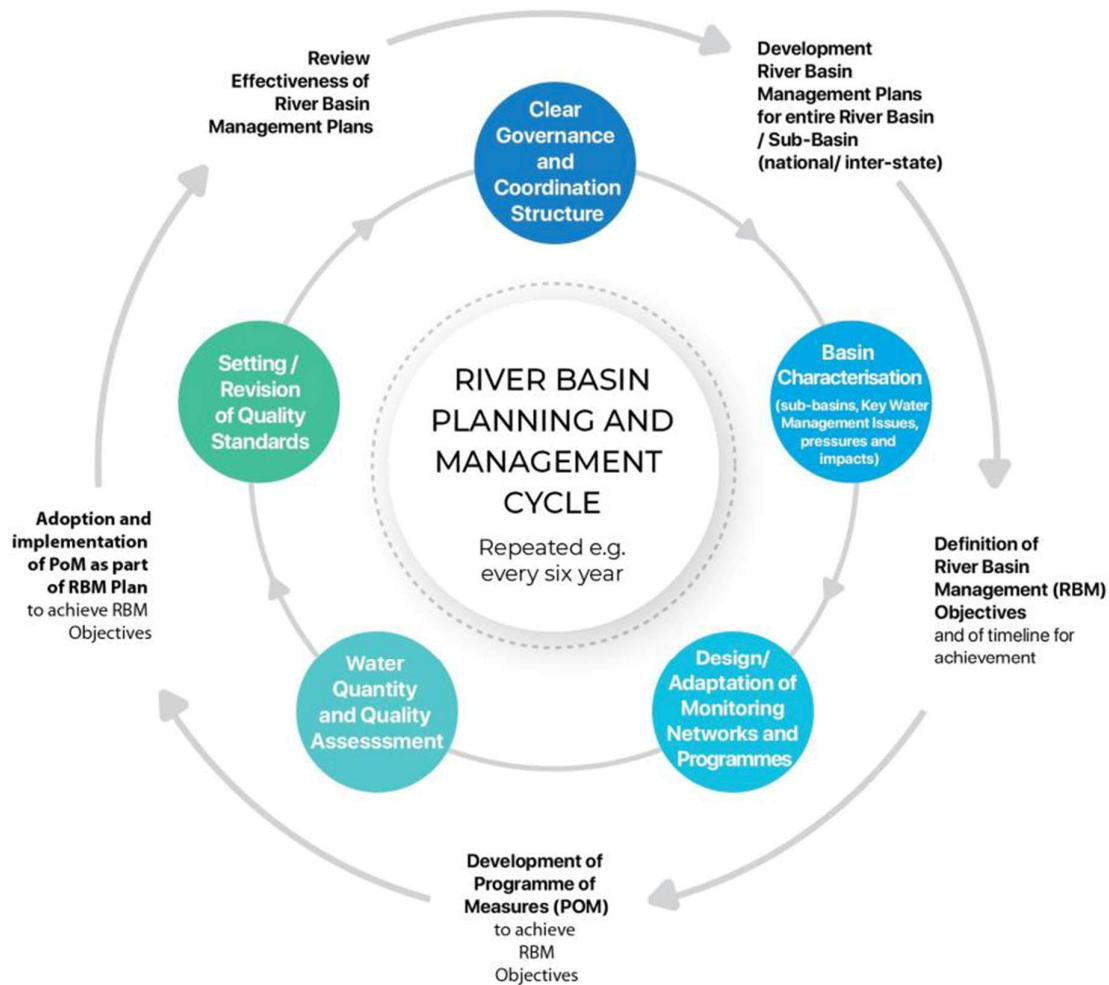


Figure 1: Scheme of the RBM Cycle

Since the training on the RBM Cycle is oriented towards practice, several **RBM cycle case studies** were integrated in the material. These include Indian examples, in particular the Tapi river, the Ganga river and the sub-basin of the Ramganga river basin. The Tapi river basin was the first in India to implement the RBM Cycle approach, followed by the Ramganga basin. The Ganga basin itself has seen many management approaches and is not yet an example for the RBM cycle. However, important elements of the RBM cycle are important to know such as the Ganga river basin plan (20??) as well as the Ganga vision.

As European examples, the Rhine river was included as well as the Danube basin and the Elbe river basin. The Danube basin is the largest European river basin, and the states managing the river's water vary considerably. The Rhine basin has the longest history of transboundary water management. The improvement of Rhine water quality from the 1970s to date is an impressive example for impacts of integrated and coordinated basin management. The Elbe river basin is the smallest basin of these examples. However, with German reunification in 1990, the Elbe has seen a remarkable improvement of water quality in a short time. Challenges in all rivers include pollution from cities and industry to mining, hydropower constructions hindering fish passage, flood risk management, and now also the impacts of droughts and climate change.

2.2 Training modules and target groups

India has embarked on RBM, with basin authorities and basin plans that are being established or published to various degrees. The country has a water administration at central, state and district level. The majority of the professionals working there are not familiar with RBM. NMCG therefore decided to develop a training programme on river basin planning and management. The objective of the RBM cycle training series was to familiarise water professionals in India, especially from the public sector, with the RBM process. The trainings aim to improve the understanding of RBM in the Indian water administration. An important side effect is that through the trainings, officials can exchange their experiences and form professional networks.

The trainings were clustered in **three training modules**:

- [1] Understanding the River Basin Management Cycle and its steps,
- [2] Skills and expertise for technical development and implementation of RBM plans,
- [3] Solutions through exchange, information flow and cooperation.

Also, the trainings were oriented towards different target groups, to reflect their professional context and time spent on the RBM cycle steps. The **three target groups** for the RBM cycle training are:

- I. Decision makers on the national and state level (e.g. Ministry of Jal Shakti, State Governments, Heads of NMCG and SMCGs);
- II. Senior officers: Officers responsible for steering the implementation at the government offices and implementation agencies on the state, district and municipal level (e.g. departments of the state and municipal bodies, water authorities like Jal Nigam)
- III. Chief technical staff: Technical level, responsible for the technical implementation on the national, state, district and municipal level

Approach of problem-oriented learning (see 3.1)

Since the RBM cycle training is organized for professionals, it is important to acknowledge that trainers do often have less knowledge about practical water management issues than their participants. Trainers therefore do not act as “lecturers”, but rather as facilitators for the participants: they provide methods and approaches to structure experience and knowledge exchange among the participants. They do NOT give frontal lectures, but support participants in solving problems. The approach of problem-oriented learning (PoL) addresses various problems of water management during the trainings, and participants apply methods to solve those problems in a structured way. They can directly link those problems to their daily work experiences. The approach of PoL related to the RBM cycle training is further explained in chapter 3.1.

2.3 Eight Learning Units: Content for the Training Modules

To develop the content for the training modules, the RBM Cycle steps served as structure. Based on the RBM cycle structure, **eight learning units** were set up with slides and problem-oriented exercises. Those learning units cluster the content for the training units.

Learning Unit 1: Introduction to the RBM Cycle

Learning Unit 2: Clear Governance and Coordination Structure

Learning Unit 3: Basin Characterisation

Learning Unit 4: Determining Basin Vision and Objectives

Learning Unit 5: Designing Monitoring Networks and Programmes

Learning Unit 6: Assessment of Water Quality and Quantity and risk assessment

Learning Unit 7: Implementation of River Basin Management (Plans and PoMs)

Learning Unit 8: Solutions through Exchange, Information Flow and Cooperation

Depending on target groups and their interests, the training modules can be designed making use of the content of the learning units (see also Table 1).

Training module 1- Understanding the River Basin Management Cycle and its steps - will surely contain Learning Unit 1- Introduction to the RBM cycle. For practitioners and technical staff. i.e. the third target group, it may be helpful to add content from Learning Unit 3 - Basin characterization-, especially the “Drivers- Pressure- State- Impact- Response” (DPSIR) approach and risk analysis. For decision-makers, it might be more adequate to add content from Learning Unit 2 on clear governance and coordination structures.

Training module 2- Skills and expertise for technical development and implementation of RBM plans – is flexible to the needs and interests of the target groups. Senior officers and decision-makers are more interested in the steering and in major milestones of the RBM cycle approach such as plans and programmes of measures. Technical staff needs to understand aspects of basin characterisation, assessment and monitoring. Therefore, trainers have to find out the training needs of their target groups and adapt the content of the training accordingly.

Training module 3 and Learning Unit 8 are identical. Again, it is important to structure the trainings according to interests and participation of the target groups. In this training module, the most important idea is to exchange knowledge and experiences between the different hierarchical levels of water management as well as between institutions. It is therefore important that technical staff has slots to present their working results of previous steps of the RBM Cycle.

Table 1: RBM Cycle Learning units related to target groups

Unit	Topic and content	Target Group		
		I	II	III
1	Introduction to the RBM Cycle	■	■	■
2	Clear Governance and Coordination Structure <i>Governance (legal aspects and framework)</i> <i>Basin Coordination Structures (institutions, stakeholder engagement)</i>	■	■	■
3	Basin Characterisation <i>DPSIR Assessment</i>	■	■	■
4	Determining Basin Vision and Objectives	■	■	■
5	Design/ Adaptation of Monitoring Networks and Programmes	■	■	■
6	Assessment of Water Quality and Quantity	■	■	■
7	Implementation of RBM <i>RBMP and PoM</i> <i>Financing and Review of PoM</i>	■	■	■

Main focus
 Level of detail driven by participants' interest
 Mentioned without any detail

3 Training Approach and Material

3.1 The Approach of Problem-oriented Learning along the RBM Cycle

Problem-oriented learning (PoL), also called problem-based learning (PBL), demonstrates superior efficacy to traditional learning approaches with regard to longer-term knowledge retention and in the application of knowledge (see also Yew & Goh 2016, or Duch et al. 2001). PoL follows the same basic steps: A real-world problem is identified to apply an idea or concept, in our case the RBM cycle. The participants may also provide actual cases from their professional context. The problem needs to be introduced or addressed in stages so that participants will be able to identify learning issues. The RBM cycle training provides some structured PoL tasks (see Table 2). Other tasks may be added. When developing PoL tasks, first identify the learning objective, then think about the methodology and material required, and about the final product to be produced by participants. It is helpful if trainers indicate good sources and approaches for participants to get started. Methods for organizing PoL may include teaching techniques such as case studies, role-plays, or simulations.

The approach of problem-oriented learning is central to the RBM cycle training, since the target groups consist of professionals with different expertise and experiences in water management. It is therefore important not to give front lectures, but rather to mobilize the knowledge of participants and to engage them in joining their forces for successful basin management methods. The approach of problem-oriented learning lets participants take up a problem and solve it with their expertise, guided by the trainers. Trainers do not act as lecturers, but as facilitators for the participants. Participants with professional background often have more practical water management expertise compared to trainers.

The trainers offer structures and methods for participants to exchange their knowledge and to solve water management problems in an integrated manner. The role of trainers is to be a facilitator and guide, not a knowledge repository, as the Indian participants of one of the RBM ToT have agreed upon in a digital gathering of ideas on the role of trainers (see Figure 2). The role of trainers as facilitator is further explained in the Annex, chapter 8.2.

RBM cycle step	PoL learning objective	PoL method	End-product
pressure/ impact analysis)	identification of key water management issues	select and know best	
Design/ adaptation of monitoring networks and programmes	Understand the design of monitoring networks and programmes	Case study: the basin or sub-basin that participants select and know best	Assessment of existing monitoring system and recommendations for future development
Assessment of water quality and quantity	Understand the complexity of water quality and quantity assessment, learn about expertise in other institutions	Case study: the basin or sub-basin that participants select and know best	Exchange of experiences of water quality and quantity assessment, identified data sources
Management and implementation of water management plans and programmes of measures	Experience the complexity of water management measures, improved competencies about integrated measures and priority setting	Role play: sustainable river basin planning. Case study: the basin that was used before	Graphical depiction of a programme of measures, reflection about planning process, priority setting




The PoL elements are included in the slide sets of the learning units and are marked with red bars and the text: It's your turn (see Figure 3).


