



Assessment of Environmental Flows

Ramganga River, Mahanadi Delta and Bharathapuzha River

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Training/Workshop on Environmental Flow Assessment-Approaches
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Background



E-flows in India

- The river system in India have so far been exploited for various human uses without looking at requirement of its own ecosystem.
- Environmental flow refers to the quantity, quality and timing of water flows required to sustain the ecosystem.
- The term 'Environmental Flow' (E-flows or EF) or 'Environmental Flow Requirements' (EFR) ... Very broad and may also include many functions and services provided by the rivers – aquatic life, religious value, water quality, lateral/longitudinal connectivity ...



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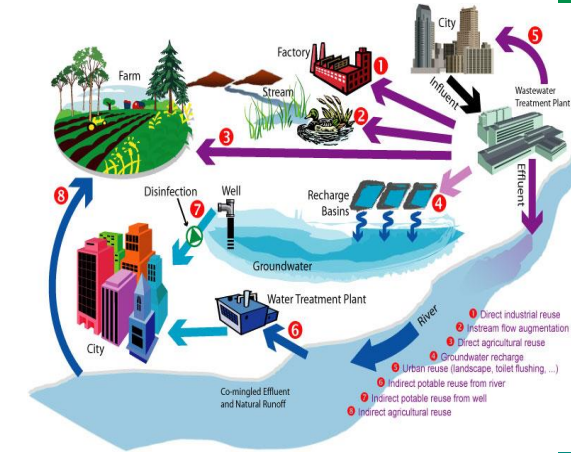
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Background



Current Policy

- The issue of E-flows is being deliberated widely in India for last 10-15 years.
- Duly recognized in National Water Policy (2002, 2012).
- Planning any water resources developmental project - Detailed environmental studies are required to be carried out including requirement of e-flows.
- Environmental Management Plan (EMP) - an integral part of planning of any water resources development project.
- EMP - scrutinized by an Expert Appraisal Committee (EAC)/(SEAC at state level), constituted by MoEF&CC/States from time to time, and finally approved by MoEF&CC/State level Authority.
- Some of the river reaches/sub-basins are declared eco-sensitive zone barring any developmental project.



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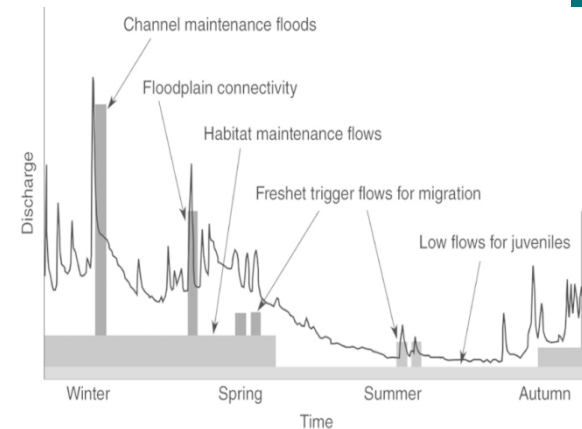
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Background



Current Policy

- EAC recommendation earlier: 20% of average lean season discharge (4 leanest months) in 90% dependable year to be released as e-flow.
- EAC recommendation now: E-flows are required to be assessed scientifically as per requirement of aquatic biota in the affected river reach in all season and provided.



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Key Issues in E-Flows



- Absence of an acceptable definition of environmental needs.
- Absence of an agreement on the priority of environmental flow releases.
- Lack of understanding and availability of quantitative data on relationships between river flows and ecological characteristics of river.
- While the domestic and agriculture requirements are easily quantifiable, it is still a challenge to decide as to what comprises the legitimate ecological needs.
- Lack of institutional mechanism for data collection/collation and Monitoring.
- Lack of data/study on socio-economic benefits/impacts of river ecology/river services.

