Multistakeholder partnerships in developing and testing E-flows Approaches

October 21, 2019

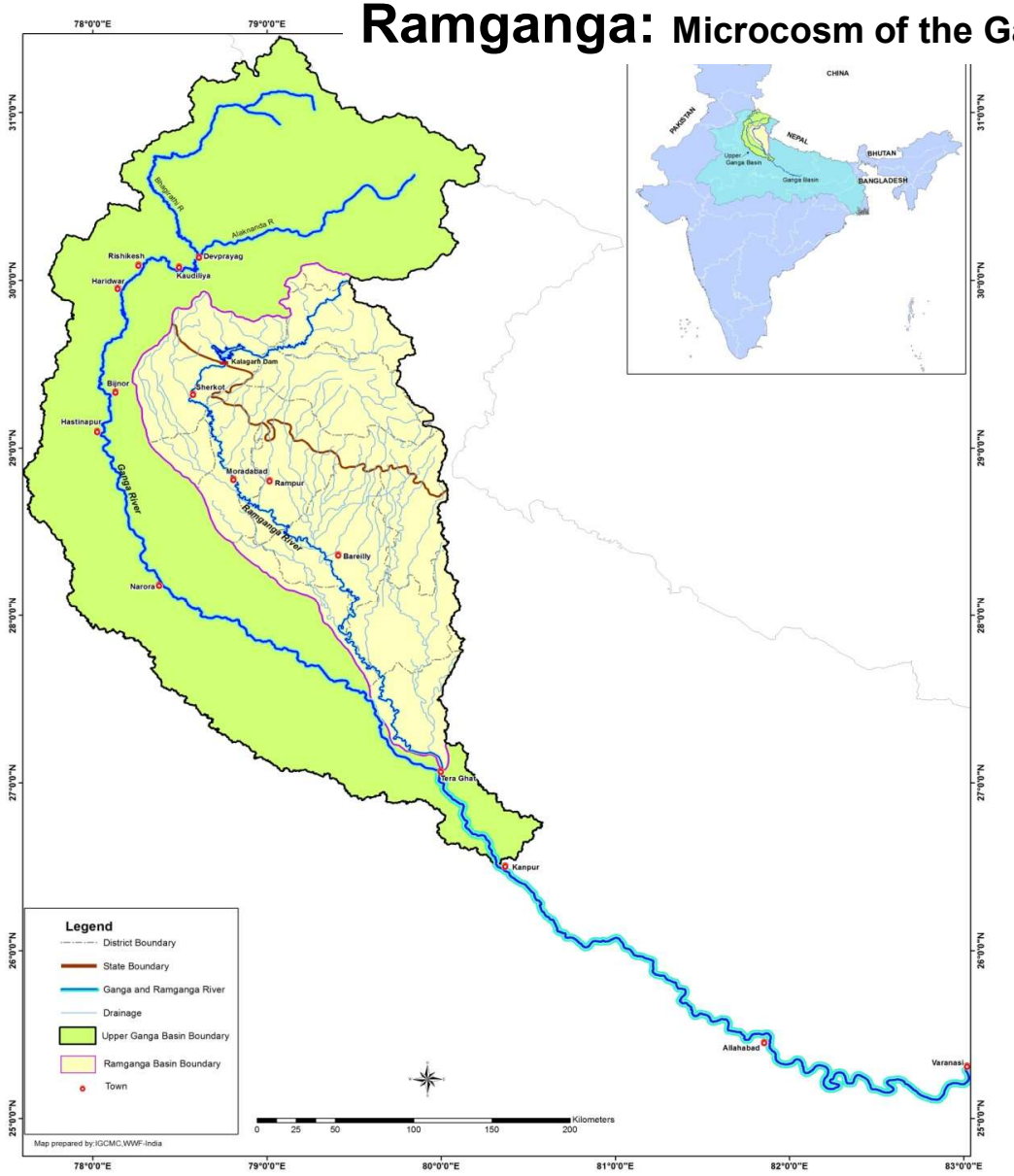
Customising environmental flows methodology for the Ganga

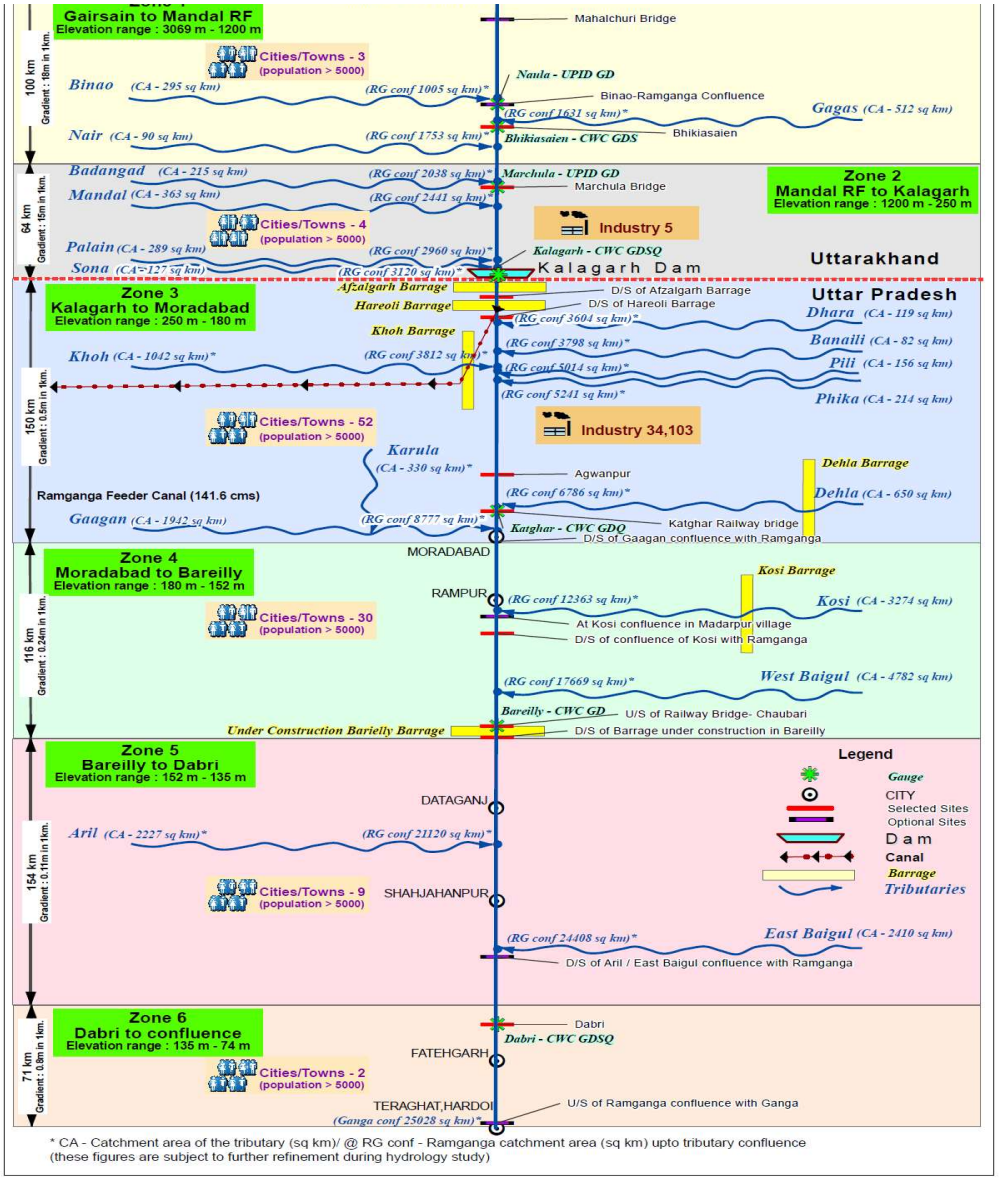
IIT - Kanpur | IIT – BHU Varanasi | INRM – IIT Delhi | PSI - Dehradun | CIFRI | HNB Garhwal University