IT'S YOUR TURN

Exercise: Key Features of Basin Management Organisations

Discuss in a small group the following questions:

- What are the **key characteristics** of basin management organisations, including:
 - Which **functions** should the organisation fulfil?
 - **Who** needs to be involved?
 - How should the organisation be **set-up**?
- Is the NMCG an RBO/ can it become an RBO?


implemented by





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Figure 3: Example slide with an exercise marked “It’s your turn”

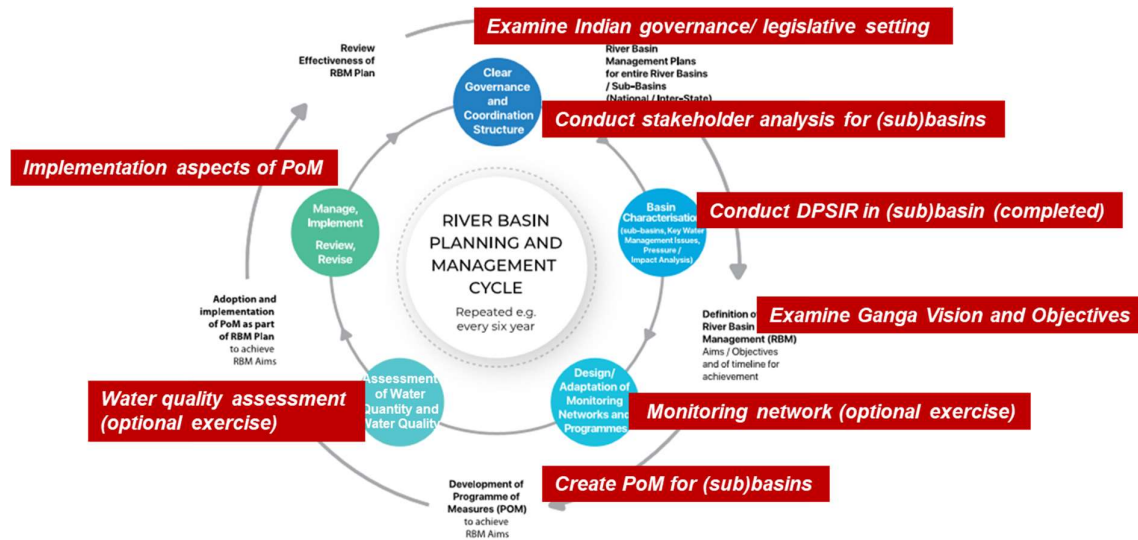


Figure 4: Depiction of Problem-oriented learning along the RBM Cycle

3.2 Action learning as didactical exercises

“Action Learning solves problems and develops leaders simultaneously because its simple rules force participants to think critically and work collaboratively. Action Learning is particularly effective for solving complex problems that may appear unsolvable. It elevates the norms, the collaboration, the creativity, and the courage of groups.” (World Institute for Action Learning, 2023)

To improve learning effects and collaboration between participants, the RBM cycle training also includes several action learning exercises. Those action learning exercises were selected from exercises developed by Dennis Meadows. Dennis Meadows and his co-researchers sought and described ways of enabling people and organisations to system changes that are necessary for sustainable development. The interactive exercises work both for climate change or water management trainings (GIZ 2011, Booth Sweeney & Meadows 2010).

The action learning exercises that are recommended for the RBM Cycle training are listed in the following Table 3. The complete methodology of those exercises is further explained in the document “Didactical exercises for RBM Cycle training”. The document includes many more exercises than the recommended ones for further information.

When implementing didactical exercises, it is important to clearly explain the rules and methodology of the exercise. Also, it is crucial to plan time for reflecting on the experiences during the exercise, and to link them with the training content. The positive value of those exercises is to improve the mood in the group, to partly get people laughing, and to thus improve learning energy. Also, participants will remember those exercises much better than the theoretical content presented by slides. They may even take those exercises back to their institutions and try them with colleagues.

Table 3: Action learning: Selected didactical exercises along the RBM cycle.

RBM cycle step	Didactical exercise	Idea	Method
Clear governance and coordination structure	Circles in the Air	Experience a change of perspective, link to multi-perspectives for basin planning	Single persons move a pen
Clear governance / joint visions; basin characterization; Programmes of measures	Conceptual drawings	Discussion on translation and communication of technical information across various disciplines/ stakeholders.	Paper and pens for participants, visual sharing of results
Clear governance/ Basin objectives	Avalanche	Challenge of achieving an objective; reflection on setting, implementing, and achieving joint vision / Programme of Measures	Group exercise with hula hoop ring or a stick
Management and implementation of water management plans and programmes of measures	1,2,3 go	Discussion on river basin management activities (e.g. review of measures; monitoring activities) and on the importance of agreements to act.	Single persons clap hands following instruction

3.3 The RBM Cycle Handbook

To support capacity development on River Basin Planning and Management in India, the Indian Ministry of Jal Shakti decided to develop a handbook for Indian River Basin Management Planning. This handbook includes the theoretical background of the RBM Cycle approach and serves as Indian reference for the RBM Cycle trainings.

The handbook is structured into the following chapters:

- Introduction of RBM and Catchment Management
- The Process- River Basin Planning and Management cycle
- Governance and Coordination Structures
 - River Basin Organization
 - Legal Framework and Agreements
 - Organizational Structure
 - Stakeholder Engagement
 - Finances
- Stakeholder Engagement
- River Basin Management Planning
 - Initiation of the River Basin Planning Process

- Basin Characterization (including Pressure/ Impact Analysis and Risk Assessment)
- River Basin Management Plan
- Developing a Plan of Measures (PoM) (including Monitoring)
- Review Effectiveness of RBM Plan
- Annexes

4 Implementing the RBM cycle training

4.1 Preparation of the trainings

When preparing RBM cycle trainings, the following aspects need to be clarified. You may use the list of aspects to be clarified as preparatory check-list and add time and responsibilities.



Table 4: Check-list for preparation of trainings

✓	What	Timeline	Responsible
	Learning outcomes / Objectives of the training defined?		
	Content clear? Target groups clear?		
	Trainers' competence secured?		
	Responsible institution/s, possibly financial resources		
	Venue of the trainings (access, rooms, atmosphere)		
	Programme for the trainings: didactic elements integrated and clear? (PoL, interactive elements, excursions, guest speakers)		
	Time schedule clarified? (planning schedule can be helpful)		
	External speakers (opening ceremony, practical inputs)		
	Participants informed and involved? Invitation and information of participants, registration		
	Logistics and material/ tools organised? (laptop, beamer, wifi connection, pinboards, cards, maps, etc.), facilities (room, light, food/ drinks, etc.)		

4.2 Planning and implementing the three RBM Cycle training modules

In the following chapters shall serve as a guide to implementing the training modules. Therefore, they all have the same sub chapters:

- **Learning objectives** of the modules,
- **Target groups and time frame** (see also chapter 2.2, Training modules and target groups),
- Which **learning units** should be combined? (see also chapter 2.3, Eight Learning Units: Content for the Training Modules),
- the **content of the learning units**,
- How to integrate **Problem-oriented learning** and practical application, and how to integrate case studies? (see also chapters 3.1 and 5)

Having gone through the training modules, an **evaluation and feed-back** round should round up the trainings – which is explained in chapter 4.3.



It is advisable to set up a **Planning schedule** to plan your training. Such a schedule fixes time slots according to topics and learning outcomes. The schedule also lists speakers, methodologies and materials. This allows to prepare well for the training. Please also check if you need virtual or hybrid formats: are guest speakers integrated by video conference tools? Do you integrate participants by video conference tools? If yes, you need to check the technical equipment and the participants ability to use this equipment.

Time estimations have to be adapted during the training depending on group dynamics. The planning schedule should be adapted after the trainings.

The suggested format for such a schedule includes the following columns. Examples for planning schedules are included in the Annex, chapter 8.1.

The planning schedules are also included in the ToT material for trainers as word files.

4.2.1 Module 1: Understanding the RBM Cycle and its steps



Learning objectives

The first training module is the start of the training. The background of trainings and their objectives have to be explained. Also, organisational aspects need to be clarified. Trainers and participants have to get acquainted to each other.

Based on this, the RBM cycle approach should be central to the first training module: the global and Indian relevance of river basin management and planning with its recurring, circular management approach should become clear. It has to be checked whether RBM Cycle planning is already performed in the basins where participants work, and how their contact with RBM cycle planning was. This influences the planning of TM2 and 3.

For target group I (decision-makers), the first training module should focus on strategic aspects to develop RBM plans linking it to relevant decision making.

For target groups II (senior officials) and III (technical staff), TM1 should give an overall introduction to the RBM cycle approach, highlighting key points for cooperation and exchange during the process of

developing RBM plans. The approach of DPSIR¹ and risk management could become a practical example to introduce group dynamics and action, and to support understanding of the necessity of collaborative RBM.

The **learning objectives** or outcomes include:

- Understand the approach of the RBM cycle: the cycle is not a new system, but should be integrated into existing systems, and it requires contextualisation to the basins. The RBM cycle can be applied to small basins or river stretches.
- Let participants identify a river stretch or sub-basin that could be used to discuss the potential application of the RBM Cycle (prioritization; use of participants' background from different organisations)
- Different stakeholders in basin management should be identified. This could be compared with the participants' own representation of different sectors or institutions.



Target groups and time frame

An introduction to the RBM cycle (Training module 1) is required for **all target groups**. However, the length and content of the training module may vary: Decision-makers might want to spend not much time. Senior officers might have more time. Technical staff will need an introduction.

The following timeframe and group size is recommended (based on 2020 experiences):

- Target group I: one training, 1 day. Up to 20 participants.
- Target groups II and III: two trainings, each 2 days, each with 10-12 participants from target group I and II (which means ~24 participants for each of the 2 trainings).

If possible, parts of the RBM Cycle explanation to technical staff is given by decision makers and senior staff. For technical staff, if their superiors explain the cycle, this may enhance the understanding of the relevance of the approach and its acceptance.



Which **Learning units** should be combined?

Training Module 1 should combine **Learning Unit 1**: Understanding the Cycle and, if time allows, additional material from another Learning Unit depending on the target group.

For decision makers (TG I), as time is limited, it would most likely be sufficient to include national and international experiences and to let the decision-makers enter into discussion themselves. If time allows, it might be interesting for them to analyse institutional set-ups in India and compare them with the EU WFD institutional set-ups. ([Learning Unit 2](#): Governance)

Both for senior officers and for technical staff (TG II and III), a good idea is to integrate the DPSIR approach from [Learning Unit 3](#)/ Basin characterisation. (DPSIR: Driving forces, Pressures, State, Impacts, Responses). The DPSIR approach offers a method to sort the problems and challenges of a river basin. The exercise can be adapted to a river basin that the participants know best and select themselves.

¹ DPSIR: Drivers, Pressures, State, Impact, Response. See Learning Unit 3: Basin Characterization.



Learning unit 1 - Content

Learning Unit 1: Introduction to River Basin Management	Slides
<ul style="list-style-type: none"> • Background, objectives and schedule of the training • Course outline, e-learning platform • Presentation of participants, expectations 	6
Introduction to River Basin Management <ul style="list-style-type: none"> • Water resources management principles, context of SDGs • IWRM definition, water resources management for conflict mitigation among water users • Water management at national, basin and local level • The River Basin Planning and Management Cycle • RBM in Europe: A long journey with the EU Water Framework Directive • RBM Plans in Europe; Exercise RBM in India • 	15
Introduction of Didactical approach with PoL → selection of sub-basin to work on	2



How to integrate Problem-oriented learning?

Let participants discuss on the RBM cycle approach: What is already existing in Indian water management, what are challenges? Document the findings, e.g. with boards and photos.

Let participants (TGII and III) form groups of perhaps five participants. Let those groups select a basin to work on throughout the training.

Institutional roles and set-ups: You may also let participants list and discuss the involved stakeholders in basin management for their specific basin. A structure that was used for this discussion was: Institutional roles: Planning, steering, implementing. Cards with institutions were added to those categories. Institutional set-ups: Institutions on water and basin management were gathered and arranged according to hierarchy and responsibility (see also Figure 5).

Let participants identify the major challenges in their basin – as it was done in the RBM cycle trainings in 2020 (see Figure 6). Based on the challenges identified, introduce the **DPSIR exercise** from Learning Unit 3: Basin characterization. Let participants sort the challenges of their basin according to the DPSIR exercise.

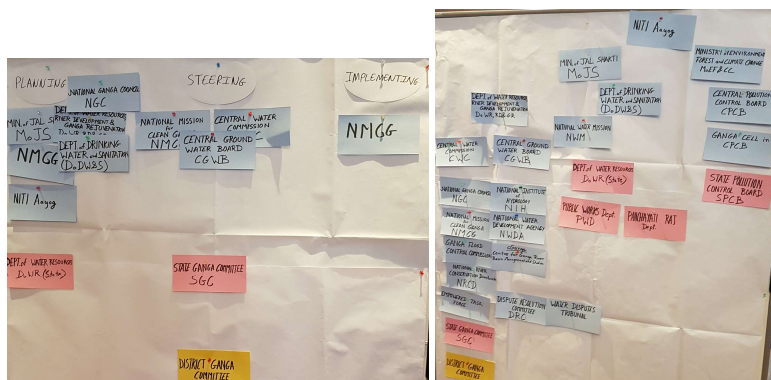


Figure 5: Board results, Institutional roles, institutional set-ups, DPSIR exercise (2020)

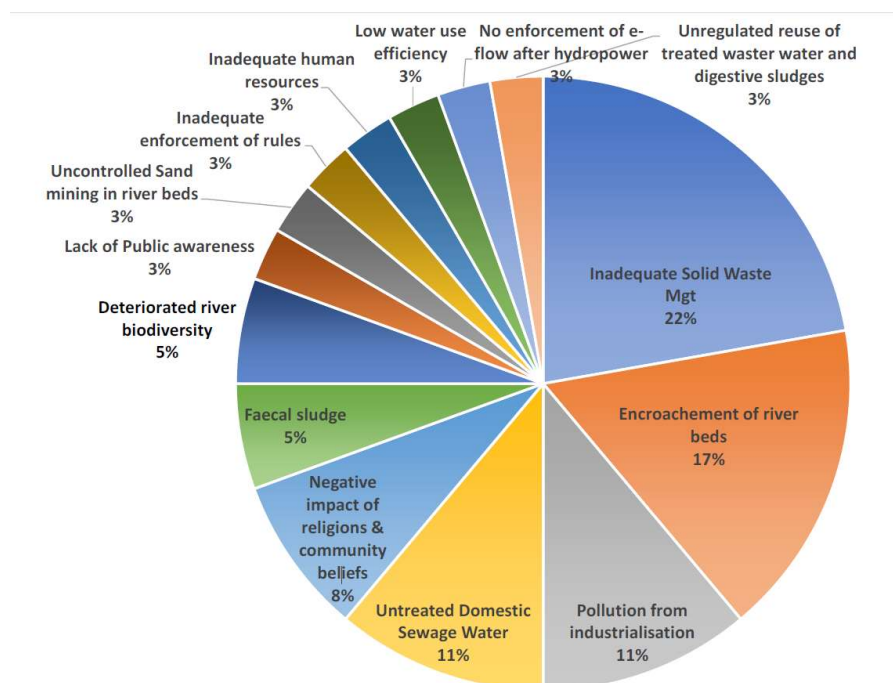


Figure 6: Challenges identified for the Ganga river in Dehradun (Uttarakhand), 2020, Module 1, target groups II and III. (The percentage next to the issue is the percentage of participants who identified the given problem.)