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Key Issues in E-Flows



- Lack of integrated planning and management-
Development Vs Environment ➡ Development with Environment
- Overexploited River Reaches/basins having insufficient discharge.
- Large variations in flows during the year in the rivers and challenges in meeting water demands for all sectors including environment during lean period.
- Lack of standardization in the assessment of environmental flows.
- Wide variations in assessment of E-flows by different methods/agencies.

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Expectations from Joint Study



- Jointly developing the Data Framework for Assessment of E-flows.
- Jointly developing the Guidance Document for pilot E-flow assessment.
 - Comparative evaluation of E-flows assessment methodologies
 - Standardise the methodology(ies) for assessment of E-flows for different hydro-climatic regions in the country including model/software requirement
- Evolve a mechanism for assessing quantitatively the socio-economic benefits/impacts of E-flows/ river eco services.
- Recommendation of a Strategy for implementing E-flows including pilot implementation and monitoring of e-flows.

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Expectations from Joint Study



Responsibilities of the Indian side will include:

- collection and collation of existing data
- fieldwork
- stakeholder consultations
- organising workshops with stakeholders for the pilot studies, including State authorities

Responsibilities of the European side will include:

- literature reviews and preparing base document
- support for the adaptation of appropriate methodologies and software for India
- Support for carrying the pilot studies
- support from European experts for specific tasks and capacity building

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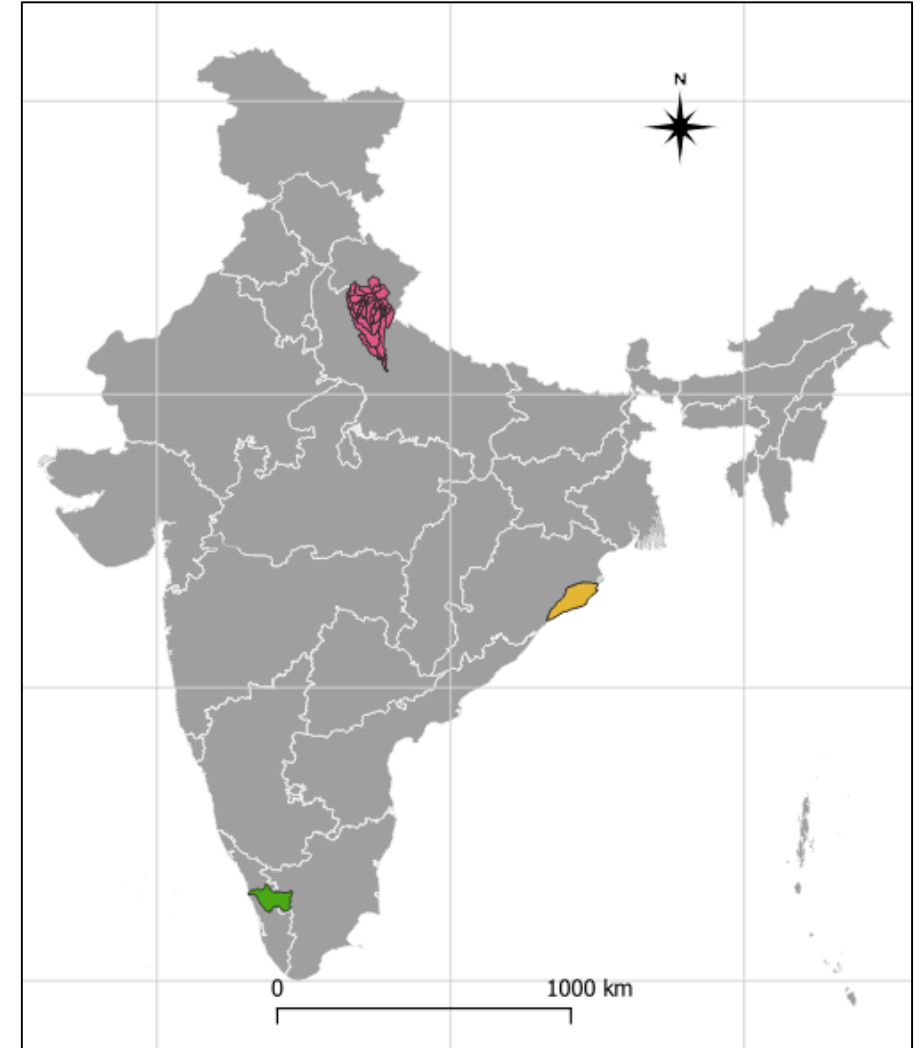
Designated Pilots