Data support: CWC, UPID, SWaRA

Prof. Jay O Keeffe, UNESCO-IHE

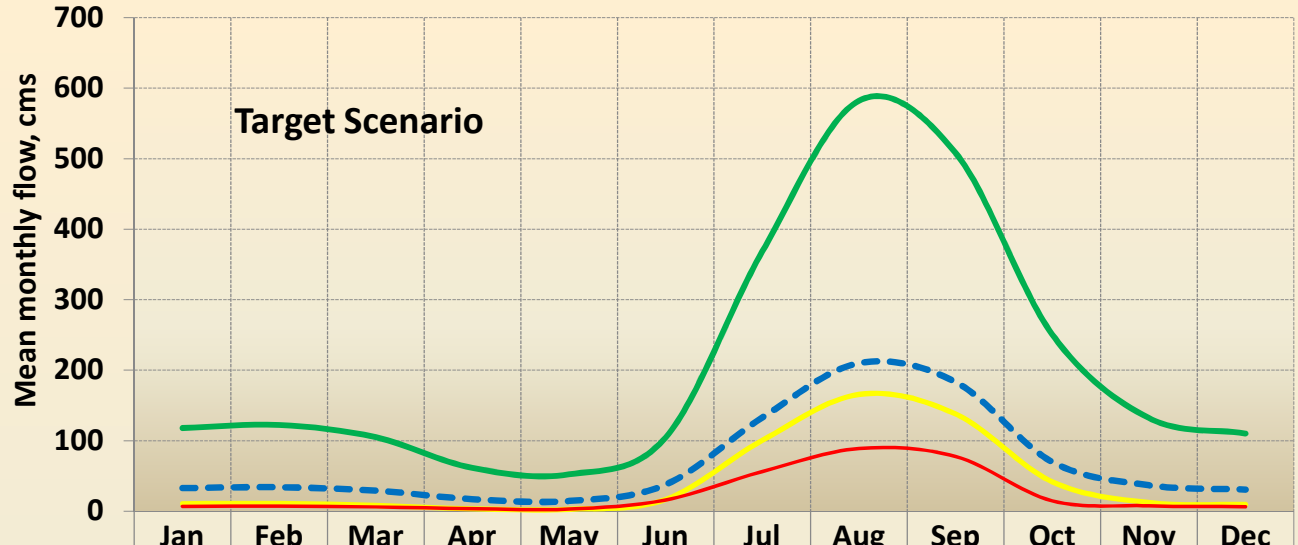
Ramganga: Microcosm of the Ganga-flows, over-abstraction, fragmentation, pollution