👉 Key didactical messages, Training Module 1

- Let participants take a look at the Indian situation and structure: What is already there with regard to the RBM Cycle? How can the RBM cycle approach be integrated or contextualised to existing water management in a (sub-)basin?
- Let participants identify the gaps or differences of the existing Indian system compared with the RBM Cycle and the European implementation.
- Discuss how to combine theoretical approaches (IWRM principles, SDGs, RBM Cycle) with practical application.

4.2.2 Module 2: Skills and expertise for RBM plans

🎯 Learning objectives

Module 2 comprises different learning units, depending on the content of TM1 and on the target group (see also Table 1, p. 9). The outcome of TM 1 regarding the competence and involvement of participants with river basin planning and management influences the content of TM 2. The learning objectives for TM 2 are therefore to be adapted to the needs and processes of participants.

Overall, an **important objective** of all RBM Cycle trainings is to include discussion among participants, interaction and group-work. This should support understanding of different institutional work settings, improve trust building and allow for inspirations and innovation to improve cooperation.

A distinction of learning objectives can be made regarding the three target groups: Target group I/ decision-makers rather focus on governance aspects and a broad and basic understanding of basin planning, programmes of measures and monitoring processes.

Target groups II and III should also get a better understanding of governance aspects, in particular institutional forms such as working groups across institutions. Since they will be responsible for suggesting and implementing measures to improve water management, the participants' role and tasks in the RBM cycle need to be clarified. Also, the technical staff might be responsible for monitoring.

Each learning unit has separate learning objectives that are listed here:

Learning Unit 2: Clear Governance and Coordination Structure

- Know the Indian legal framework as basis for the RBM Cycle.
- Explain how the legal framework and the institutional set-up link with RBM Cycle implementation.
- Know different forms of institutional set-ups to cooperate for RBM
- Explain the rationale and different forms of stakeholder engagement
- Know how to do a stakeholder analysis

Learning Unit 3: Basin Characterisation

- Know the methodology for basin characterisation and identification of key risks (DPSIR and risk assessment)
- Apply the DPSIR methodology in a simplified way to a model basin

Learning Unit 4: Determining basin vision and objectives

- Know different basin visions and objectives of important river basins including Ganga River
- Understand the development of objectives over time
- Know how to assess the quality of objectives with the SMART methodology

Learning Unit 5 Designing Monitoring Networks and Programmes

- Explain the rationale and relevance of monitoring networks, linking monitoring to basin objectives and Programmes of Measures (PoMs)
- Know important parameters and methods for monitoring river basins – quantity, chemical and microbial quality, hydromorphology, ecology
- Know about ongoing monitoring activities in relevant Indian River basin(s), know examples for monitoring networks of Ganga River and European rivers

Learning Unit 6: Assessment of Water Quality and Quantity

- Understand the objectives of assessing water quality and quantity
- Know the major three components to assess the status of river basins in Europe
- Explain the parameters of biological, hydromorphological and physico-chemical assessment for rivers and lakes
- Know the colour code system to depict the ecological status of European rivers
- Understand the difference in frequency and costs related to assessment parameters

Learning Unit 7: Implementation of River Basin Management (Plans and PoMs)

- Know examples of RBM plans with their structure and content, including Ganga RBMP
- Explain the linkage of River Basin Vision & Objectives to RBM Plans and Programme of Measures
- Develop measures for a Programme of Measures and know how to go about prioritisation
- Know sources of financing for PoMs
- Understand the RBM cycle which repeats review and revision of RBM Plans and PoMs

Learning units – Content

Learning Unit 2: Clear Governance and Coordination Structure	Slides
Introduction, definition of governance	2
Governance and legal framework <ul style="list-style-type: none"> • Water governance, UN Checklist for effective governance • Water law, water rights • Legal settings in Europe and Germany, governance and RBM in Germany • Legal integration of EU WFD in Germany • EU support for EU WFD, Implementing the EU WFD in Germany • EU WFD: A continuous effort • Legal Framework for Basin Management in India (3 slides) 	19
Basin coordination structures: Institutional set up <ul style="list-style-type: none"> • Need for basin coordination • Set up of basin management institutions; internal governance • Institutions for water management in Germany • Governance structure of RBM in Germany • Set-up of Basin Community of Rhine River • Other institutional forms of Basin cooperation, world • Tapi River Basin Management Plan including institutional set up • Ganga River Institutional Set-up 	13
Basin coordination structures: Stakeholder engagement <ul style="list-style-type: none"> • Why is stakeholder engagement important? • Stakeholder analysis- aims, different ways, steps and forms • Ladder of citizen participation • Approaches for stakeholder engagement, stakeholder involvement at different stages of RBM Cycle • Stakeholder engagement under EU WFD, and in Danube River Basin 	16

Learning Unit 3: Basin Characterisation	Slides
<ul style="list-style-type: none"> • Steps of characterising a river basin, assessment of pressures and impacts • DPSIR Scheme • Problem analysis for the Upper Ganga (as exercise) • Examples of DPSIR Exercises, Dehradun & Lucknow • Rationale for Monitoring Programme 	11


Learning Unit 4: Determining Basin Vision and Objectives	Slides
<ul style="list-style-type: none"> • What is a vision, why a vision? Key characteristics of a joint vision • Vision Ganga 2017 (3 slides) • Examples of basin visions worldwide, flagship species • Process of defining a vision, changes over time. • From vision to specific objectives; Types of objectives • SMART Objectives • Examples: Environmental objectives of EU WFD; Vision & objectives, Danube basin • Example: Ganga Vision and eight Missions (Objectives) 	23

Learning Unit 5 Designing Monitoring Networks and Programmes	Slides
<p>Monitoring Programmes</p> <ul style="list-style-type: none"> • Rationale for a Monitoring Programme (also example EU WFD) • Relevance of basin characterisation & monitoring for policy dialogue • Needs for monitoring programmes, parameters and methods • Monitoring network, example Elbe River • Monitoring networks, example River Ganga (3 slides) • Monitoring network examples, Rhine River and Danube River • Exercise: Assessment of existing monitoring in Ganga basin 	14

Learning Unit 6: Assessment of Water Quality and Quantity	Slides
<ul style="list-style-type: none"> • Objective from assessing water quality & quantity, both surface and groundwater for the relevant river basin • Three water quality elements, EU WFD • Biological quality elements • Hydromorphological quality elements • Chemico-physical quality elements • Colour codes to assess ecological status in European Union and understand how to assess comparative ecological statuses for Indian River Basin 	8


Learning Unit 7: Implementation of River Basin Management (Plans and PoMs)	Slides
<p>River Basin Management Plan</p> <ul style="list-style-type: none"> • From vision & objectives to a comprehensive plan • Planning basin approaches, levels of basin plans • Examples of Basin plan structures, including Ganga RBM Plan • Tapi River Basin Management Plan: five key water management issues 	8
<p>Development of Programme of Measures (PoM)</p> <ul style="list-style-type: none"> • Content of PoM, Elements of RBMP and PoM under EU WFD • Emission cadastres as Decision support tool for PoM, Sewage treatment prioritisation • Theoretical example: from a vision to specific measures to reduce river pollution • Exercise: PoM for a sub- basin; and RBM Role Game 	7 + 5 for RBM role game
<p>Aspects for Implementing PoMs/ RBM Plans</p> <ul style="list-style-type: none"> • Sources of financing basin management • Water charges, fees and taxes 	10

<ul style="list-style-type: none"> • Planning and constructing public infrastructure: tasks and roles, time frames and example of a flood control reservoir/ Germany • 	
Review and Revise PoM <ul style="list-style-type: none"> • Review of RBM Cycle, EU WFD cyclic periods 	3

 **Target groups and time frame**

The training module 2 / Skills and expertise for RBM plans/ requires most of the time of the RBM Cycle training. However, the content is very flexible, depending on the background of the target groups and their actual status in river basin planning and management.

- Target group I: one training, 1 day, or two separate shorter days,
- Target group II: one training, at least 2 days, 20 participants
- Target groups III: one training, up to 5 days, 20 participants

 **How to integrate Problem-oriented learning?**

All learning units contain different approaches for Problem-oriented learning (PoL) (see also Table 2, page 10). In addition to the list of PoL in Table 2, the suggestions for activating participants are also listed here. The action- learning -sets are not listed again– trainers should integrate them flexibly, depending on group energy and composition. Please do not forget that discussions need documentation- suitable are pin boards or flip charts, or digital methods. Make sure to document the results of the group works during the course of the training- e.g. by fixing cards to paper and putting them up on the walls.

PoL in Learning Unit 02: Clear Governance and Coordination Structures

- Discuss the definition of water governance
- Rate water governance in India by UN checklist (optional)
- Discuss the River Basin Management Bill of India and its meaning for RBM
- Discuss key characteristics of basin management organisations, discuss NMCG as potential RBO
- Arrange and discuss stakeholders in the selected sub-basin by a stakeholder analysis

PoL in Learning Unit 03: Basin Characterisation

- Perform a problem analysis for a sub-basin and/ or the Upper Ganga. Sort the drivers, pressures, impacts and responses by DPSIR scheme.

It is advisable to take the major river basin challenges from a real case, for example from the Ganga Missions, and ask the group to focus on one problem only (e.g. Aviral Dhara- which would be pollution). For a smaller sub-basin, the exercise could be splitted in two steps: i) gathering of all problems or challenges, and ii) further analysis by DPSIR approach of one of the problems.

Results of those exercises are depicted in chapter 4.2.1, Training Module 1, since this exercise is a good example to integrate in training module 1.

PoL in Learning Unit 04: Determining Basin Vision and Objectives

- Discussion: Does Vision Ganga reflect the key characteristics of a basin planning vision?
- Discussion: Are the Missions (Objectives) of Vision Ganga SMART?

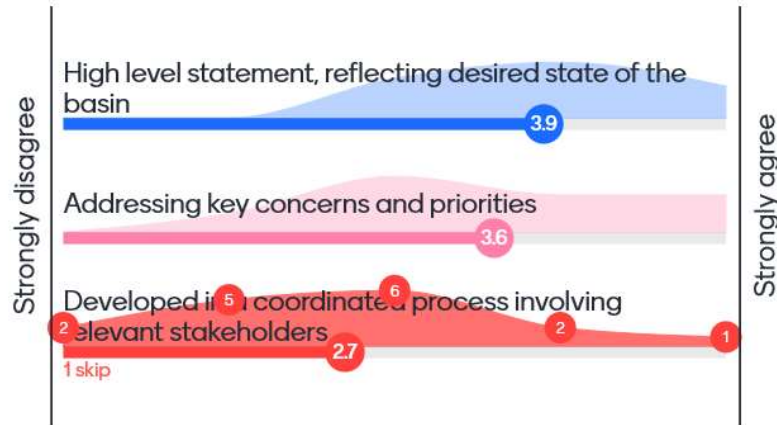


Figure 7: Vision Ganga- reflection by participants. Question: In your opinion, does Vision Ganga reflect the key characteristics of a basin planning vision? Number of voices: 16.

PoL in Learning Unit 05: Designing Monitoring Networks and Programmes

- Exercise: Participants exchange and discuss their perspective on existing monitoring networks and programmes in the Ganga (or in a sub-basin). Sorting of discussion by two questions.

PoL in Learning Unit 6: Assessment of Water Quantity and Quality

No exercise included. Depending on your group, you may support participants in sharing their experience and knowledge on water assessments. This could be done with pinboards, grouping assessment methods under the three quality parameters of the EU WFD. It could also be a homework for target group 3 to gather information on existing assessments in an Indian sub-basin.

PoL in Learning Unit 7: : Implementation of River Basin Management (Plans and PoMs)

- Exercise: PoM for a Sub-basin of the Ganga River
- RBM Role Game (allocate about 2 hours, see also)
- Discussion on achievements & bottlenecks when implementing PoMs regarding scheduling, financing, authorisation, construction and operation

Integrating Case studies in Training Module 2

In Training Module 2, time should be allocated to learn from case studies, in particular from India, but also from Europe. Those case studies can touch the different topics of the learning units. From the pilot trainings implemented in 2020, it became clear that in particular the Tapi and Ramganga Experiences are of interest to the participants. Presentations on both case studies are available, but are probably

soon outdated, so it makes more sense to include a guest speaker or several guest speakers in the training. Contacts can be secured over NMCG.

Time allocation should be per case study at least one hour, probably a bit more, depending on the questions of the audience.

A very good example was the presentation of Tapi and Danube RBM and PoM. The case study illustrated the common approach and differing key pressure indicators of the basins which are very different in size and nature.