Diverse hydro-climatic regions of India

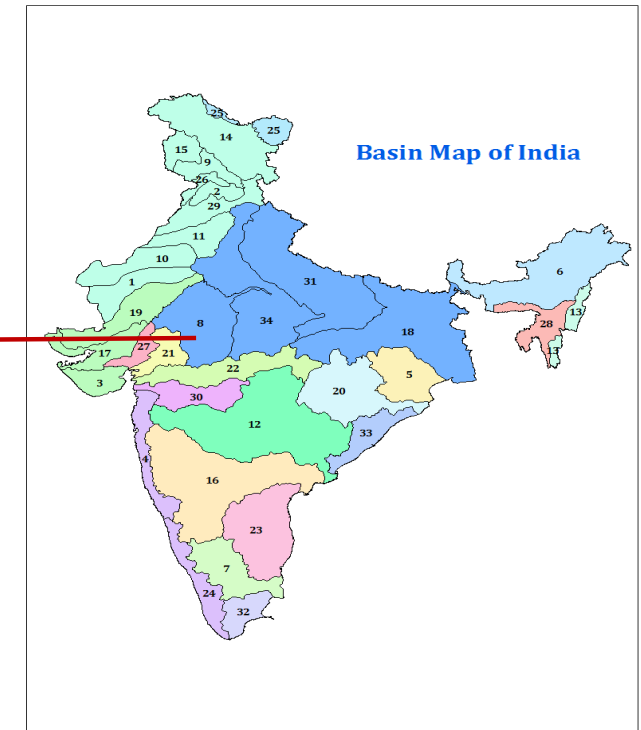
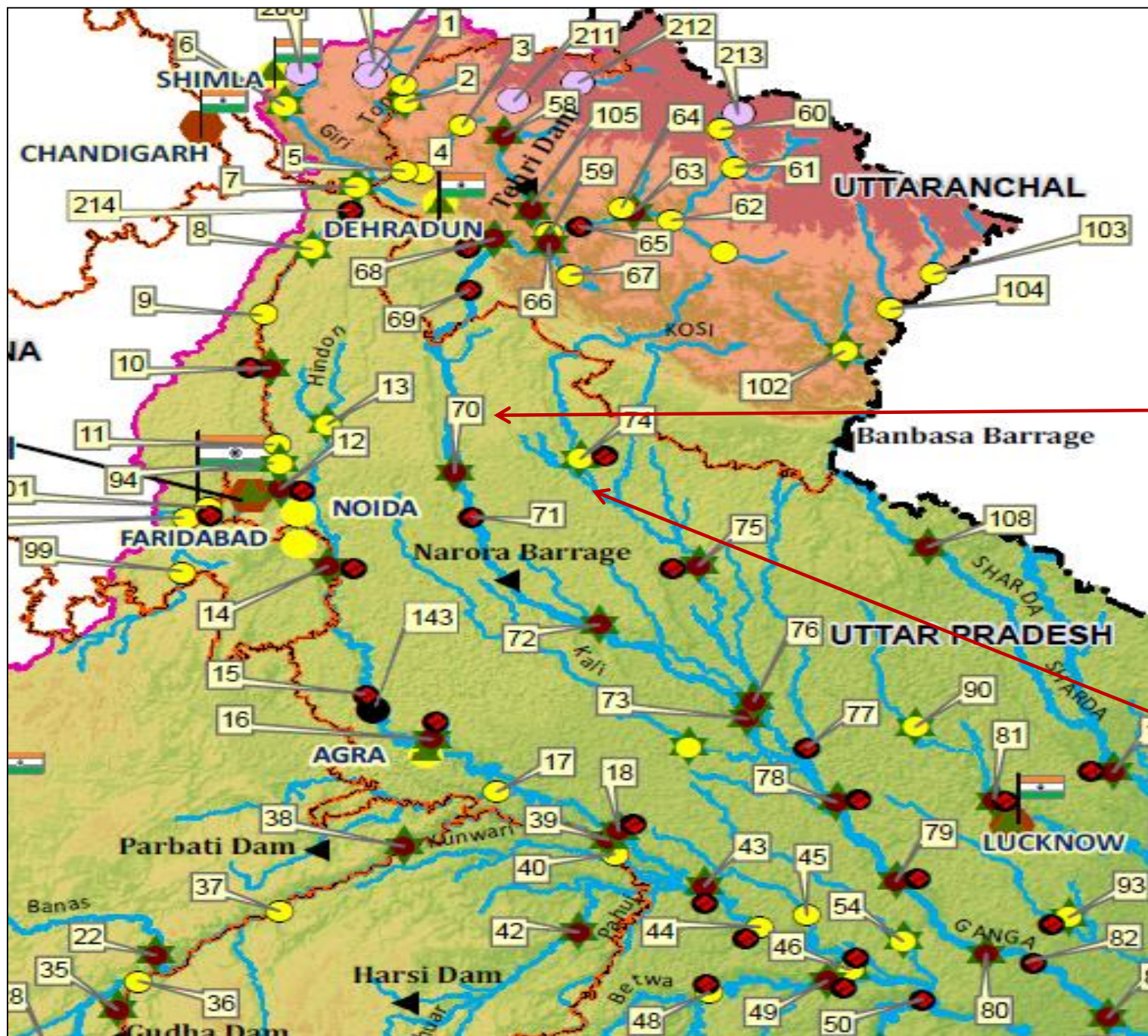
- Ramganga River Basin: Sub-Himalayan system
- Mahanadi Delta : Estuarine eco-sensitive hotspot
- Bharathapuzha River Basin: Westward flowing River