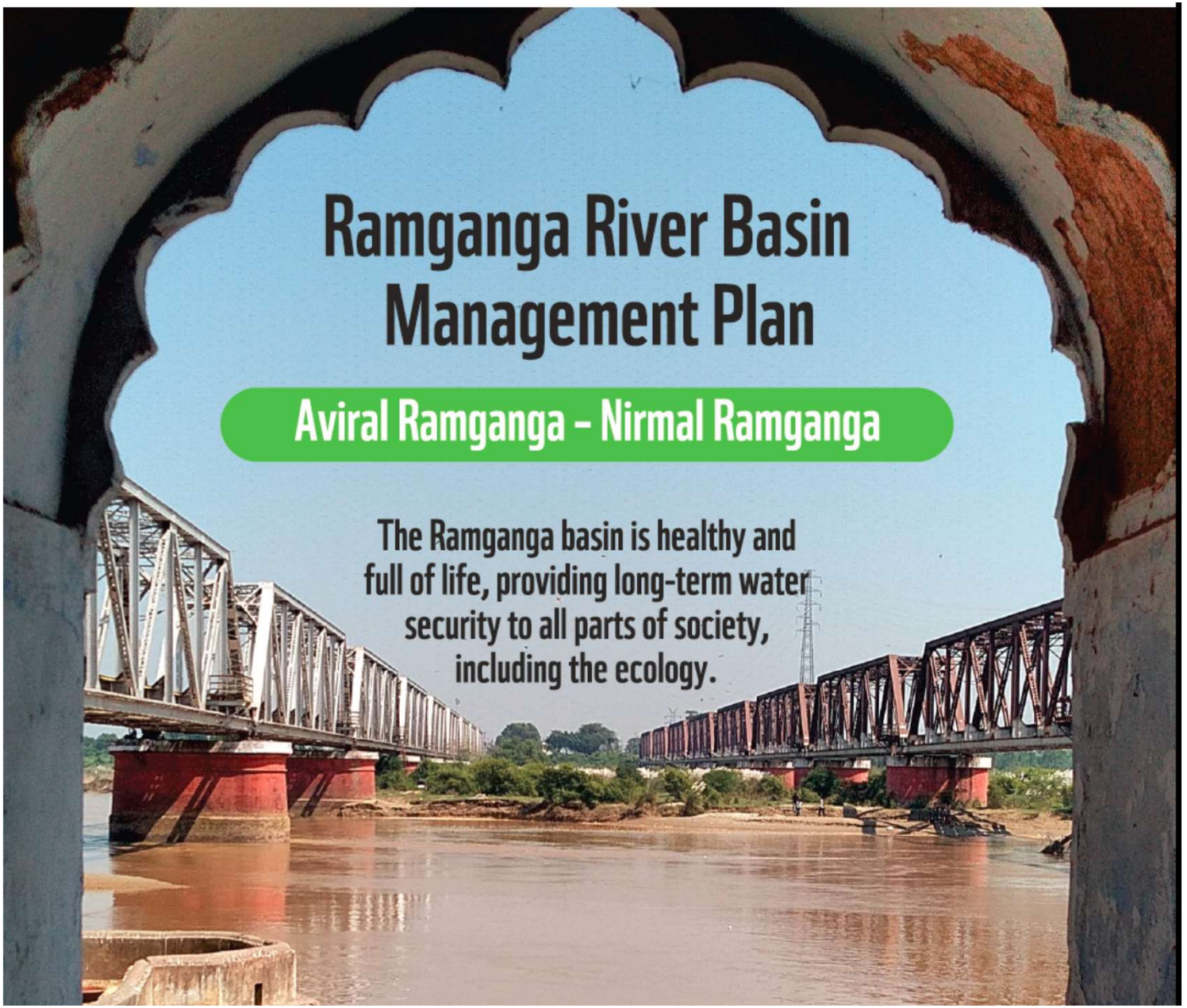


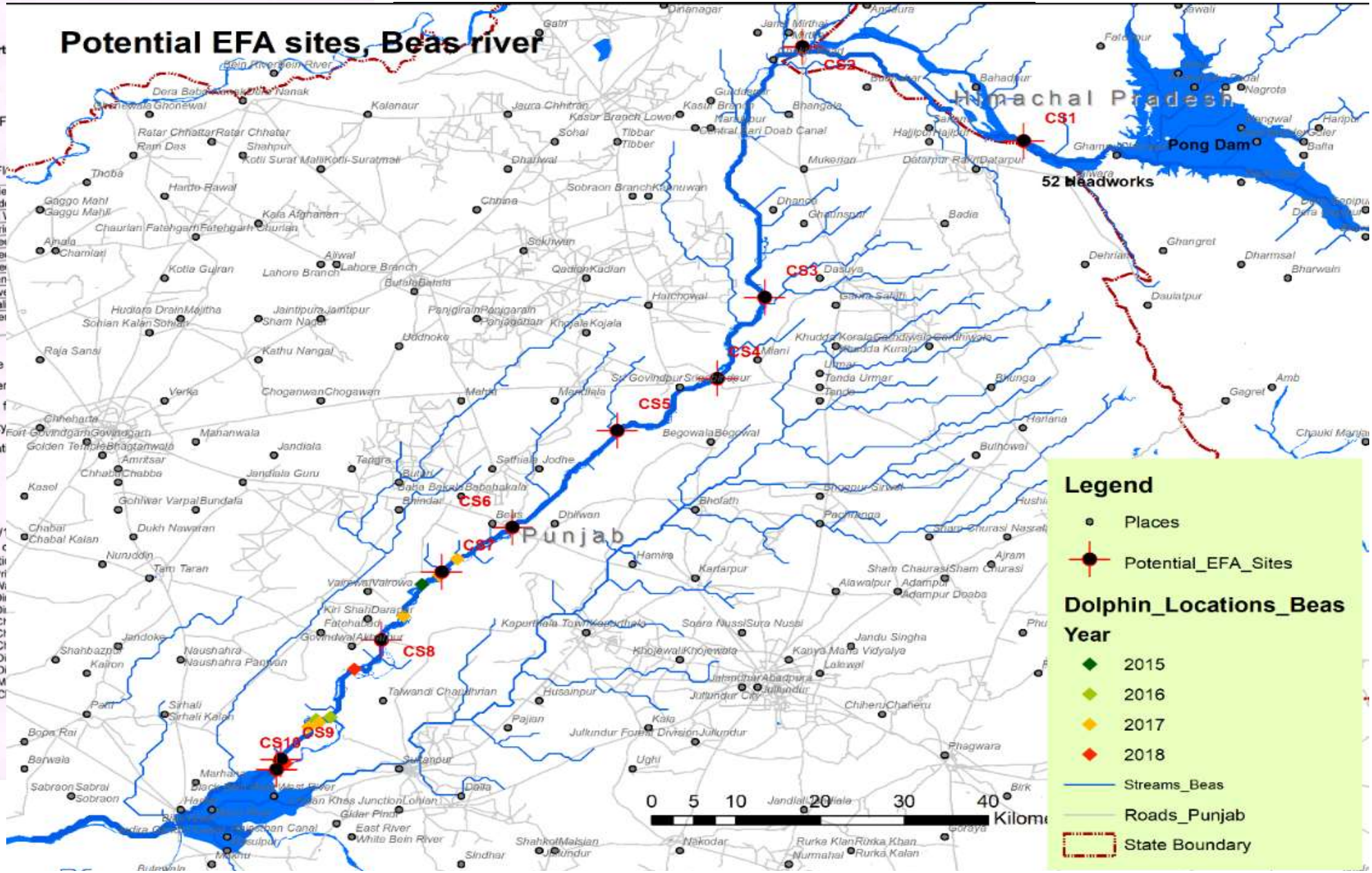

24.12.2013

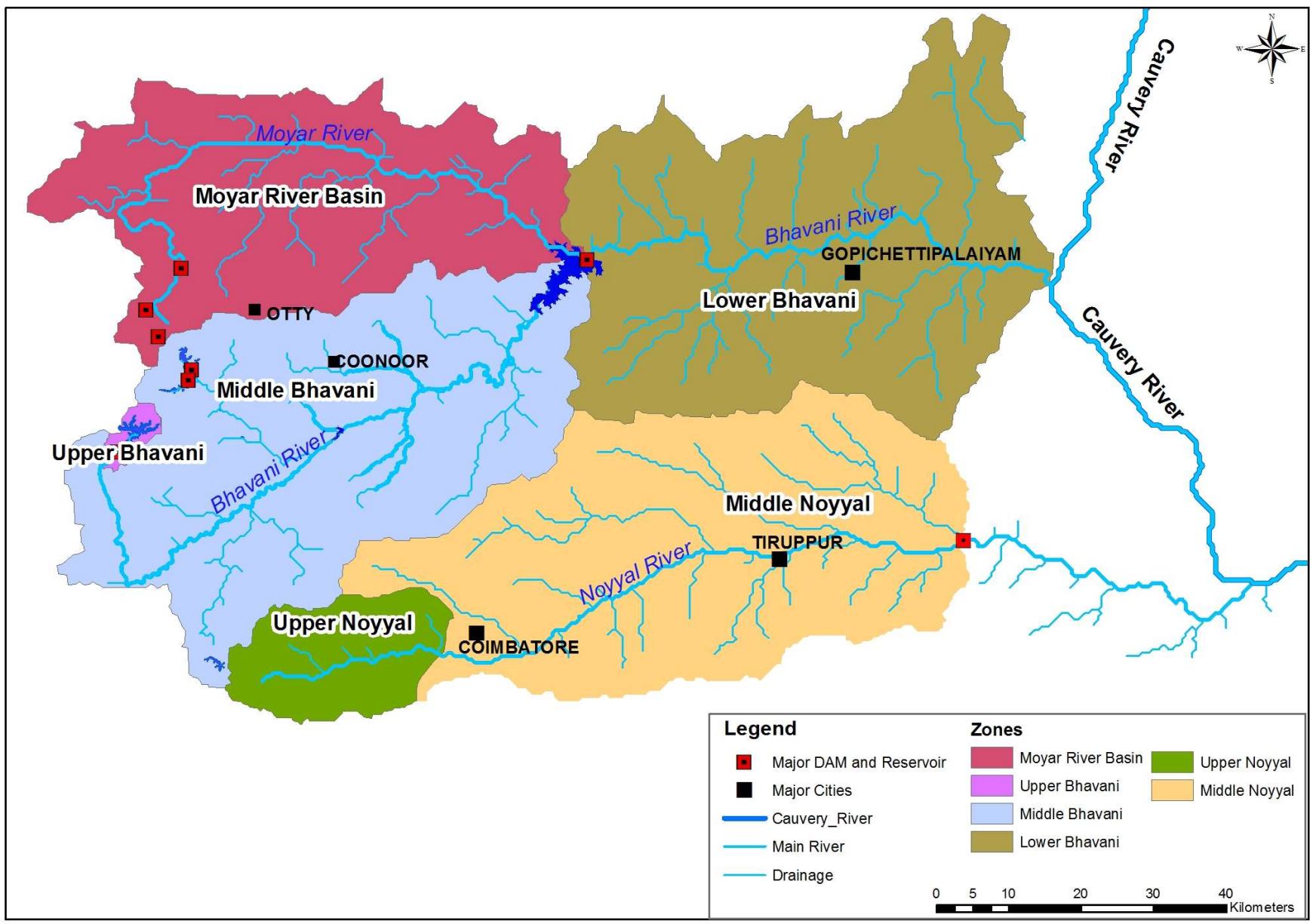
E-Flows corresponding to river health classes and management scenarios



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Katgarh(Natural), cms	118.1	122.4	105.0	61.5	52.4	104.7	368.5	582.2	508.2	250.8	132.3	110.3
Katgarh(Regulated), cms	10.8	11.0	8.3	3.5	2.8	16.8	100.6	165.7	138.1	41.8	12.3	9.6
Eflow - Maintainance Year	32.9	34.1	29.3	17.1	14.6	37.8	132.9	210.0	183.3	69.9	36.9	30.8
Eflow - Drought Year	7.0	7.2	6.2	3.6	3.1	16.0	56.3	89.0	77.7	14.8	7.8	6.5


Ramganga River Basin
Management Plan
Aviral Ramganga – Nirmal Ramganga
The Ramganga basin is healthy and
full of life, providing long-term water
security to all parts of society,
including the ecology.


Potential EFA sites, Beas river
Himachal Pradesh
Punjab
CS1
CS2
CS3
CS4
CS5
CS6
CS7
CS8
CS9
CS10
Pong Dam
52 Headworks
Legend
Places
Potential_EFA_Sites
Dolphin_Locations_Beas
Year
2015
2016
2017
2018
Streams_Beas
Roads_Punjab
State Boundary
0 5 10 20 30 40
Kilome