Another very interesting case study can be provided from Elbe River Basin. The Elbe River Basin illustrates working structures of the different states such as the joint commission and the expert groups. It also shows how priority setting can be done to start measures timely. This was shown by the pollution reduction example after the German reunification.

Finally, the Rhine example shows how much time it takes to address different emerging issues in river basins, and how trust and cooperation can be built and result in amelioration of the basin for the well being of the 30 million people living there.

For further information on case studies, please refer to chapter 5.

Please also try to use your participants as experts on their river basins. Also try to visit the river basin where your training is held – allocate about half a day for visiting part of this basin and probably find time to get into dialogue with local water experts. In Pune in 2022, a visit to the Mula Muthab river basin has helped to show the challenges of large dams and their downstream basin.



Key didactical messages, Training Module 2

The following didactical messages were gathered during the ToT in 2020 and reflect the Indian trainers' feed-back.

Key didactical messages, Learning Unit 2: Governance and legal framework

Participants shared the opinion that the legal framework in India is adequate for RBM (including the 2018 Water Bill). However, the legal framework does not include a legal obligation to publish coordinated plans and PoMs in a coordinated process.

Participants agreed that coordination across different institutions and agencies is required for RBM. The legal framework allows to perform functions within the agency, but not "outside".

The RBO should take the lead in coordinating states and agencies for RBM. Expert working groups are an approach to reach consensus at an expert level.

Participants exchanged their views successfully using digital pinboards, guided by the questions in the slide sets. The digital pinboards served as documentation.

Key didactical messages, Learning Unit 3: Basin Characterization

The DPSIR assessment is a good basis for designing the monitoring network. The approach is very good, also for stakeholder consensus. It helps to bridge the gap between grassroots and policy level. The DPSIR tool adds to participatory approach.

As an exercise, the DPSIR assessment was considered to be very useful. It addressed local problems and helped to keep participants involved. With this exercise, the understanding of assessment and characterization goes beyond the purely scientific interpretation, but that social and political issues are also included.

Allocate time for participants to understand the terms: Driving forces, pressure, impact, response. The different understandings have to be sorted out. Participants worked in groups (1 hour). One hour work, facilitation often by trainers, facilitators presented the results in a follow up training session. Two trainers have to be present at least for group work. During the trainings, time constraints were faced.

Have someone from Europe to share the experiences from EU with India.

The group work results in a problem analysis for a sub-basin. Taking a basin perspective may help. (Everybody is emotionally attached to the river.) Can contribute to action-based learning in the basin. Point out that the results reflect the participating institutes/ expertise, i.e. results depend on participants. Mention participants when presenting the results.

Key didactical messages, Learning Unit 4: Basin Vision and Objectives

Not all participants know the Ganga vision, so it is useful to clarify and share the Ganga vision and the Ganga objectives with all participants. The Mentimeter on the Ganga Vision (“scales”) was great idea. In a short period of time, you get a lot of views together. Another option could be to use “Jam board” for group work – with google suite. The participant can type and edit themselves.

The Ganga objectives should also be transferred to participants. For this, there needs to be more time, since not all know the objectives. The quality of basin objectives should be discussed – starting with the SMART assessment (specific, measurable, achievable, relevant, time-bound). The Webinar grouped participants in two sub-groups discussing two separate objectives (Aviral Dhara, Nirmal Dhara). The groups were very heterogenous, and the discussion time with less than an hour was not sufficient. For the future, it was decided to go for discussions without sub-groups. Also, the digital pinboards were technically not perfect (not everyone had access).

In a face-to-face format, the interactive element “Avalanche” (or HulaHoop) could be used to point out the challenges when achieving ambitious objectives. Trainers have to try this format out It is important that the trainer supports participants in reaching a result. (see also Video, section 15:57 – 20:00 (approx. 4 min), <https://www.youtube.com/watch?v=XITeBeK2Syk> ; Video Credits: Theory and practice of games. Workshop 11 May 2015 at Teachers Competence Development Training in ESD: Steps to a Sustainable Future. Arranged by the Baltic University Programme, Uppsala University)

Key didactical messages, Learning Units 5: Monitoring networks, and 6: Water Quantity and Quality

Analysis of the monitoring on water quantity and quality was done in groups related to sub-basins. Pinboards were used. The results were linked to the objectives set for the river stretch- and the SMART criteria. The time allocation was 2,5 hours for two groups. Results were shared with pin boards. There was not enough time for an in depth discussion.

Trainers need to concentrate on rationale of monitoring – and the idea: linking monitoring to effectivity of measures that are applied. Better present less information and details on monitoring. Facilitators should transfer the message: Monitoring has to be understood by everyone in the basin, not only by those who do the monitoring. Monitoring describes the state, but does not contribute to improvement.

In India, access to monitoring data is theoretically possible; but data is not freely disseminated. Participants often complain that they do not have data – but RBM can be possible with data that is already available. Message from the training: do not wait for data before you act. Work with what you have, start right away.

Key didactical messages, Learning Unit 7: Implementation of RBM

The learning objectives were adapted during the course of the training: There was a wish to get more RBM cycle experiences from Europe and Tapi river. This is why a presentation of Tapi, Danube (Birgit Vogel) and from Elbe (Christian Ebel) was integrated with considerable discussion time. The Tapi and Elbe experiences were considered to be very helpful to understand what has worked. The environmental quality standards example from Elbe river was appreciated by participants.

The two presentations were followed by a discussion around a key question: a) How can the recommendations of the Ganga RBM plan and the Ganga Vision be translated into an operational and inter-institutional implementation plan? Further questions for discussion were: How can a Ganga implementation plan build upon and integrate ongoing efforts and measures? How can the same approach be applied to the other 12 Indian river basins?

The following critical discussion might recur in a training. Maybe you would like to actively integrate this discussion in your training and see what suggestions can be made by the participants for the way forward.

“RBM Cycle is not yet implemented in India: Objectives for basins are not developed in a coordinated process, based on a joint assessment of problems and risks in the basins. Programmes of measures are not aligned to jointly developed objectives. But selected aspects of the RBM cycle are there and can be used to build upon for further establishing RBM cycle processes. “

“IWRM was a concept where people could align to. After integrating, what difference has been observed? IWRM was immediately adopted but everyone was continuing with what they were doing before. Likewise the RBM Cycle is now “adopted” but what is different?”

With regard to the **RBM game**, the feed-back of the trainers was:

Good idea to use the game. Very good, you start thinking on issues and possible solutions. Quite good-looking at situation first and finding out the reasons. In spite of online, everybody contributed. Online, it was easier to contribute ideas “out of the cards”.

Highlighting the long-term risks of the polluted lake – (groundwater contamination, others) should be discussed as well. Not much talk about community-level engagement. Awareness of stakeholders of pollution.

More time is required for preparation and reflection. For face-to face group work: 90 to 120 min would be good. For facilitators: how to stay out of the argumentation is difficult. Facilitation of the group and writing has to be two persons for online. In face-to-face, participants can contribute to the board.

General comments

Participants are heterogeneous – some were well informed, others were not so informed. Group is heterogeneous – have participants get an insight into the other participants’ expertise. If the group is

heterogenous, it will be easier for the trainers to convey this message. The participants tend to listen to other departments – and more than to the trainers.

Be aware that participants might not be interested in the training, but were nominated by superiors. It could also be a challenge if superiors instead of targeted participants join.

4.2.3 Module 3: Solutions through exchange, information flow and cooperation

Learning objectives

Training Module 3 shall bring together all target groups to exchange their views and experiences on river basin management, and to continue to cooperate in their respective basins.

Learning objectives:

- Review institutional approaches for better cooperation in river basins
- Understand how stakeholders can be aligned to RBM framework, including drivers for collaboration
- Know the Indian water information system approaches
- Know about the European water information systems, including the platform for EU WFD
- Know approaches for improving public awareness on RBM in the Ganga and Danube basins
- Exchange views among participants of all target groups, improve trust and understanding

Since this module is the end of the training, the objective is also to evaluate the training and to get feed-back on training methods, the usefulness of the training, the competence of the trainers, logistics, and further aspects of the training.

Important learning outcomes are listed before. Interesting for preparing this unit is a reflection on which learning outcomes are relevant and which are not:

Table 5: Intended learning outcomes with regard to stakeholder participation, Training Module 3

The following learning outcomes for TM3 were discussed with the trainers during a ToT in 2020.

Intended learning outcomes, stakeholder participation, TM 3	Relevant?
Understanding how stakeholders can be aligned to the RBM framework	Yes
Understanding drivers for collaboration- of different government departments	Yes
Understand the current structures in Namami Gange framework	(yes)
Understanding the overlapping roles and accountability	Maybe
Better understanding of decision-making scenarios, trade-offs that the stakeholders face	Maybe
Understanding stakeholder engagement process itself	Maybe
Recognizing the importance of stakeholder participation	No (TM2)


Understanding roles and responsibilities of different stakeholders within their working domain and in RBM Cycle.	No (TM2)
Knowing the institutions to be involved in RBM - both formal and informal	No (TM2)
Understanding their own organization structure and coordination	No

 **Learning units – Content**

Learning Unit 8: Solutions through Exchange, Information Flow and Cooperation	Slides
<ul style="list-style-type: none"> Forms of exchange and cooperation, reference to TM 2 with regard to institutional cooperation and stakeholder engagement 	1
Water Information <ul style="list-style-type: none"> What information is needed; analysis and use of water information Challenges around data and information; Exercise on communication challenges India’s water resources information system Information and communication in Ganga Basin Water Information Systems for Europe (WISE) Information platform for implementing the EU WFD Data and information management in Danube River Basin Water Information on River Water Tables; Water Information Systems 	11
Raising Awareness <ul style="list-style-type: none"> Raising awareness among the public in Ganga Basin Ganga Basin celebrations Danube day and Danube box, Ganga Box 	4
Discussion: Exchange, information flow and cooperation	2
End of the training, evaluation; feed-back	2

 **Target groups and time frame**

- All target groups
- One day, online half a day, supported by recorded videos


 **How to integrate Problem-oriented learning?**

- Discussion on exchange, information flow and cooperation in the Ganga basin / other basin where participants come from

The idea is to let participants discuss on the status of institutional exchange, information flow and cooperation. A large group would need to be broken up in smaller groups. The discussion results should be sorted by three topics: available information, cooperation of institutions, and awareness of stakeholders. Then, participants can rate what is already good, and where improvements could be

made. The suggestions for improvement can direct further work in the basins, since they come from a multitude of institutions.

Another approach of the last training module has been to integrate the results of DPSIR analysis of target groups II and III in the agenda. The participants of those target groups were invited to present their results and recommendations to their superiors in the training. This also enables further understanding and improvement of RBM.

 **Key didactical messages, Training Module 3**

Most important is to check again for the learning outcomes of this module. There are three topics included which have partly been addressed in previous learning units:

Institutional cooperation: You do not want the participants to engage again in a discussion on institutional cooperation, but review the discussion of the related training unit. So rather a reflection on the results of the previous trainings and a discussion between the different target groups is core of this unit. Maybe future institutional cooperation recommendations can be taken from the group discussion, so be aware of documenting the discussion results.

During TM3, participants of TG3 can present their experiences with basin characterisation and monitoring networks. The trainers should limit slides and organize that slides follow the same guiding questions. Trainers should assist presenters to tailor their presentations to the target group and time available.

Four presentations were given in half an hour, followed by an interactive session on stakeholder engagement. The discussion then concentrated on recommendations for stakeholder engagement, information flow and cooperation, guided by the question: **Are the existing institutions and processes for stakeholder engagement (and information flow) adequate- what can be improved?**

Training Module 3 also allows for further content to be presented, depending upon requests by the participants. Having checked those requests, topics such as in 2020 “micropollutants removal in wastewater treatment” can be added.

Do not forget to end your training with an evaluation and feed-back round -see next chapter.

Table 6: Are the existing institutions and processes for stakeholder engagement (and information flow) adequate- what can be improved? Discussion results, 18 September 2020.

Stakeholder engagement

- District Ganga Committees could be further strengthened in terms of planning and execution. It is a very good coordination structure existing at District level. some coordination at ULB level may also be useful.
- District Ganga Committee is for implementation of programs of NMCG. But the State department is responsible for State finance. Coordination between departments for concise information and stakeholder engagement needs to be worked out.
- The coordination between departments (state level) requires to be worked out to engage stakeholders efficiently and to take-up their multiple roles. Different stakeholders must be clearly assigned with regard to RBM related to their specific roles and responsibilities.
- Are the roles and responsibilities of all the stakeholders delineated and clearly understood? The principle of subsidiarity needs to be followed.
- I think we need to expand the stakeholder institutions - Hydropower, Inland navigation, Industries, Drinking water supply utilities.
- Are non-state actors like civil society, academicians included in RBM committees? Are marginal stakeholders such as artisanal fishermen, farmers, etc. directly represented in these committees?
- Fisheries department is an important stakeholder. As we have dammed several stretches of Ganges, both the quantity and quality of fish has been impacted. The movement of fish is important for their growth.

Information exchange

- There is still scope for improvement- suggestions: launching a platform like E-learning platform on which information can be kept & shared.
- In case data sharing (data not in public domain) does not happen between two different departments, what measures have been taken to address it? Any specific example?
- Information exchange needs to be strengthened. Regarding the knowledge sharing between various groundwater departments of different states, more efforts are required. there are issues like high population density and dependency on groundwater etc

4.3 Evaluation and feed-back

At the end of the training is before the next training: Take time for evaluation and feed-back so that the next training will be even better. Take up the expectations of the beginning of the Training: where those expectations met? If yes, it has been a good training.

