River Basin Management Cycle Training Series

05 - Design/ Adaptation of Monitoring Networks and Programmes

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INDIA-EU WATER PARTNERSHIP

Outline

Unit	Topic
1	**Introduction to River Basin Management**
2	**Clear Governance and Coordination Structure**
	Governance (legal aspects and framework)
	Basin Coordination Structures (basin institutions and stakeholder engagement)
3	**Basin Characterisation**
	DPSIR Assessment
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**
	River Basin Plans and Programme of Measures (PoM), Financing and Review of PoM
8	**Solutions through Exchange, Information Flow and Cooperation**

5 Monitoring Programmes

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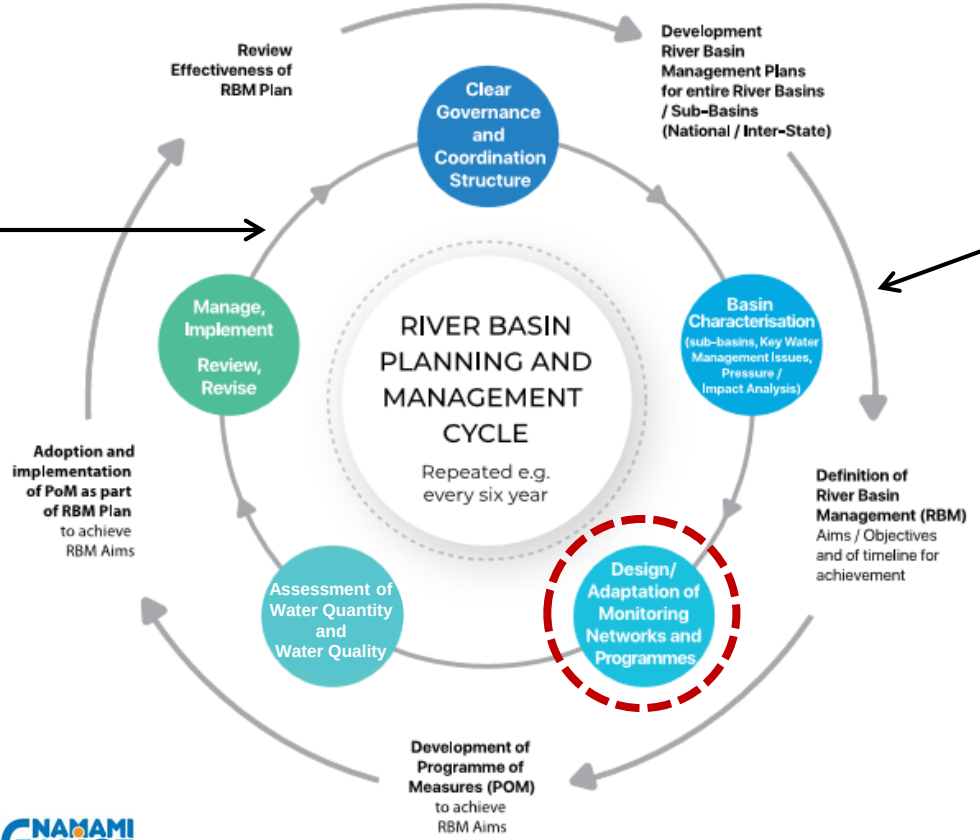
The River Basin Planning and Management Cycle