The selection of the basins has been done so as to capture the heterogeneity in terms of meteorological and hydrological domain ... Perennial, Variability, Deltaic.



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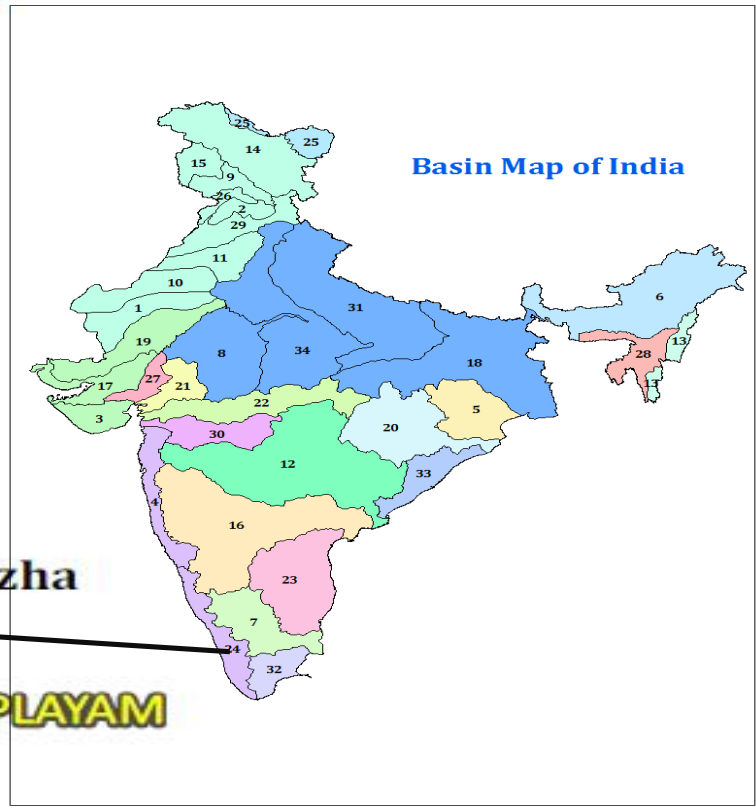
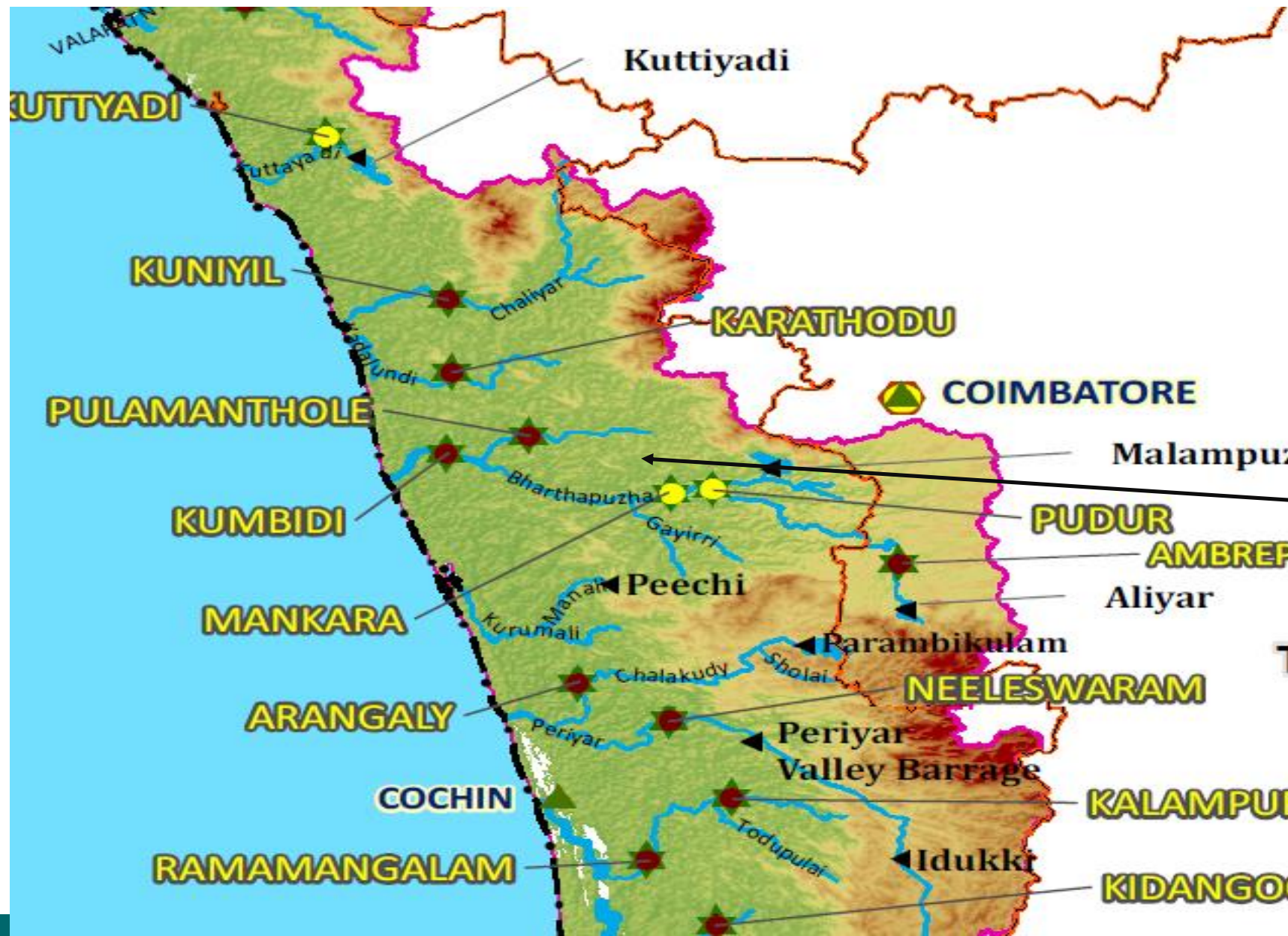
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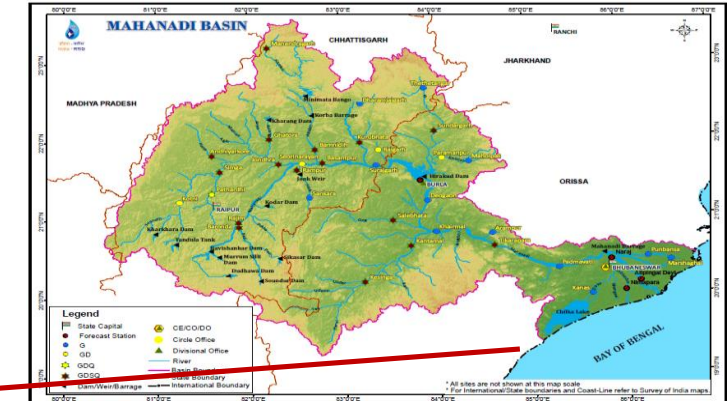