Additional questions are provided in the feed-back form in the annex that you may use for your training. You may also ask participants to give their evaluation by points sticking to a board (see).

The flip-chart asks simply: What did you like? What did you NOT like?

The Smiley board with sticky dots grouped the following five questions:

- Did you find the training content adequate?
- Will the knowledge exchange be helpful in relevance to your work?
- Usefulness of interactive sessions and group activities
- Willingness to participate in next module
- Where your expectations met?

In the Annex, you can find an evaluation sheet that was used in a separate training – which you might want to use for your training. Also, Mentimeter scales could be prepared to evaluate your training.

Always make sure that feed-back is given in oral form, not only in writing. You might otherwise risk misunderstandings. The feed-back is also a good time for thanking everyone involved in the training.

Probably you may want to share some feed-back rules before entering the discussion:

Feed-back must be impersonal, related to performance and outcome, not to persons. It should also be specific, descriptive and factual: what was observed, what happened, and how was this perceived by the participants. The feed-back should be understood by recipients. And the feed-back should relate to aspects that the trainers can control and influence. Having this in mind, feed-back is very valuable for the trainers, so do appreciate the time that participants spend on it.



Figure 8: Evaluation boards from RBM cycle trainings, 2020

5 Integrating RBM cycle case studies

Case studies are important to learn how RBM can function, to take and adapt methodologies, and to also get inspirations for institutional forms and structures. The RBM training therefore has spent time on gathering information on RBM around six case studies, three from India and three from Europe.

The integration in the trainings can work in various ways: invite experts from the basins and let them explain their experiences, or visit the basins and get into dialogue with RBM experts there. The RBM

Cycle training could also work to accompany the RBM Cycle implementation in a river basin – by providing short inputs and practical exercises to start working on a basin management plan.

The following chapters summarize the experiences and material that was gathered for each of the case study basins.

5.1 Ganga river basin

The Ganga river basin is the largest and probably most famous basin of India. The whole basin spreads over four nations (India, Nepal, China and Bangladesh) and covers an area of about 1,080,000 km² of which the major part of about 862,000 km² lies within India (Jain et al., 2007, in Ganga River Basin Environmental Management Plan Interim Report, 2013). More than 300 million people live in this basin.

In 2014 the Indian Government approved the “Namami Gange Programme”, as an integrated conservation mission, to accomplish the objective of effective abatement of pollution, conservation and rejuvenation of the Ganga. The National Mission to Clean-up Ganga, NMCG, has been founded in ... to implement measures to achieve the objectives.

Within those efforts, the **Ganga River Basin Environment Management Plan** has been developed by a Consortium of seven Indian Institutes of Technology, published in 2010-11. The **Ganga River Basin Management Plan (GRBMP)** was published by the same institutions in 2015. The plan includes a main plan document, and then documents on each of the 7 missions of the Ganga Vision Document. Those include Aviral Dhara (uninterrupted flow), Nirmal Dhara (unpolluted flow), ecological restoration, sustainable agriculture, geological safeguarding, basin protection against disasters, river hazards management, and . The **Vision and Missions for the Ganga River** have been published in 2017.

5.2 Tapi river basin

The Tapi river basin is in the India’s west and is shared by the three Tapi states which are Gujarat, Madhya Pradesh and Maharashtra. The basin’s size is with about 65,000 km² comparatively small (Ganga: 1,080,000 km²; Rhine: 185.000 km²). The Tapi basin stakeholders were supported in a pilot process to enter into the RBM Cycle. The process resulted in structures to continue river basin planning and management: the Tapi River Basin Committee which adopted the Tapi River Basin Management Plan in October 2020.

The Tapi River Basin Committee involves the CWC, the CGWB and the three Tapi States.

The Tapi RBM Plan was the first Indian RBM plan to follow the RBM

Cycle approach. The plan includes a baseline characterisation of the basin, a description of monitoring

The Overall Tapi River Basin Aims

Ensure sustainable water resources management in the Tapi River Basin enabling the protection of the aquatic environment as well as a sustainable socio-economic development and water supply security through appropriate measures. In detail, it is aimed for:

- to ensure good quality of surface waters and groundwaters through the reduction of pollution and all other relevant pressures.
- to ensure good/sufficient water quantity in surface waters and groundwaters through efficient water use and all other needed measures.

networks. The RBM Plan mentions the agreed River Basin Aims (see text box) and the Tapi Key Water Management Issues. The Plan also contains a Programme of Measures to mitigate possible impacts.

Key Water Management Issues of the Tapi Basin

1. Pollution from Urban Settlements and Industries
2. Area Source Pollution from Agriculture and other sources
3. Alterations of River Hydrology/ Water Quantity
4. Alterations of Groundwater Quality and Quantity
5. Alterations of River Structure through Sand Mining

The Tapi RBM Plan of 2020 is included in the USB stick for further reference.

5.3 Ramganga river basin

The Ramganga river basin is a sub-basin of the river Ganga- Ramganga is the first major tributary of Ganga. The basin size comprises 30,640 km², with a population of 24 million people. The Ramganga is the smallest basin of the case studies presented here. Along its course of 596 km, the river originates in the lower Himalaya in Uttarakhand and passes from there through major towns of western Uttar Pradesh. Due to wastewater discharge from industries and cities, the stretch from Moradabad to Kannauj is critically polluted. There is also a major hydro-power dam at Kalagarh. Ramganga's annual discharge of 17 billion m³ forms 3.1% of the annual flow of the Ganga.

The Ramganga River Basin Management plan was the second Indian RBM plan following the RBM Cycle approach. It was adopted in October 2023. The plan- similar to the Tapi RBM plan- The development of the Ramganga RBM Plan also follows the RBM Cycle approach. The first step is the characterization of the Ramganga River basin, which includes the identification of 5 Key Water Management Issues (KWMI) and a pressure/impact analysis and a risk assessment for each identified KWMI. Based on this, a Programme of Measures (PoM) will be developed for the Ramganga Basin, suggesting a set of management options and measures for implementation to achieve the set RBM targets and to improve the overall water management situation in the Ramganga Basin. The plan is to be repeated after every five years – the first cycle lasting from 2022 to 2027.

For the RBM plan, NMCG is clearly mandated- as for all other sub-basins of the Ganga river. The State Missions to Clean Ganga in Uttar Pradesh and Uttarakhand also need to be involved, as well as the District Ganga Committees – 20 alone in the Ramganga basin. Several national and state level departments and parastatal bodies contribute towards the RBM activities through their mandates and roles- thus are stakeholders contributing to the RBM process.

The Ramganga RBM Plan of 2023 is included in the USB stick for further reference.

The two **aims of the Ramganga Basin** were developed with stakeholders during a series of meetings:

- Maintain good surface and ground water quality level by reducing pollution from point and non-point sources
- Maintain good surface and groundwater quantity by employing efficient water usage techniques.

The overall Ramganga Basin Vision: Protect and enhance the status of all waters and protected areas including water-dependent ecosystems, prevent their deterioration and ensure long-term, sustainable use of water resources.

Key Water Management Issues of the Ramganga Basin

1. Water quality deterioration due to pollution from point sources
2. Water quality deterioration due to non-point sources including agricultural activities
3. Alterations in Groundwater regime impacting on sub-surface flow
4. Alteration in River Hydrology and Water Quality
5. Flood risk due to encroachment, including sand mining

5.4 Rhine river basin

The Rhine River basin covers 185.000 km² (compared to Ganga Basin 17%). 60 million people live in this basin, which equals about 320 persons per km². The length of the Rhine River is 1230 km.

The Rhine has its origins in the Alps in central Europe. From Switzerland it goes to Germany and France, partly forming the border line. It has also tributaries from Belgium and Luxemburg before it enters the Netherlands and spills into the North Sea close to the haven of Rotterdam. The Rhine river is the most important navigational route in central Europe- linking the ports of Rotterdam and Antwerp to the continent. Via the Rhine-Main-Danube- canal, it is possible to ship goods up to the Black sea. The Rhine is also a very important drinking water source – by bank filtration and groundwater recharge, many cities along the Rhine depend on its water flows. The Rhine river is also affected by climate change- the glaciers in the Alps are dwindling, thus influencing the glacio-fluvial flows of the upper Rhine. Floods are common in winter, and drought periods are becoming more frequent and prolonged, affecting navigation and economy. The Rhine is also a source of hydropower, in particular for France. The upstream parts are dammed, with contracts on the hydropower use dating back to the first world war.

The International Commission to Protect the Rhine, ICPR, was founded in 1950 between France, Germany, Luxemburg, the Netherlands and Switzerland. Several river basin management plans have been formulated under the EU Water framework directive, the latest being published in 2022. The **four essential management issues** of the Rhine are currently:

- Restoration of ecological river continuity, increased habitat diversity
- Reduction of diffuse inputs interfering with surface waters and groundwater (e.g. nutrients, pesticides, dangerous substances)
- Further reduction of classical pollution of industrial and municipal point sources
- Harmonisation of water uses (navigation, energy production, flood protection, regional land use planning and others) with environmental objectives

(see also the programme “Rhine 2040”, adopted in 2020 by Ministerial Conference in Amsterdam).

The flagship species of the Rhine is the salmon – the goal is to restore its natural habitat.

Major events at the Rhine river that gave the international cooperation momentum were: the 1986 Sandoz accident, when a fire at a large chemical plant resulted in chemicals entering the river, with millions of fish dying. There was great concern that drinking water along the Rhine might be intoxicated. A large biomonitoring and pollution control programme followed. The 1994/95 floods with huge infrastructure damages, e.g. in the city of Cologne. After that, flood risk management became a priority.

5.5 Danube river basin

The Danube River Basin is Europe's second largest river basin with 801.463 km² (this equals about 74% of the Ganga River Basin) (ICPDR website, River basin). The Danube River Basin is home to about 80 million people. The 19 countries of the Danube basin include Albania, Austria, Bosnia-Herzegovina, Bulgaria, Croatia, Czech Republic, Germany, Hungary, Italy, Moldova, Montenegro, North Macedonia, Poland, Romania, Serbia, Slovakia, Slovenia, Switzerland, and the Ukraine. The Danube's source lies in Germany, and its mouth spills into the Black sea.

The International Commission to Protect the Danube River (ICDPR) was created in 1998 and nominated as platform for the implementation of the EU Water Framework Directive in 2000. The commission includes 15 parties.

The goals or key elements of the ICPDR's management plans for the Danube are:

- a Cleaner Danube – this means reducing pollution from settlements, industry and agriculture;
- a Healthier Danube – this means protecting rivers as ecosystems that provide a living environment for aquatic animals and plants, as well as services for people such as drinking water and recreation;
- a Safer Danube – this means a safer environment for people to live without the fear of major flood damage.

The latest Danube River Basin Management Plan (DRBMP) at international level was published in 2021. It can be downloaded in the Internet. The DRBMP was jointly coordinated with the Danube Flood Risk Management Plan. The DRBMP of 2021 is the third basin management plan for the Danube since 2009.

The flagship species for the Danube is the Sturgeon.

The structure of the ICPDR is documented and explained on the website. A lot of further information is available there, including a film.

5.6 Elbe river basin

The Elbe River is a smaller river basin in central Europe. The Elbe originates in the Czech Republic and then flows to Germany. Large cities in the Elbe basin include Prague, Berlin and Hamburg. The basin size covers 148.268 km².

The Elbe river has seen two century flood events in 2002 and 2013, resulting in huge infrastructure damage and a few tragic losses of lives. The Elbe river was also prone to pollution from former east block countries, and a lot of efforts went into cleaning up the river after the German reunification in 1990. A special action programme was implemented in the years 1991- 2010. Several substances from industry and municipalities were targeted to be reduced. The river basin sees huge groundwater drainage due to lignite coal mining – resulting in flow regime changes and water quality issues such as raised sulfate concentrations.

The Elbe is used for navigation, even though not as much as the river Rhine, and part of the river is a UNESCO biosphere area.

The Elbe River Commissions include an international commission (IKSE) as well as a national commission within Germany. The German Elbe commission unites several German states who need to coordinate their water management along with the EU Water Framework Directive obligations. Under

the IKSE, a warn and alarm plan was prepared and published, latest version 2023. Also, an international monitoring programme was agreed upon.

6 Experiences with RBM Cycle trainings in India

The water resource governance in India exhibits complicated nature as it involves diverse stakeholders/decision makers such as Central, State and Local governments through several expert agencies and institutions. This complicated governance structure coupled with inadequate representation of relevant stakeholders in decision making, and lack of a systematic approach generally result in fragmented efforts and poor delivery towards protection and rejuvenation of rivers.

Further, in 2008-2009 efforts by the Government of India with the constitution of the National Ganga River Basin Authority (NGRBA), constitution of consortium of the Indian Institutes of Technology (IITs) to prepare a River Basin Management (RBM) Plan and establishment of National Mission for Clean Ganga (NMCG) as a registered Society in 2011 led to the foundation towards a basin-wide approach for river rejuvenation. Spurred by the advantages of basin approach, Integrated Ganga Conservation Mission/Programme under NGRBA called “Namami Gange” was launched by Government of India.