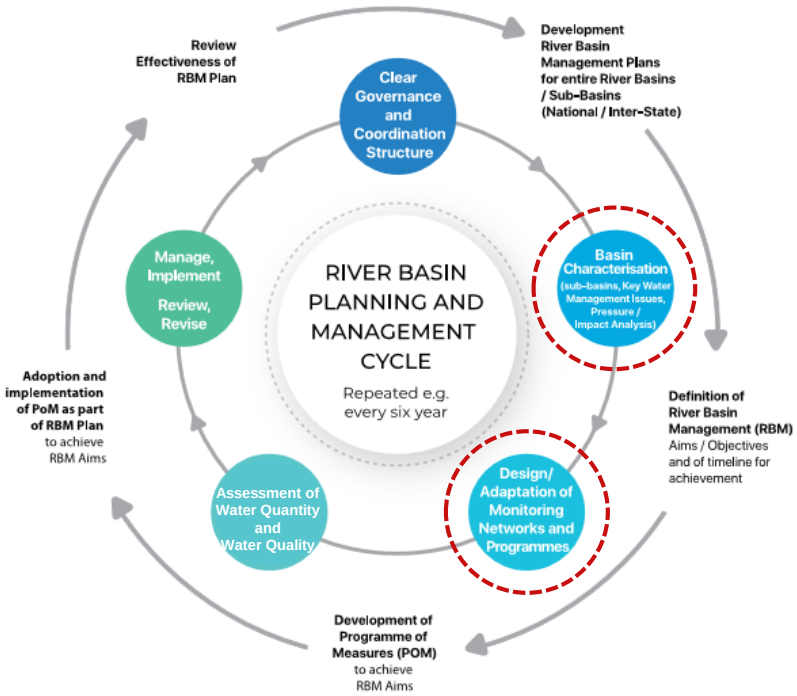
„Inner cycle“
Technical/
operational level“

„Outer cycle“
Planning and
decision making
level



Rationale for a Monitoring Programme

Annex II and V of the EU WFD



Characterisation

- Description of the river basin
- Identify pressures
- Assess Risk from pressures

Annex II

Monitoring

Annex V

- Develop monitoring and classification system
- Monitor to check risk assessment
- Monitor to assess status
- Monitor to assess effectiveness of measures

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Monitoring Programmes

- “Monitoring programmes are required to establish a coherent and comprehensive overview of water status within each river basin district.”

- **Monitoring information from surface and groundwater is required for:**
  - The classification of status (biological, chemical and hydromorphological/ quantity for groundwater)
  - Validating the risk assessment
  - Assessment of long-term changes from natural conditions and resulting from anthropogenic activities
  - Estimating pollutant loads
  - Identifying reasons for failure to achieve environmental objectives

Source: European Commission (2003) Guidance Document No. 7: Monitoring under the WFD

Relevance of Basin Characterisation and Monitoring for Policy Dialogue

- Basin characterisation and monitoring is a complex undertaking → Requires the consideration of hydrology, hydro-morphology, chemistry, and biology to assess the overall status of water resources

- All this makes the undertaking of basin characterisation and monitoring a **labour-intensive**, **time consuming** and **costly** activity → Thus, the following needs to be carefully established:
  - The scope of the characterisation
  - Division of roles and responsibilities among the various stakeholders involved
  - In addition to securing **sustainable financing mechanisms**

- Monitoring programmes (according to the WFD) are derived from/ aligned with the risk assessment (DPSIR) to achieve cost-efficient design

What is Needed for the Design and Adaptation of Monitoring Programmes

- Development of a monitoring programme and observation grid within the river basin
- Assessment of the current water quality
- Assessing options of environmental remediation
- Identify shortcomings of regulations and protection provisions
- Data to calibrate and run models

Monitoring Parameters and Methods

Many of the monitoring methods applied for basin characterisation and assessment are also used for monitoring → **Those include:**

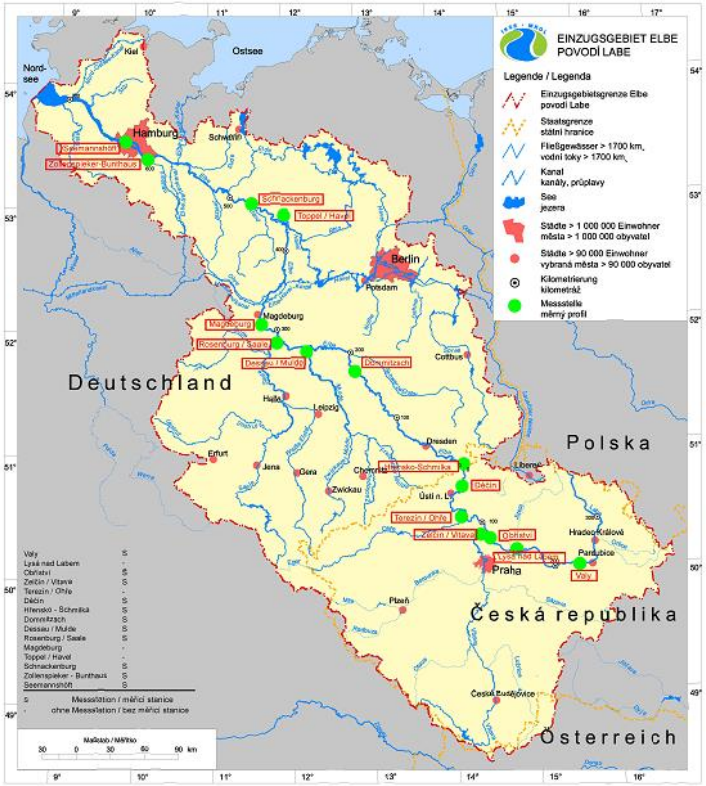
- Hydrological parameters
- Water quality parameters
- Biological parameters