Ramganga

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Joint efforts undertaken so far



- The Joint Working Group has had 6 Meetings so far and a Workshop during 21-22 May 2018 followed by field visits to pilot basins to explore the most appropriate methodologies.



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Joint efforts undertaken so far



- **Ramganga Basin:** Field visit during 23-25 May 2018 to identify the critical reaches.



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Joint efforts undertaken so far



- **Ramganga Basin: Cross section surveys during October 2018**



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Joint efforts undertaken so far



Bharathapuzha Basin: Field visit during 07-11 January 2019 to identify the critical sites



Joint efforts undertaken so far



- **Mahanadi Delta:** Field visit during 28 January-01 February 2019.
- Developed insights on hydrological and ecological scenarios of the delta.



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Mahanadi Delta: Field visit during 15 April-17 April 2019.



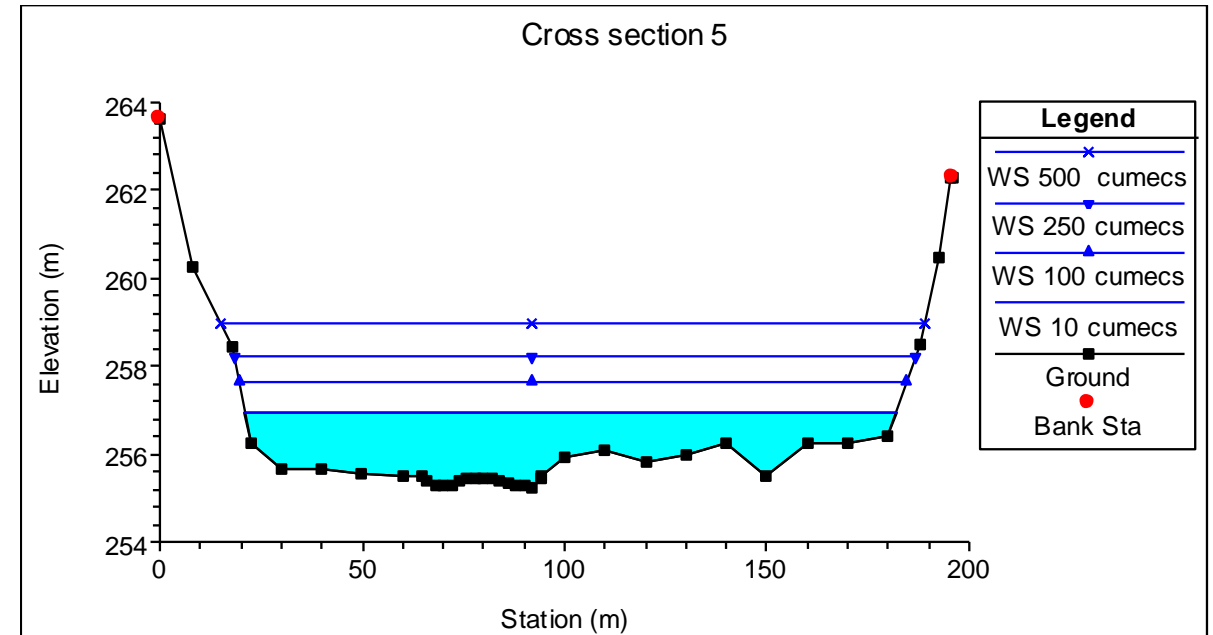
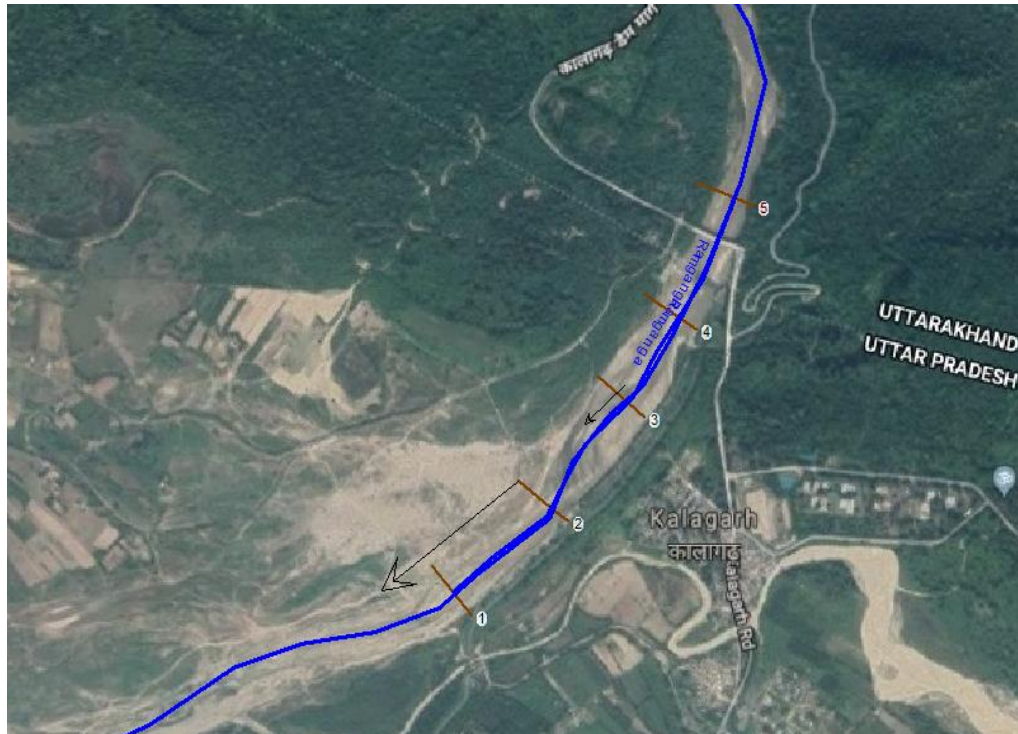
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Joint efforts undertaken so far



- Ramganga Cross section Surveys for identified critical locations: November-December 2018.
- Hydrodynamic modelling exercise for Ramganga critical reaches underway.
- E-flow assessment study for Ramganga basin is expected to be completed by May 2019.
- Data collection and similar exercise for other pilots underway.



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Thank you for your attention !

Dr. Jyoti Nale

Project Advisor, IEWP



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