With the Ganga River Basin Management Plan (GRBMP), developed by the IIT consortium in 2015, the principles and strategic direction for Ganga Rejuvenation based on a basin-wide approach were laid. The NMCG aims to accomplish the mandate given to NMCG under Authority Notification 2016. The authority notification include adoption of a river basin approach, promotes inter-sectoral coordination for comprehensive basin planning and management with the aim of ensuring water quality and environmentally sustainable Ganga Rejuvenation.

Simultaneously, the river basin approach to promote inter-sectoral co-ordination among all basin stakeholders for development of comprehensive RBM plans, developing pragmatic monitoring mechanisms, implementation and periodic review, and adaptation of risk assessment was realised as a requirement. There was also a need to build from peer-to-peer exchanges with similar experiences across the various river basins.

During the Phase I of the Support to Ganga Rejuvenation Project (SGR being implemented by GIZ-India) trainings were developed and implemented in a modular concept as a pilot training series in collaboration with the NMCG and the Central Water Commission (CWC) during November 2019-September 2020. This pilot training series consisted of customised strategic discussions and participatory trainings that provided common terminology and understanding among different level of governance (Target Groups-TGs) especially in Uttar Pradesh and Uttarakhand states of the Ganga Basin.

The modular training series had an objective to “introduce RBM Cycle as a practical steering and management tool for River Basin Planning and Management”. Stakeholders responsible or involved in developing and implementing RBM across India were trained on the methodology for risk assessment, RBM cycling approach and implementation.

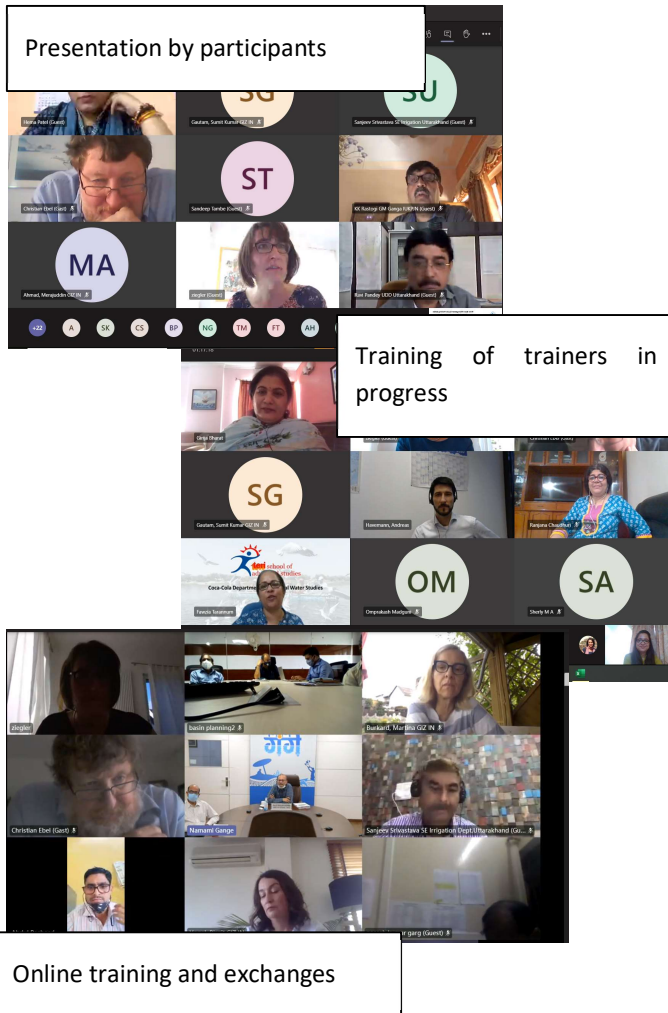


Glimpses of the Pilot training series for introduction of RBM Cycle approach for Integrated River Basin Planning and Management in India

Due to the pandemic, the concept was adapted to an online format. The following table gives an overview about the trainings. The agendas and presentations can be found on a supplementary flash drive to this document.

Date	Training Module	Target Group	Venue
02 Dec 2019	Training Module 1	TG 1	Delhi
3-4 Dec 2019	Training Module 1	TG 2,3	Dehradun
5-6 Dec 2019	Training Module 1	TG 2,3	Lucknow
28 Feb 2020	Training Module 2	TG 3	Pune
23 June 2020	Training Module 2, Kick-off	TG 1,2	Online
07 July 2020	Training Module 2, LU 2	TG 1,2	Online
24 July 2020	Training Module 2, LU 4	TG 1,2	Online
21 Aug 2020	Training Module 2, LU 7, and Training Module 3, Kick off	TG 1,2	Online
18 Sep 2020	Training Module 3	All TGs	Online

The online trainings were limited to a maximum of three hours. This was far too short for the content, so it was encouraged that the participants get acquainted with the content by watching pre-recorded videos. Those videos were recorded by the trainer/ expert pool.



The participants were identified for these trainings from three target groups of actors contributing to the River Basin Management and Integrated Water Management. The following groups were identified:

- Decision Makers
- Senior Officers
- Chief Technical Officers

To institutionalize the understanding of the RBM Cycle for all the participatory stakeholder groups/ departments, special modules to train master trainers were also developed and implemented in 2020.

The modular training series supported by the e-learning platform provided login-based access to the training content, learning material and relevant latest updates. This also provided flexibility of use information and presentations by the relevant basin stakeholders on need basis.

This was being hosted by NMCG and provided access to all participants.

The platform also extends scope of initiating discussions and dialogues on any relevant topic which is to be managed by the trainers of selected training institutions. This provides an opportunity to flag challenges and find solutions via peer-to-peer learnings. Based on the experience, it was understood that a dedicated IT/ training personnel should be allocated to maintain this platform and facilitate engagements for an effective use.

During the pilot phase this RBM E-learning platform was developed based on Moodle and had inbuilt target-specific material (to offer multiple target groups within a given level of the training), to meet the needs of diverse roles of learner profiles.

In August 2022, a face-to-face ToT in Pune followed the pilot training series with nominated trainers from the selected training institutions by National Mission for Clean Ganga. The trainer experience acknowledged that the pool of the trainers from the select training institutions were not consistent: the original concept aimed at a continued training of trainers that can take over the role of trainings in India. Institutes that might take over the RBM Cycle training were contacted, and a dialogue on how to institutionalize the RBM cycle training was initiated between NMCG and those training institutions. At the time of writing this Didactical Handbook, it was clear that there is a need for further training for the RBM Cycle approach and its adoption by trainers to upscale this. The concept for future trainings needs close collaboration with NMCG and ongoing processes for RBM plans in the Ganga sub-basins.

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8 Annex

8.1 Planning schedules for TM1, 2 and 3

Possible Planning Schedule for Training Module 1, Target Group I (Option1) and Target Groups II and III (Option 2)

Time	Topic	Learning Outcome	Speaker/ Facilitator	Methodology, Mode and Material	Remarks
(up to 2 hours)	Technical check, room preparation				
15 min	Welcome and arrival, presentation of trainers, Agenda of the training	Get to know trainers	Trainers	(atmosphere creation: trust, good humour, fun, open exchange, passion for water management)	
10-x min	Presentation of participants, expectations towards the training	Get to know participants, gather their expectations	Participants/ trainers	Either each participant, or moderated: "sociograms" ² , or indirect presentations by neighbours after a short chat. Gather the expectations of participants, e.g. with Audience Response Tool like Mentimeter.	
20 + x min	Introduction into the topic	Understand approach of Indian RBM Cycle	Representative of Indian Government, e.g. NMCG	Free speech / PowerPoint slides	
10 min	Q&A	Indian RBM Cycle	All	Questions, possible documentation. (Chat, Flip, ..)	
30 min	Practical application	Practical experiences with RBM Cycle: Case study	Guest speaker, e.g. Tapi/Ramganga	PowerPoint, possibly film material to improve exposure.	
15 min	Q & A	RBM Case study	All	Questions, possible documentation. (Chat, Flip, ..)	
30 min	BREAK, GROUP PHOTO				
Option 1: 60 min	Institutions for RBM Cycle	Institutions in India on RBM	All, group work (5-7 participants)	Boards	
Option 2: 90 min	DPSIR exercise	Understand basin characterization	All, group work	Group work: <ul style="list-style-type: none"> ▪ Task explanation with PowerPoint (10 min, .. slides) ▪ Group work (60 min) ▪ Sharing of results (20 min) 	
30 min	Outlook training programme	Explaining the upcoming trainings	Trainers	PowerPoint, maybe learning platform.	
TOTAL Time estimation: 5 + x hours, depending on guest speeches, welcome and presentation time, group work.					

² „Sociograms“: Arrange the participants by up to three categories – if possible outside your room: Examples: Line up by age, represent your city on a map, form groups by study background, form groups by hobbies.

Possible Planning Schedule, Training Module 2, Target Group II (2 day training)

Time	Topic	Learning Outcome	Speaker/ Facilitator	Methodology, Mode and Material	Remarks
<i>(up to 2 hours)</i>	Technical check, room preparation				
15 min	Welcome and arrival, Agenda of the training	Get to know agenda	Trainers	(atmosphere creation: trust, good humour, fun, open exchange, passion for water management)	
15 min	Presentation of participants – in case they are not already known from TM1	Get to know new participants, reconfirm expectations	Participants/ trainers	Informal presentations, dialogue	
25 min	Learning Unit 2: Clear Governance and Coordination structures – Part 1 (19 slides)	<ul style="list-style-type: none"> • Understand the legal framework as basis for the RBM Cycle. • Explain how the legal framework and the institutional set-up link with RBM Cycle implementation. 	Trainer, probably input from NMCG or Indian Government	PowerPoint slides	
45 min	Group discussion on RBM legal framework	<ul style="list-style-type: none"> • Understand the legal framework as basis for the RBM Cycle. • Explain how the legal framework and the institutional set-up link with RBM Cycle implementation. 	All	Group work, discussion with pin boards or with audience response system on legal framework – on legal Framework	
20 min	Learning Unit 2: Clear Governance and Coordination structures- Part 2	<ul style="list-style-type: none"> • Know different forms of institutional set-ups to cooperate for RBM 	Trainers	Powerpoint presentation, 13 slides	
20 min	Group discussion, RBOs	<ul style="list-style-type: none"> • Know different forms of institutional set-ups to cooperate for RBM 	All	Group work, discussion on characteristics of RBO, NMCG as RBO. Support with pin boards or with ARS	
20 min	Learning Unit 2: Clear Governance and Coordination structures- Part 3	<ul style="list-style-type: none"> • Explain the rationale and different forms of stakeholder engagement • Know how to do a stakeholder analysis 	Trainers	Powerpoint presentation, 16 slides	
45 min	Stakeholder analysis	<ul style="list-style-type: none"> • Know how to do a stakeholder analysis 	All	Pin boards, or powerpoint, or a digital whiteboard such as flinga	
20 min	Stakeholder analysis- presentation of results to plenary				
BREAK					
15 min	Learning Unit 4: Basin Vision and Objectives	<ul style="list-style-type: none"> • Know different basin visions and objectives of important river basins including Ganga River 	Trainers	Powerpoint, total: 23 slides, Part 1 – until Visions	
20 min	Vision Ganga	Analyze and discuss Vision Ganga	Participants	Examine Vision Ganga as a basin vision (e.g. Scales, Mentimeter, and discussion	

Time	Topic	Learning Outcome	Speaker/ Facilitator	Methodology, Mode and Material	Remarks
15 min	Learning Unit 4: Basin Vision and Objectives	<ul style="list-style-type: none"> Understand the development of objectives over time Know how to assess the quality of objectives with SMART methodology 	Trainers	Powerpoint, total: 23 slides, Part 2	
45 min	Examine Ganga Objectives	Examine Ganga Objectives with SMART	Participants	Pinboards, or Powerpoint	
15 min	Presentation of group work to plenary	Presentation of group work, get an idea for future vision	Participants	See above	
60 min	Optional: Formulate objectives for your basin	Develop objectives for your sub-basin. Think about the DPSIR exercise, and link your objectives to the pressures and impacts.	Participants in basin groups	On which basin did participants work with regard to the DPSIR? Let them regroup and think about objectives for the basin.	
15 min	Presentation of group work to plenary				
60 min	Optional: Presentation of Case study: How were objectives formulated for Tapi, Ramganga basin?	Learn from case studies- from India. Look at Tapi and Ramganga basins.	Guest speaker/ resource person from Tapi, Ramganga basin		
Total time, first day: 7 hours 50 min without breaks: need to shorten this to 7 hours, better 6,5 – which is possible considering the optional elements.					
BREAK/ NEXT DAY					
20 min	Learning Unit 5: Monitoring networks and programmes	<ul style="list-style-type: none"> Explain the rationale and relevance of monitoring networks Know important parameters and methods for monitoring river basins Know examples for monitoring networks in Europe and in particular of Ganga river 	Trainers	Powerpoint slides, 14	
45 min + 15 min		Exercise: Participants exchange and discuss their perspective on existing monitoring networks and programmes in the Ganga and/ or in their sub-basin. Sorting of discussion by two questions. Sharing of group work results	Participants	Sorted discussion, assisted by pin board or digital white board.	
15 min	Learning Unit 6: Assessment of Water Quantity and Quality	<ul style="list-style-type: none"> Understand the objectives of assessing water quality and quantity Know the major three components to assess the status of a river basin in Europe Explain the parameters of biological, hydromorphological and physico-chemical assessment for rivers and lakes 	Trainers	Powerpoint slides, 8	