Additional methods which could be employed include:

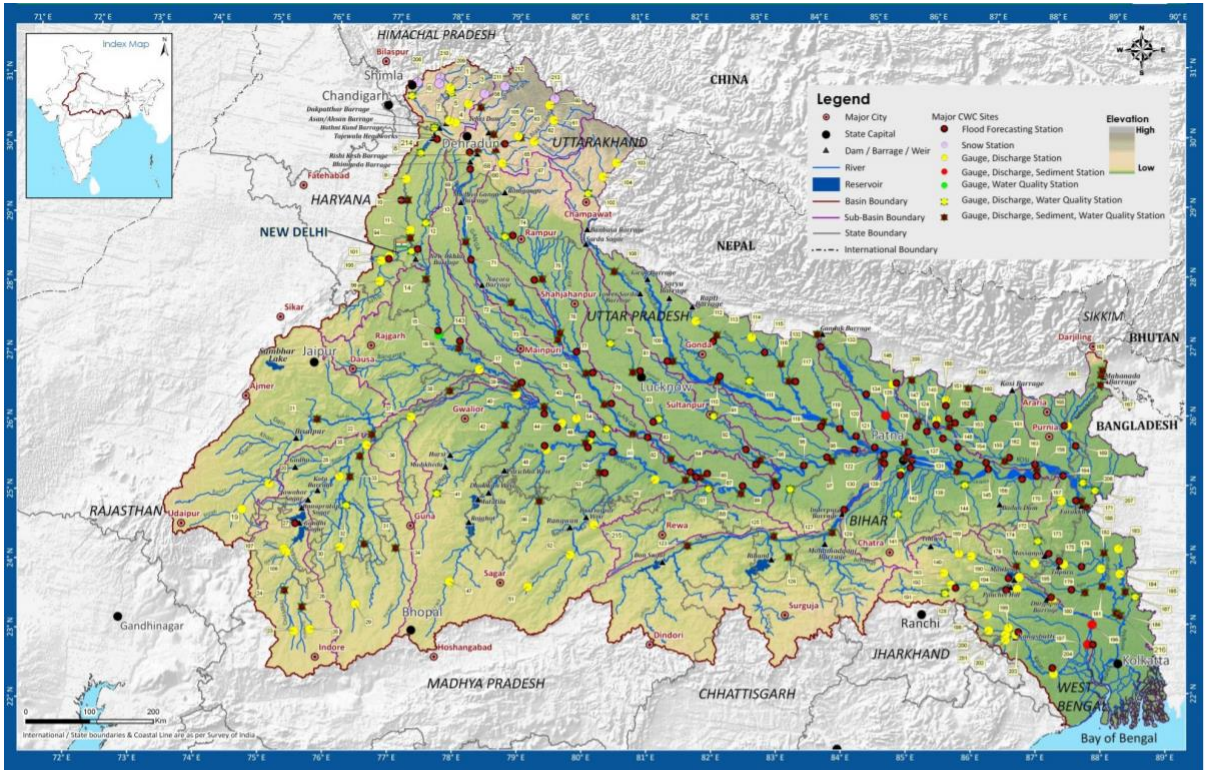
- Telemetric Monitoring Systems
- Remote Sensing
- Geographic Information Systems (GIS)

The International Commission for the Protection of the Elbe River (ICPER) – Monitoring Networks and River Transects

The water quality within the framework of the International **Elbe Monitoring Programme** 2019 is monitored at 9 monitoring profiles in Germany and 6 monitoring profiles in the Czech Republic (10 directly at the Elbe and 5 at tributaries).