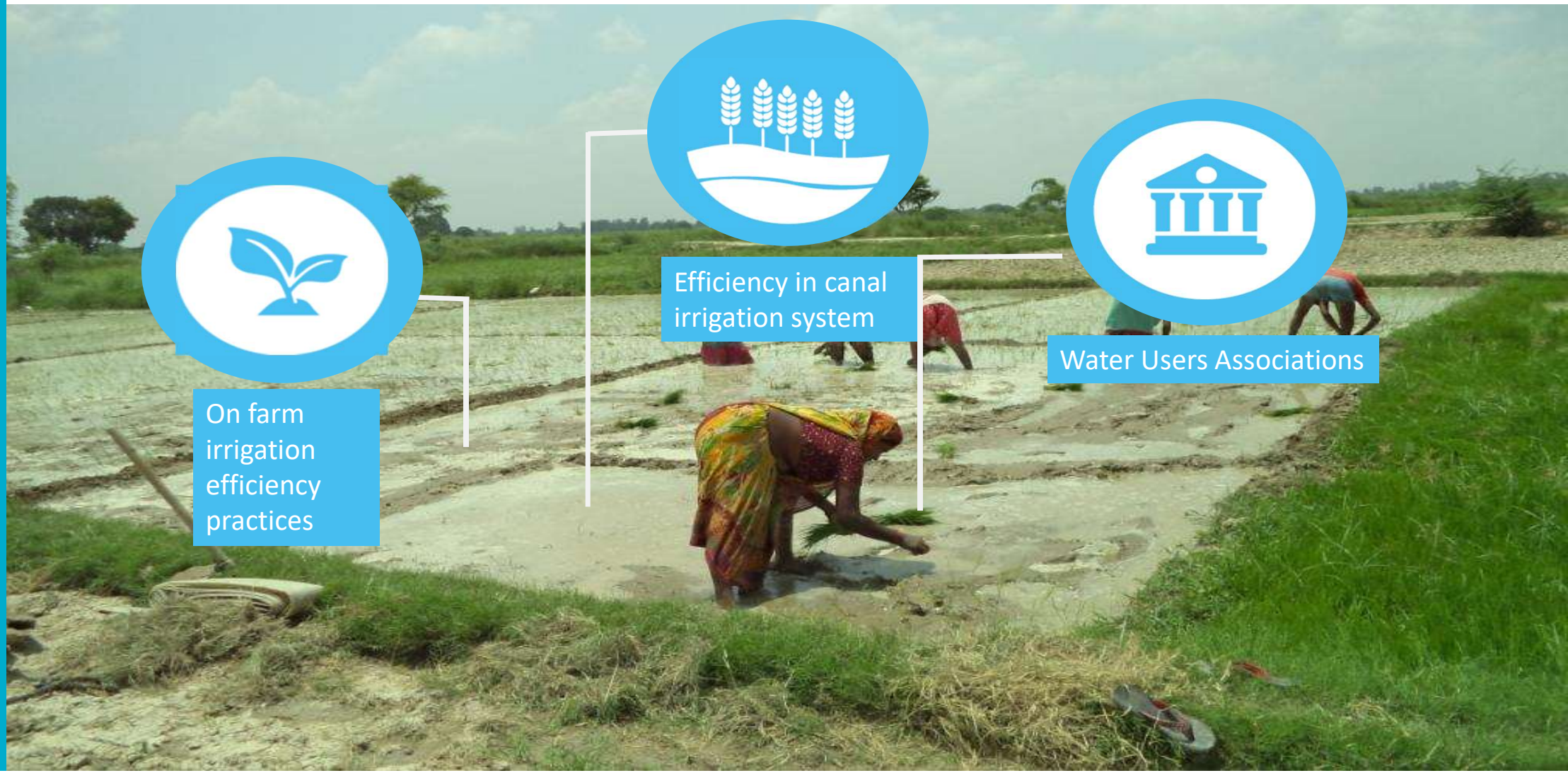


Map prepared by:IGCMC,WWF-India

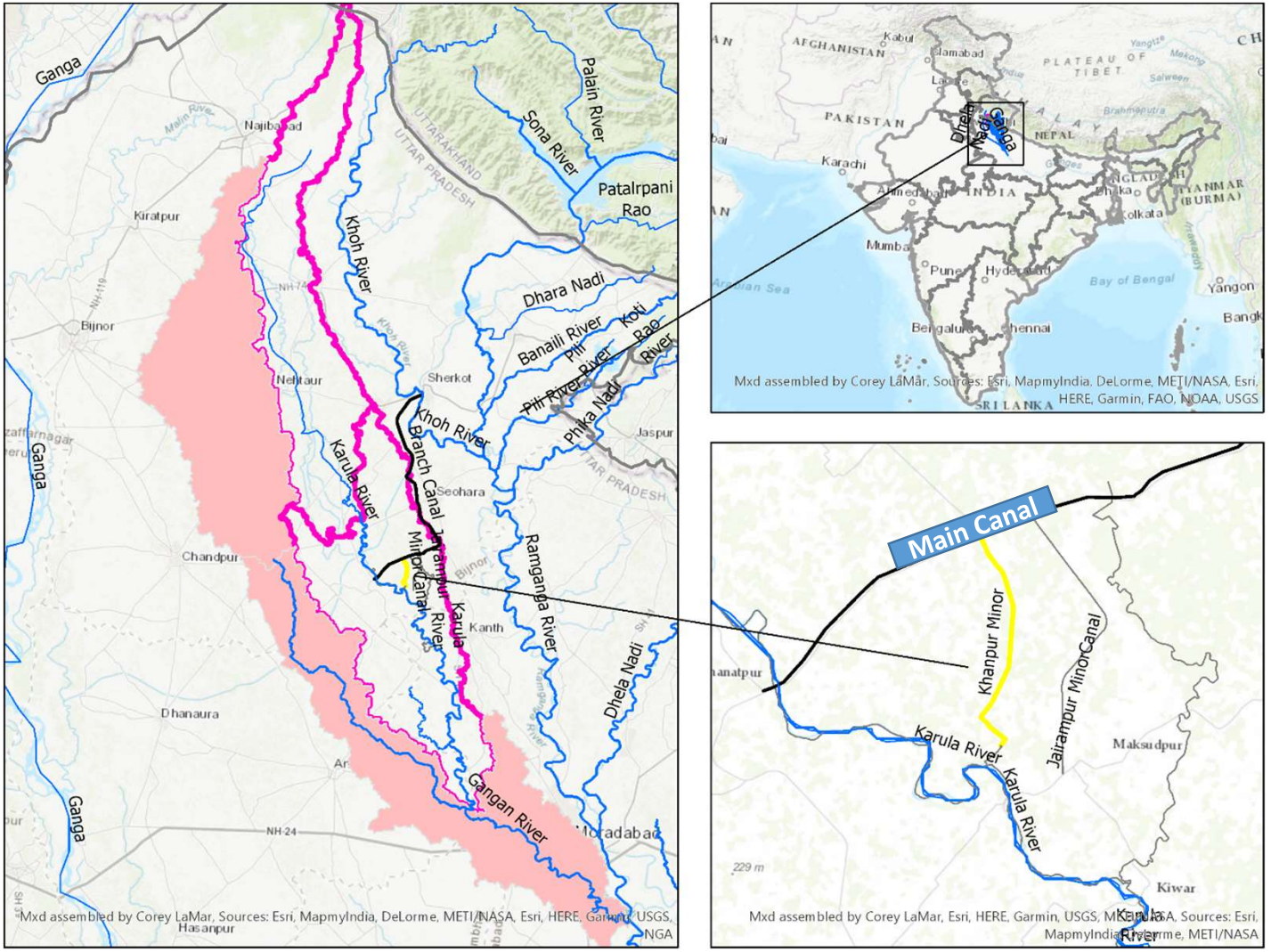

Basin Water Security Plan
Basin Description
Basin Extents
Basin Details
Situational Analysis
Water Risk
Basin Vision and Goals
Motivation and Vision
Goals and Outcomes
Basin Strategies
Aquifer Management
Demand Management
Sustainable Agriculture
Water Quality
Catchment restoration
E-Flows
Disaster Management
Policy and Institutions
Implementation Plan
Framework with roles and responsibility