Time	Topic	Learning Outcome	Speaker/ Facilitator	Methodology, Mode and Material	Remarks
(45 min)		Optional: Depending on your group, you may support participants in sharing their experience and knowledge on water assessments. This could be done with pinboards, grouping assessment methods under the three quality parameters of the EU WFD.	Participants	White board, working on sub-basin	
15 min		Sharing of group work results			
BREAK					
15 min	Learning Unit 7: Implementation of RBM Plans and PoMs – part 1	<ul style="list-style-type: none"> • Know the structure and content of RBM Plans, including Ganga RBMP • Explain the linkage of River Basin Vision & Objectives with RBM Plans and Programme of Measures 	Trainers	Powerpoint, 7 slides on Plans	
60 min	Optional: Case study	Include a case study on Danube, Tapi, or Elbe river on RBM and PoMs	Resource person	Powerpoint	
15 min	LU 7: Implementation of RBM Plans and PoMs – part 2	<ul style="list-style-type: none"> • Develop measures for a Programme of Measures, know an approach for prioritisation 	Trainers	Powerpoint, 7 slides on PoMs	
10 min	RBM Role game	Understand the rules and outcome of the RBM game	Trainers	Powerpoint, 5 slides RBM role game. Maps on boards. Cards on environmental and water technology	
120 min	RBM Role game	Develop a programme of measures for a fictional or real basin	Participants	Group work with boards and technology cards	
30 min	Sharing of results	Presentation of group work results	Participants	Presentation of group work results	
15 min	LU 7: Implementation of RBM Plans and PoMs – part 3	<ul style="list-style-type: none"> • Know sources of financing for PoMs • Understand the cycle and its role for review and revision of RBM Plans and PoMs 	Trainers	Powerpoint, 10 slides on aspects for implementing PoMs/ RBM Plans	
30 min + x	Discussion on financing, authorisation, other bottlenecks	Discussion on achievements & bottlenecks when implementing PoMs regarding scheduling, financing, authorisation, construction and operation	Participants	Assist with boards, mentimeter (open ended)	
30 min	Closure and Outlook, TM 3	-	Trainers		
Time second day: 8 hours – without breaks. Again, this needs to be shortened, looking at the optional parts and probably shortening the RBM role game.					
TOTAL Time estimation: 2 days, depending on guest speeches, excursion, welcome and presentation time, group work.					

Possible Planning Schedule for Training Module 3, all Target Groups

TM 3 needs to be developed carefully, with reference to the previous trainings and the interests of all three target groups. Those might include case studies/ guest speakers from Europe and from Indian RBM Cycle examples. Also, possible group work might be presented such as DPSIR assessments. The agenda here only suggests options.

Time	Topic	Learning Outcome	Speaker/ Facilitator	Methodology, Mode and Material	Remarks
<i>(up to 2 hours)</i>	Technical check, room preparation				
15 min	Welcome and arrival (presentation of trainers/ organisers)	Arrival, good mood. Participants know trainers / organisers	Trainers/ organisers	NMCG as guest, or some other organiser. Trainers. Oral, no material needed.	
10-20 min	Presentation of participants	Get to know participants of all target groups	Participants/ trainers	Since presentation takes a lot of time, it would be good if participants can be presented per institution by one person. Or think of some other methodology to shorten presentation time.	
10 min	Learning objectives of TM 3, Agenda of the training	Understand goals of TM3	Trainers	Probably add slides or use flip chart, maybe get in discussion with participants	
Option 1: 20 min	Presentation of Water information tools	Understand vast options and systems of water information	Trainers	Powerpoint- 11 slides	
30 min	Discussion on water information systems	Get to know water information systems, gather ideas on strengths and weaknesses of status quo	Participants	Moderated discussion- with boards, Audience response system or digital whiteboard	
Option 2: 20 min	Stakeholder engagement and water information systems in Europe	Get inspired from European examples with regard to RBM- information exchange and cooperation	Guest speaker, EU	Powerpoint, max 15 slides	
15 min	Questions on European examples	Understand the European example, compare with India, what can be learnt	Participants	Moderated discussion- with boards, Audience response system or digital whiteboard	
30 min + x	DPSIR group work	Understand the assessments of Target group 3 and their case study basins	TG 3 group work representatives	Groups present their results to target groups 1 and 2- on their assessments of the Problem-oriented learning case studies. The presentations need to be reviewed by trainers before being held. Trainers need to give advice on structure, length, presentation style so that the presentations are not too long and also similar – to be better understood. Also make sure that to listen to those presentations is an added value for TG 1 and 2.	
15 min	Discussion and feed-back of group work	Get into discussion on the group work results	All participants	Methodology can be open, or documented. Or the group work representatives can document the feed-back received.	

10 min	Optional: Raising Awareness among the public for RBM	Get to know ideas and examples of awareness raising for RBM	Trainers OR NMCG	Powerpoint, 4 slides.	
Optional: 30 min	Discuss and develop ideas for raising awareness	Get participants involved to develop their own ideas and suggestions for raising awareness	Participants/ NMCG	This is optional- depending on decision-makers wish to have a group develop ideas on awareness raising. If there is no interest by the TG1, then you can shorten this to a question round of 5 min.	
10 min	Interactive session on stakeholder engagement in India	Participants contribute their thoughts about stakeholder participation in Indian RBM	Participants	Mentimeter or Audience response system; if you want to get many voices, individual work, probably group work per 2 persons in presence format	
35 to 45 min	Discussion: Exchange, information flow and cooperation	Get the three target groups to exchange their views, take up the group's recommendations for development and next steps	Participants	Guiding question of 2020: Are the existing institutions and processes for stakeholder engagement adequate – what can be improved? (Adapt this question or the set of questions with NMCG and/ or organisers of the training- what are they interested in?) Organize the documentation of the discussion: pin board, digital boards, ARS	
10 min	Feed-back and Evaluation	Explain how to evaluate the training; look back at the expectations	Trainers	The feed-back methodology has to be prepared before: either boards, points, tables, paper questionnaires, or digital tools. The review of the participants' expectations has to be prepared before. The group needs clear orientation how to evaluate and give feed-back. Maybe the trainers want to present the feed-back rules.	
10-20 min	Feed-back and Evaluation	Gather the feed-back and evaluation to orient future trainings	Participants and trainers	Oral discussion plus methodology chosen before.	
15 min	Closure of the training	Look back and look forward	Trainers, organisers	Closing words, maybe handing out of certificates, maybe outlook	
A break needs to be inserted depending on the final programme					
TOTAL Time estimation: Maximum 315 min = 5 hours 15 min plus break. Possible to organize in half a day.					

8.2 The RBM game

The RBM game takes up a game that was developed by the German Association of Water, Wastewater and Waste (DWA) on IWRM. The game has been used for different target groups: professionals of different backgrounds were enjoying the experience to discuss about environmental technologies, and student groups were challenged to present their ideas in a university challenge. For professionals, the game helps to exchange their experiences in a playful manner, and to bring their ideas on solutions for water management together. The participants – given enough time- enjoy to suggest solutions for a river basin, and to propose a management scheme. The game does not focus on problem analysis- on the contrary, the problem analysis is given to participants as text beforehand.

The game can take up every basin- so if you want to align it to the background of your participants, take the basin where you are organising the training.

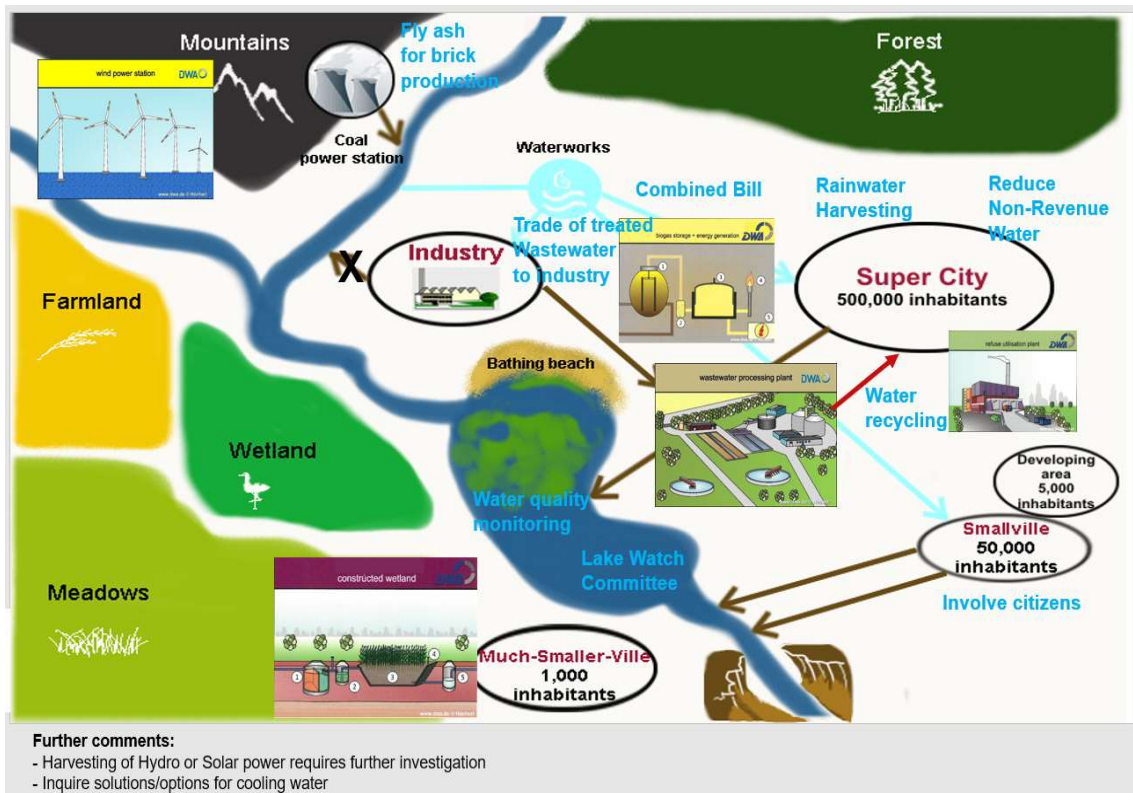
The game is a role game: The idea is to develop a Master plan for a green, sustainable city or river basin. Such a plan should be like a programme of measures including suggestions what to build, e.g. new water and wastewater infrastructure, but also energy infrastructure and waste treatment. Essential roles include a technical advisor or planner that suggests innovative solutions for the basin. Someone from the municipality should try to bring in the objectives of the city, i.e. citizens that have jobs, water and waste infrastructure, and access to energy. Also, the quality of life is important for an attractive city environment. You may include the role of the mayor. Please bear in mind that a mayor might have a hierarchical rank that destroys a constructive discussion. The last role could be someone from the water operator who needs to consider costs and resources for maintaining new infrastructure. Additional roles can include someone from the state government looking at the larger objectives of the region, it might also be someone from an environmental NGO, or someone from the water operator.

The descriptions for a model basin as well as the map of such a basin are available on the stick. You also need cards to pin to the basin so that participants can illustrate what they want to establish to improve their basin infrastructure.

Allocate time for reading through the basin and for discussing potential measures. Students normally get one hour for the task which is very short. If you have more time, allocate 75 -90 minutes. Then, allocate time for presenting the Master plans. Also, allocate some time for reflection- did the game help to understand challenges and potential solutions? What are interdependencies of technical solutions? What are priorities? How much time is required for all measures to be implemented?

The digital version is possible, but challenging: Participants need to work on a joint map – which might be very small to see. The cards can be attached to the map in digital form. New cards can be designed easily. The documentation could be simple.

Figure 9: RBM game of ToT in 2020



8.3 Role of a facilitator

The following text describes the role of a facilitator. The text is based on the German book “Change Management” (Doppler & Lauterburg, 2005).

What is the role of a facilitator?	What is NOT the role?
<ul style="list-style-type: none"> ▪ Active service provider for the whole group ▪ Coach for meaningful, efficient working methodology ▪ Coach and support for mutual understanding ▪ Coach and support for cooperation ▪ Team-Coach 	<ul style="list-style-type: none"> ▪ Team-speaker ▪ Technical expert ▪ Schoolmaster ▪ Referee with sanctioning power ▪ Uninvolved spectator ▪ Outside observer

Essentials of facilitation

1. Create climate of open dialogue and trust

Atmosphere, discussion style should be open and relaxed. This is the basis of learning. It starts with openness, honesty and humour of the facilitator. The facilitator is the role model for the group.

2. Communication: control dialogue

Good understanding of team participants is crucial. The facilitator has to ensure good listening, questioning, clarifying of issues- to avoid „to get one’s wires crossed“

3. Team development: help people help themselves

Don’t do everything, but organize the team to get and stay active; to get sensible for the quality of understanding in the team; to organize their cooperation in an effective, relaxed form

4. The whole team as a “customer”

Have an eye on the functioning of the whole team. Principle: every team member is important! Be available for everyone. Do not favour anyone, do not disqualify persons, never exclude persons.

5. Do not set yourself under performance pressure

The facilitator does not always have to have everything in the focus. He/she is no witch. She/he does not always understand everything at first sight. He/she is not “guilty”, if there are stops or conflicts in the process. The only thing that matters is the effort to support the team in analysing and solving difficulties in their discussions.