Example: in the Ganga basin – Monitoring Networks



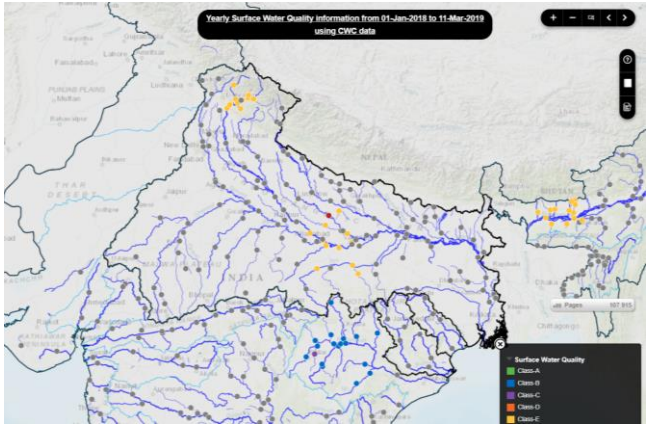
Source: Ministry of Water Resources (2014) Ganga Basin

Example: in the Ganga basin – Monitoring Networks

Example: Surface Water Quality

- 36 Real Time Water Quality Monitoring Station (RTWQMS) are operational
- Water quality monitoring is carried out 130 locations
- Dissolved Oxygen levels improved at 39 locations, Biological Oxygen Demand (BOD) decreased at 42 locations and coliform bacteria count decreased at 47 locations (2017 vs 2018 data).
- Bio-monitoring of river Ganga at various locations (Haridwar to Diamond Harbour in West Bengal) has been carried out to study the Benthic Macro Invertebrates, which reflects the biological health of river

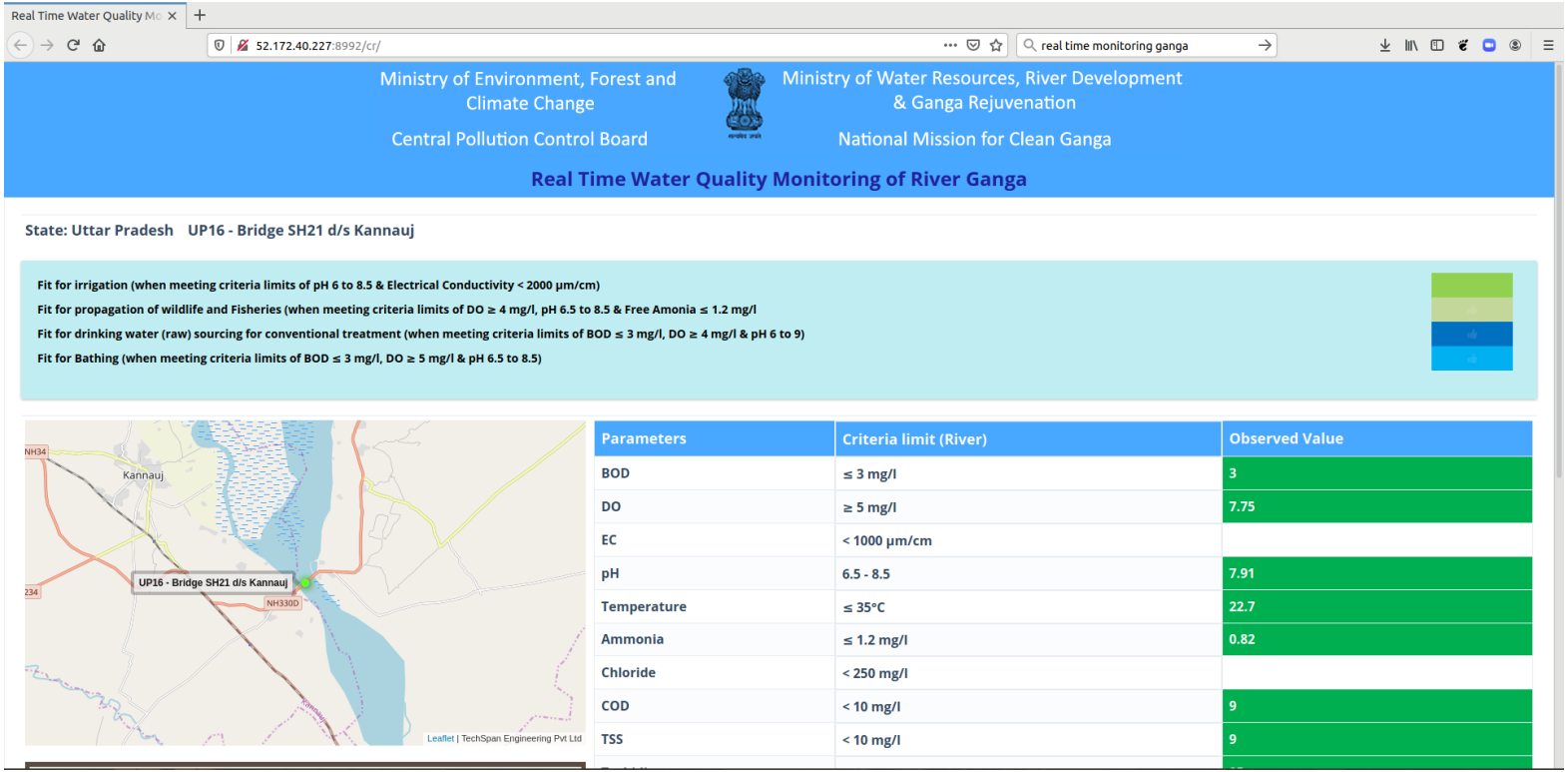
India Water Resources Information System (WRIS)