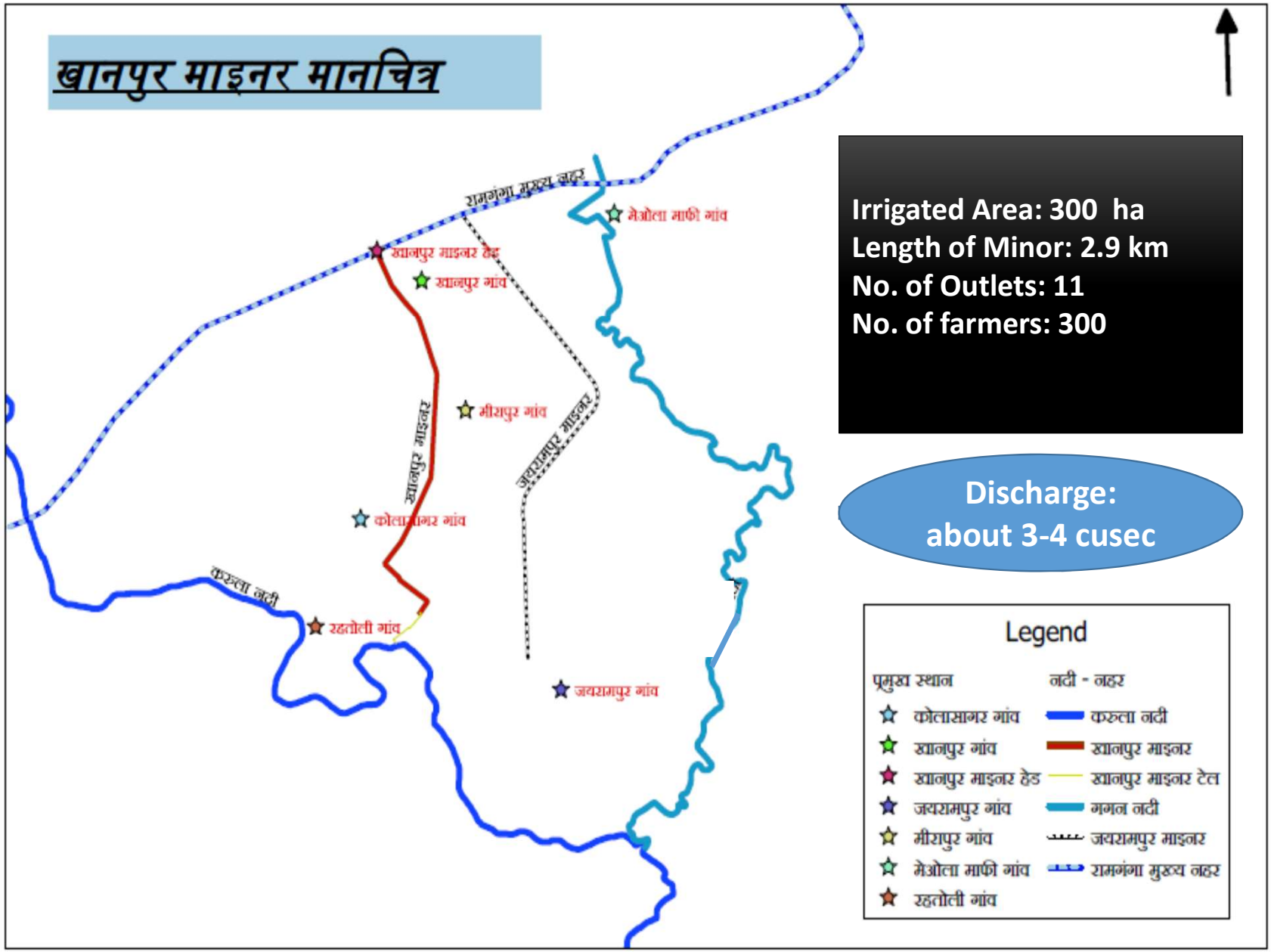
How to restore flows and river health?