Tasks of facilitation

1. Clarify background and context

Good facilitation is only possible if the context and background of the discussion is clear to the facilitator. In addition, the facilitator has to support the team in complex issues (which is mostly the case) not to draw fast conclusions, but to analyse the underlying facts and background.

2. Secure good understanding (see essentials)

3. Ascertain and care for concretion

Secure that abstract, general or not understandable contributions will be concretized, e.g. with examples, or visualized (for example on flip chart graphs)

4. Secure visualization

Complex issues should be visualized (by team or facilitator)

5. Give the word to participants

Depending on group size. Might be words or votes. Spontaneous discussions can be worthwhile to the process.

6. Activate silent participants; stop long speakers

7. Bring the discussion back to the topic

8. Work out the essentials

9. Summarize intermediate results

10. Lay open / reveal differences of opinions and interests

11. Work on conflicts if the conflict endangers the constructive discussion

12. Pick the understanding in the team up as central issue

13. Give feed-back to the team, give feed-back to single team members

14. **Address feelings and perceptions; show your own feelings**

15. **Time management**

16. **Secure results of the discussion**

17. **Clear agreements and task distribution**

18. **Collective and joint review and “critique of the manoeuvre”**

No event without an evaluation!

A common, critical review increases the learning effect for all participants and helps the team to steer itself better in the future.

8.4 How to deal with resistance to RBM cycle as new concept

There is resistance to the RBM cycle as a new or foreign model! What could you do to deal with such a situation?

Resistance to change is normal and has several reasons:

- Solutions/ concepts from outside are normally not taken up. By taking up “foreign” concepts, the own value and the desire for self-profiling and development cannot be fulfilled or met.
- People have not understood the goal, background or motivation for the new concept.
- People have understood, but do not believe in what they were told.
- People have understood and believe what was discussed, but they do not want or cannot agree on the new model/ concept, because they do not see positive consequences.

Find out the reasons for resistance by asking questions:

- What is important for people? What are their interests, desires, issues?
- What could happen if the concept would be adopted? What should be avoided?
- What are alternatives? What is a concept or model to solve the problem/s to satisfy everybody?

Resistance – four basic principles

1. There is no change without resistance.

It is normal that change results in resistance to it. If there is no resistance, no one believes that the change might be realistic. If there is no resistance, this is more worrying than resistance!

2. Resistance always includes a “coded” message.

If people resist against something that seems to make sense, they have concerns or are frightened. The reasons for resistance are emotional!

3. Ignoring resistance leads to blockades.

Resistance shows that the requirements for change are not or not yet given. Increased pressure will only increase “back pressure” or resistance. ☒ include a break for thinking and revision!

4. Go with the resistance, not against it!

The underlying emotional energy has to be taken up- meaning it has to be taken seriously- and then directed sensibly.

What to do as trainer in case of resistance?

- take away the pressure, **give room to resistance**
- put out antennas, **start dialogue**, analyse reasons
- **agree jointly** on new definition and/or **process of change**

8.5 Online trainings, audience-response systems and e-learning platforms

Online trainings

The RBM cycle course had to be transferred to a digital format during the Covid-19 crisis in 2020. The course adaptation was a mixture of offline and online modules of the training. The presentations on the different learning units were recorded as videos, including the video of the lecturer. The participants were asked to view these videos before joining the online sessions. The online sessions were restricted to 2, maximum 3 hours in order not to lose the motivation and concentration. First, the videos were summarized, and questions could be raised. Then, a discussion session followed, supported by digital audience-response systems to activate the participants. With those elements, the discussion became engaging to everyone, and via options such as the chat and the audience response systems, it was possible to engage all participants without a lengthy online discussion. The digital tools allowed documentation of results. Challenges are the participation of more than one person with one digital access, and the connection quality. However, the latter was overall quite good. Also, informal dialogues are not possible when meeting online. Finally, the memory of the course will be less engraved since the impressions of participants remain distant with online media. On the other hand, more participants can join since there is no travel time required for participation.

Audience-response systems

With audience-response systems (ARS), it is possible to quickly engage participants and let them formulate their own thoughts and results on the topics discussed. ARS thus support the interaction between trainers and participants. Participants are required to give a short feed-back or to gather or even test their knowledge on a certain topic. Participants need to have smart phones or tablets in order to use those ARS.

A very simple tool with a nice graphical output is **Mentimeter**. By registering, you can establish as many mentimeters as you like. Please note that within one presentation, you are limited to two slides if you do not pay for your account. But the total number of presentations is not limited. Mentimeter is very suitable for quick polls, for the scales- evaluation (used to evaluate the Ganga Vision), or for gathering feed-back in the form of open text or in word clouds. It is also suitable for smaller multiple choice questions. It is not suited if you want to arrange results or edit cards. Then, you need different formats.

Other audience-response systems are: pingo, kahoot, arsnova, eduvote.de, socrative.

If you want to arrange the inputs of your students in columns containing of text cards, pictures, internet links or other formats, you can use a **Padlet**. Padlets are digital boards that allow to gather all this information in a pre-structured form. You could use them if your answers shall be arranged in strict

categories, i.e. up to 8 or 10 categories. Padlet allows you to have three padlets at the same time without a paid user account.

Finally, **online white boards** are a useful collaboration tool. White boards can be filled with text, pictures, links and so on- in unlimited space. Also, work processes can be visualized. To present results, you can zoom in and out. Several users can access a white board. Examples that are open source include: Miro boards, conceptboard, stormboard, mural, limnu, or flinga.fi.

E-learning platforms

E-learning platforms are website-based software tools to organize learning and trainings. E-learning platforms contain the following characteristics and functions:

- Access to a learning platform is normally restricted to trainers and participants. Whereas trainers have full access and can structure and update the content, participants have a restricted access so that content cannot be influenced.
- The functions of e-learning platforms include: i) shared folders for presentation material, videos, literature, ii) a calendar function, iii) communication functions: e.g. messages or chats, iv) test and feedback functions: multiple choice or open tests, quizzes, feedback tools, v) delivery and evaluation tools (probably combined with deadline setting), to name the most important.
- Once a course is set up, there need to be resources for updating the content, otherwise the material is soon outdated. Normally, there is a person responsible for the content and structure of the course, e.g. the principal trainer.
- The software is easy to use but requires some accommodation with it. At learning institutes, students are normally using the same software for various courses. However, for adult learning, the accommodation with a “new” software might present a hurdle to active enrolment.
- The digital platform requires a “host institution” including technological support with regard to registering participants and solving technical problems.

For the RBM Cycle training, a digital platform has been set up with a focus of sharing material such as presentations, case studies, further literature and learning videos. The platform is based on Moodle- a customisable e-Learning solution that is applied by universities and learning institutes worldwide including India (moodle.com). The resources for hosting the digital platform including technical support and the continuous update of material are not yet clarified. The platform was last updated in 2022 by AHT on behalf of GIZ. The experience with the RBM Cycle trainings was that participants rarely logged in the platform, but preferred printed material and/ or material on USB sticks.

8.6 Engaging and motivating your audience

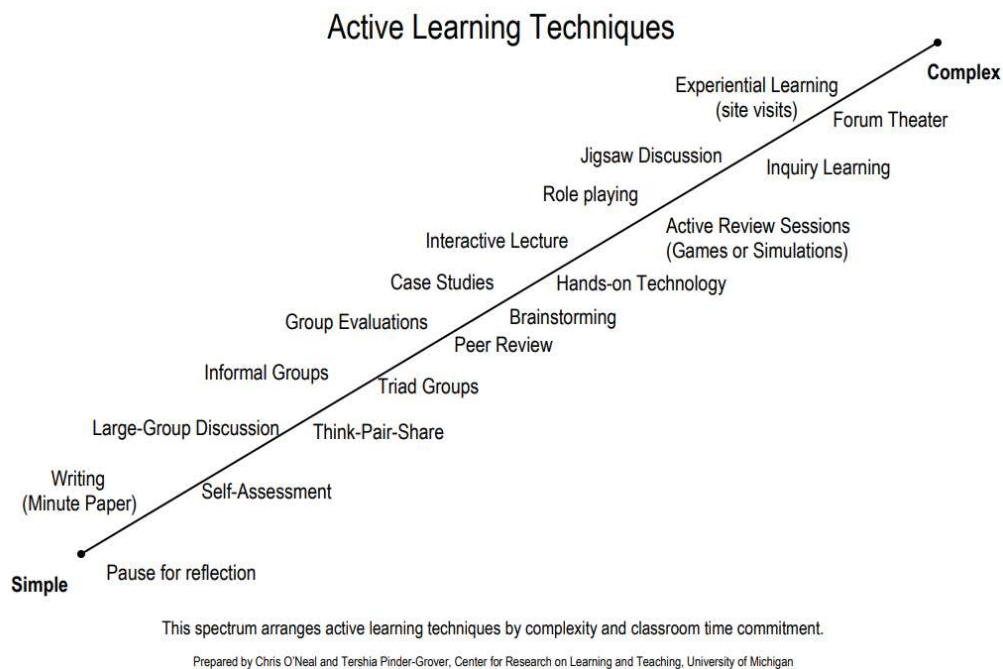
Participants learn best when they are engaged and activated. They can then keep up interest and motivation during the training. Passive listening does not reach the same learning results as individual and group learning does. So the teaching concept needs to consider the limited timespan of listening- up to 20 minutes- before integrating different activating elements in the training that enable participants to reflect new content, to share their different knowledge, and to build up new competences by discussing or developing own thoughts or presentations.

Examples for activating the audience include: questions, brainstorm sessions, short group work – probably in pairs, audience response system elements with multiple choice, or scales, or open text inputs. The approach of the RBM Cycle training is already structured following this approach: Problem-oriented learning is the basic concept, so that participants are required to perform group exercises and to document their results. This starts with stakeholder analysis, DPSIR assessments, and goes further with analysing the Ganga Vision and objectives, and finally culminates in developing a programme of measures for a small sub basin. Participants thus share their knowledge and develop their own solutions with regard to the problems of a river basin.

Also, the interactive elements are short and activating elements that help to keep up concentration and motivation throughout the training. For target group 3, it might be a good idea to let them develop their own presentation on a case study of their river basin, including the DPSIR assessment, probably existing monitoring data, and finally a selection of measures that are planned to improve river basin planning and management. The RBM role play is another motivating and activating element that is included in the RBM Cycle training.

Elements of engaging and activating participants have been listed and explained by many universities, one example is the University of Michigan, How can you incorporate active learning into your classroom, File name “Active learning continuum 2.doc”, available here: https://crlt.umich.edu/sites/default/files/resource_files/Active%20Learning%20Continuum.pdf

Figure 10: Active Learning Techniques, University of Michigan (n.y.)



A few explanations on those elements that are maybe less known are cited here:

Think-Pair-Share: Have students work individually on a problem or reflect on a passage. Students then compare their responses with a partner and synthesize a joint solution to share with the entire class.

Hands-on Technology: Students use technology such as simulation programs to get a deeper understanding of course concepts. For instance, students might use simulation software to design a simple device or use a statistical package for regression analysis.

Jigsaw Discussion: In this technique, a general topic is divided into smaller, interrelated pieces (e.g., a puzzle is divided into pieces). Each member of a team is assigned to read and become an expert on a different topic. After each person has become an expert on their piece of the puzzle, they teach the other team members about that puzzle piece. Finally, after each person has finished teaching, the puzzle has been reassembled, and everyone on the team knows something important about every piece of the puzzle.

Inquiry Learning: Students use an investigative process to discover concepts for themselves. After the instructor identifies an idea or concept for mastery, a question is posed that asks students to make observations, pose hypotheses, and speculate on conclusions. Then students share their thoughts and tie the activity back to the main idea/concept.

Forum Theatre: Use theatre to depict a situation and then have students enter into the sketch to act out possible solutions. Students watching a sketch on dysfunctional teams, might brainstorm possible suggestions for how to improve the team environment. Ask for volunteers to act out the updated scene.

Experiential Learning: Plan site visits that allow students to see and experience applications of theories and concepts discussed in the class.

8.7 Evaluation form

Personal information

Organisation? Age? Gender?

Evaluation of the course

	Yes				No
	1	2	3	4	5
The course is clearly structured.					
The course was conducted on time as planned.					
The learning environment was conducive (e.g. room size and materials were appropriate).					
The requirements for the performance assessment were clearly explained.					
The course content is in accordance with the syllabus/course description.					
The course content matches my expectations.					

To follow the course, my previous knowledge is sufficient.					
The work materials (e.g. pdf, digital material, references etc.) are helpful.					
The course content in each learning unit is appropriate.					

How much time have you invested per week in preparation and follow-up for this course?

- None
 1-2 hrs
 3-4 hrs
 5-6 hrs
 More than 6 hrs

Evaluation of the trainer/ lecturer

	Yes				No
	1	2	3	4	5
The trainer has prepared the learning units carefully.					
The communication of the trainer is well audible.					
The trainer uses appropriate and mixed presentation material (e.g. slides, blackboard, pin boards, flipcharts) in the course.					
The trainer has explained relations between theory and praxis.					
The trainer is easily accessible – also outside the lecture hours (via e-mail, consultation hours, etc.).					
The trainer is open to discussion and kind towards the students.					

Open questions and total evaluation

If every aspect could be combined, I would attribute the following marks to the course:

1	2	3	4	5

(1: very good, 5: failed/ insufficient)

What did you like most in the course? Why?

What did you like least in the course? Why?