Link: http://indiawris.gov.in/

Source: Press Information Bureau (2018) Year end Review-2018

Example: in the Ganga basin – Real time Monitoring



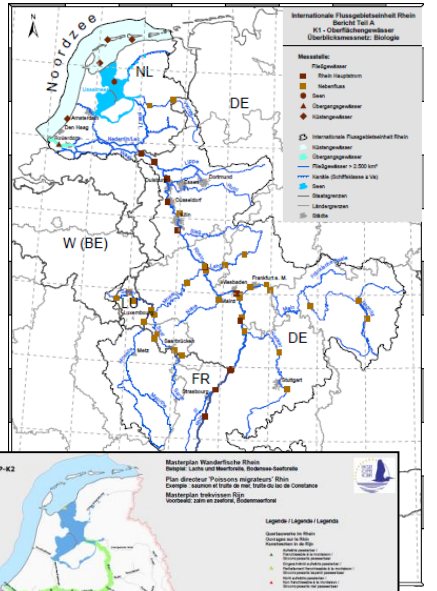
Joint Monitoring in the Rhine River Basin

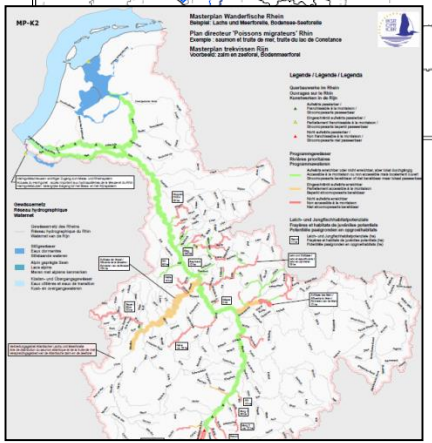
ICPR monitors:

- State of the river and changes of it (flow, quality, hydromorphology, biodiversity, etc.)
- Specific issues countries have identified as priorities (e.g. salmon migration)
- Nationally implemented measures and their effects (on improvement of state of the river)
- Compliance with specific joint decisions that have been taken (implementation/lack of implementation) of specific measures – example Haringsvliet Sluices)

→ **Done on the basis of national data, national and regional analyses, inputs from scientific community and civil society**

→ **Provides comprehensive picture of the state of the river and the effectiveness of measures implemented**





Data and Information Management in the Danube River Basin

In the Danube River Basin, data acquisition and analysis includes:

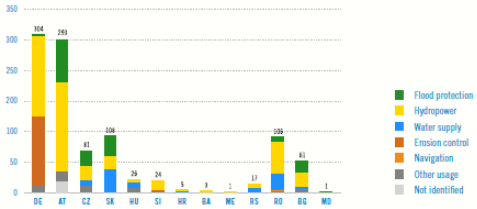
- Danube Basin Analysis (state of the basin, human activities, impacts, economic water use)
- Identification of pressures in DRBMP – basis for identification of specific monitoring needs
- Trans-National Monitoring Network (TNMN) with specific parameters
- Specific monitoring efforts (Joint Danube Survey)
- Mechanisms for sharing data between ICPDR member countries (DANUBIS)
- Mechanisms for sharing analyses results with other actors and the general public

→ **Data and analyses are the basis for science-based and informed decision-making**

Table 1: List of monitoring sites

No.	Country code	DEFF Code	New TNMN code	River	Name of site	Locations	x- coord.	y-coord.	River-km	Altitude	Catchment
1	DE	L2130	DE2	Danube	Jochenstein	M	13.703	48.520	2 204	290	77 086
2	DE		DE5	Danube	Dillingen	L	10.499	48.566	2 538	420	11 315
3	DE	L2150	DE3	/Inn	Kirchdorf	M	12.128	47.782	195	452	9 905
4	DE	L2160	DE4	/Inn/Salzach	Laufen	L	12.933	47.940	47	390	8 113
5	AT	L2220	AT1	Danube	Jochenstein	M	13.703	48.521	2 204	290	77 086
6	AT		AT5	Danube	Enghagen	R	14.512	48.240	2 113	241	84 869
7	AT	L2180	AT3	Danube	Wien-Nussdorf	R	16.371	48.262	1 935	159	101 700
8	AT		AT6	Danube	Hainburg	R	16.993	48.164	1 879	136	130 759
9	CZ	L2100	CZ1	/Morava	Lanzhot	M	16.989	48.687	79	150	9 725
10	CZ	L2120	CZ2	/Morava/Dyje	Pohansko	M	16.885	48.723	17	155	12 540
11	SK	L1840	SK1	Danube	Bratislava	LMR	17.107	48.138	1 869	128	131 329
12	SK	L1860	SK2	Danube	Medvedov	M	17.652	47.794	1 806	108	132 168
13	SK	L1960	SK4	/Váh	Komárno	MR	18.142	47.761	1.5	106	19 661
14	SK	L1871	SK5	Danube	Szob	M	18.853	47.813	1 707	100	183 350
15	SK		SK6	/Morava	Devín	M	16.976	48.188	1.5	145	26 575
16	SK		SK7	/Hron	Kamenica	M	18.723	47.826	1.7	114	5 417
17	SK		SK8	/Ipoly	Salka	M	18.763	47.886	12	110	5 060
18	HU	L1470	HU1	Danube	Medvedov	M	17.652	47.792	1 806	108	131 605
19	HU	L1475	HU2	Danube	Komarom	LMR	18.121	47.751	1 768	101	150 820
20	HU	L1490	HU3	Danube	Szob	LMR	18.964	47.787	1 708	100	183 350
21	HU	L1520	HU4	Danube	Dunafoldvar	LMR	18.934	46.811	1 560	89	188 700
22	HU	L1540	HU5	Danube	Hercegszanto	LMR	18.814	45.909	1 435	79	211 503
23	HU	L1604	HU6	/Sio	Szekszard-Palank	M	18.720	46.380	13	85	14 693
24	HU	L1610	HU7	/Drava	Dravaszabolcs	M	18.200	45.784	78	92	35 764
25	HU	L1770	HU8	/Tisza/Sajo	Sajopuspoki	M	20.340	48.283	124	148	3 224
26	HU	L1700	HU9	/Tisza	Tiszasziget	LMR	20.105	46.186	163	74	138 498

Number of barriers and associated main uses — FIGURE 25



Exercise: Assessment of existing Monitoring in the Ganga

IT´S YOUR TURN

Objective of the exercise:

- Participants exchange and discuss their perspective on existing Monitoring Networks and Programmes in the Ganga.

Assess the monitoring programme which exists for your (sub-)basin while considering the following:

- From your group point of view, does the current Monitoring Network and Programs help in your daily work, your assessment and decision-making?
- Does it need to be improved? If yes, please detail.

Continued engagement pre and post webinar

1. For queries and related engagements contact GIZ colleagues:

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2. E-Learning platform - http://78.46.247.119/

(Temporarily hosted on AHT servers and will be transferred to the servers of training institutes.)

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