Karula Proof-of-Concept

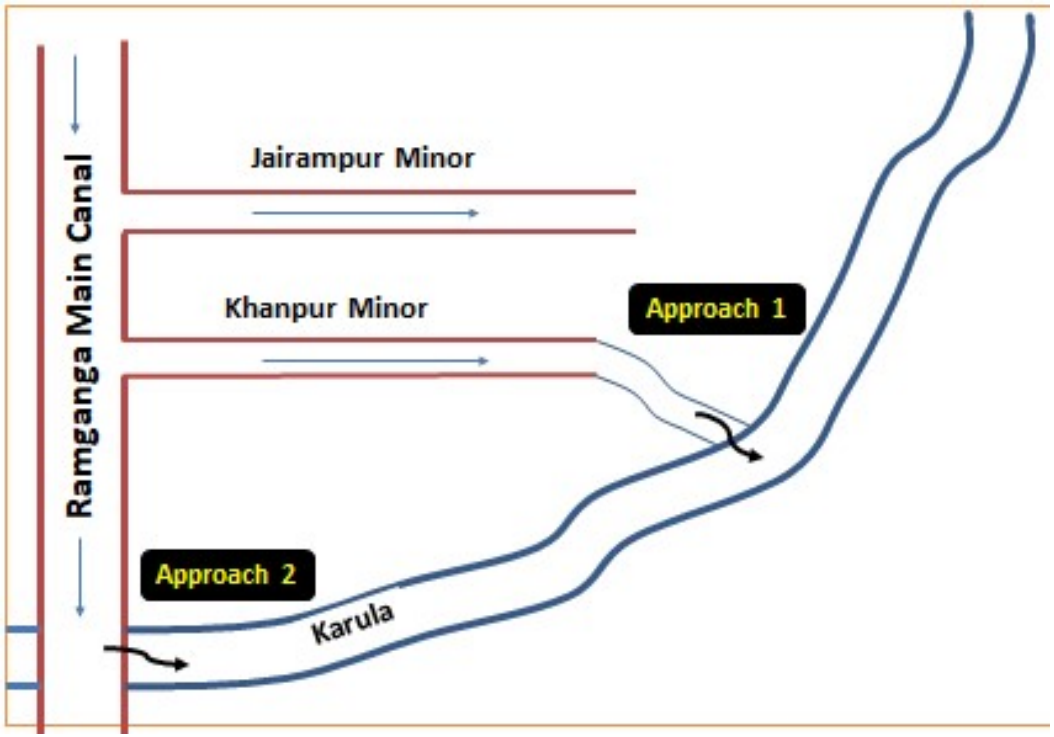


Khanpur Minor- Basemap

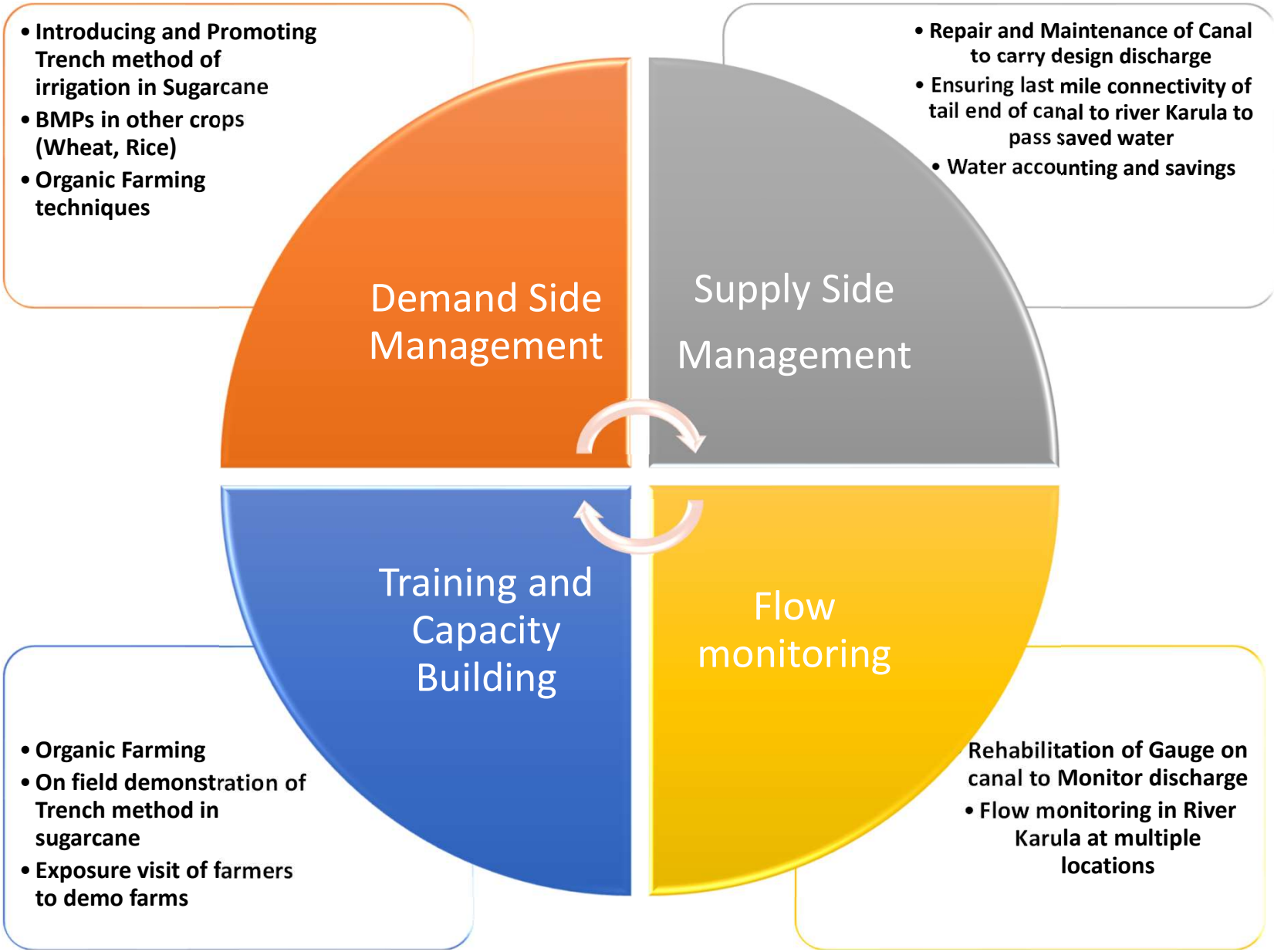



खानपुर माइनर मानचित्र
रामगंगा मुख्य नहर
मेओला माफी गांव
खानपुर माइनर हेड
खानपुर गांव
मीरापुर गांव
खानपुर माइनर
जयरामपुर माइनर
कोलासागर गांव
करुला नदी
रहतोली गांव
जयरामपुर गांव
Irrigated Area: 300 ha
Length of Minor: 2.9 km
No. of Outlets: 11
No. of farmers: 300
Discharge:
about 3-4 cusec
Legend
प्रमुख स्थान
कोलासागर गांव
खानपुर गांव
खानपुर माइनर हेड
जयरामपुर गांव
मीरापुर गांव
मेओला माफी गांव
रहतोली गांव
नदी - नहर
करुला नदी
खानपुर माइनर
खानपुर माइनर टेल
गगन नदी
जयरामपुर माइनर
रामगंगा मुख्य नहर

4 villages; 300 farmers, 59 Hectares

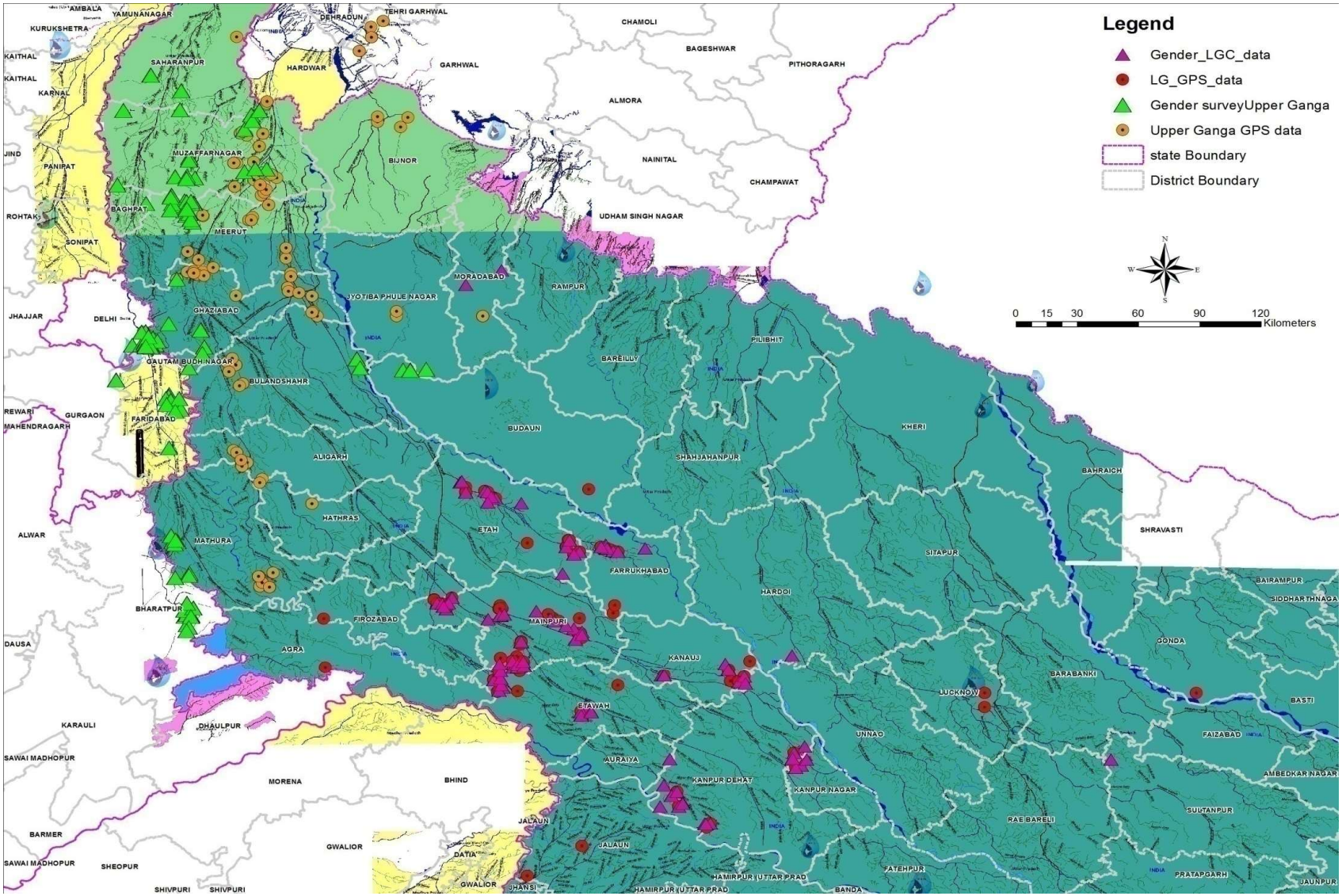


Target 100 Ha


• Introducing and Promoting Trench method of irrigation in Sugarcane
• BMPs in other crops (Wheat, Rice)
• Organic Farming techniques
Demand Side Management
• Repair and Maintenance of Canal to carry design discharge
• Ensuring last mile connectivity of tail end of canal to river Karula to pass saved water
• Water accounting and savings
Supply Side Management
Training and Capacity Building
• Organic Farming
• On field demonstration of Trench method in sugarcane
• Exposure visit of farmers to demo farms
Flow monitoring
Rehabilitation of Gauge on canal to Monitor discharge
• Flow monitoring in River Karula at multiple locations

Agriculture PoPs; capacity building

- **Trench based sugarcane cultivation**
- **Application of Bio-fertilizers and Bio-pesticides**
- **Application of micro-nutrient**
- **Promotion of multi-cropping**


Legend
Gender_LGC_data
LG_GPS_data
Gender surveyUpper Ganga
Upper Ganga GPS data
state Boundary
District Boundary
N
W
E
S
0 15 30 60 90 120
Kilometers
AMBALA
YAMUNANAGAR
KURUKSHETRA
KAITHAL
KARNAL
PANIPAT
SONIPAT
ROHTAK
JHAJJAR
DELHI
REWARI
GURGAON
MAHENDRAGARH
SAHARANPUR
MUZAFFARNAGAR
BAGHPAT
MEERUT
GHAZIABAD
GAUTAM BUDH NAGAR
BULANDSHAHR
FARIDABAD
DEHRADUN
TEHRI GARHWAL
HARDWAR
GARHWAL
CHAMOLI
BAGESHWAR
PITHORAGARH
ALMORA
NAINITAL
CHAMPAWAT
UDHAM SINGH NAGAR
BIJNOR
MORADABAD
JYOTIBA PHULE NAGAR
RAMPUR
BAREILLY
PILIBHIT
BUDAUN
ALIGARH
HATHRAS
ETAH
MATHURA
ALWAR
BHARATPUR
DAUSA
FIROZABAD
AGRA
MAINPURI
FARRUKHABAD
KHERI
SHAHJAHANPUR
BAHRAICH
SHRAVASTI
SITAPUR
HARDOI
BAIRAMPUR
SIDDHARTHNAGA
GONDA
KANAUJ
BARABANKI
LUCKNOW
BASTI
ETAWAH
UNNAO
FAIZABAD
AMBEDKAR NAGAR
AURAIYA
KANPUR DEHAT
KANPUR NAGAR
SULTANPUR
RAE BARELI
JALAUN
DHAULPUR
KARAULI
SAWAI MADHOPUR
MORENA
BHIND
BARMER
GWALIOR
DATIA
SHEOPUR
SHIVPURI
JHANSI
HAMIRPUR (UTTAR PRAD
FATEHPUR
PRATAPGARH
JAUNPUR
BANDA

River and Basin Ecosystem Health

- Flow Regimes
- Water Quality Management
- Species and Habitat Conservation
- Catchment (Watershed, Wetlands and Floodplains) Conservation

Social, Economic, and Cultural Benefits

- Water And Sediment Provisioning
- Cultural and Recreational Services
- Livelihood

Basin Governence

- Framework for Collective Action
- Basin Management and District Level (Framework and Institution) Committee
- Capacity Building and Empowering Stakeholder

Disaster and Risk Management

- Public Health
- Flood Management
- Climate Adaptation

E-Flows Steering committee

Daily/Monthly water budget and e-flows release schedule

Communications, awareness amongst water users and downstream communities

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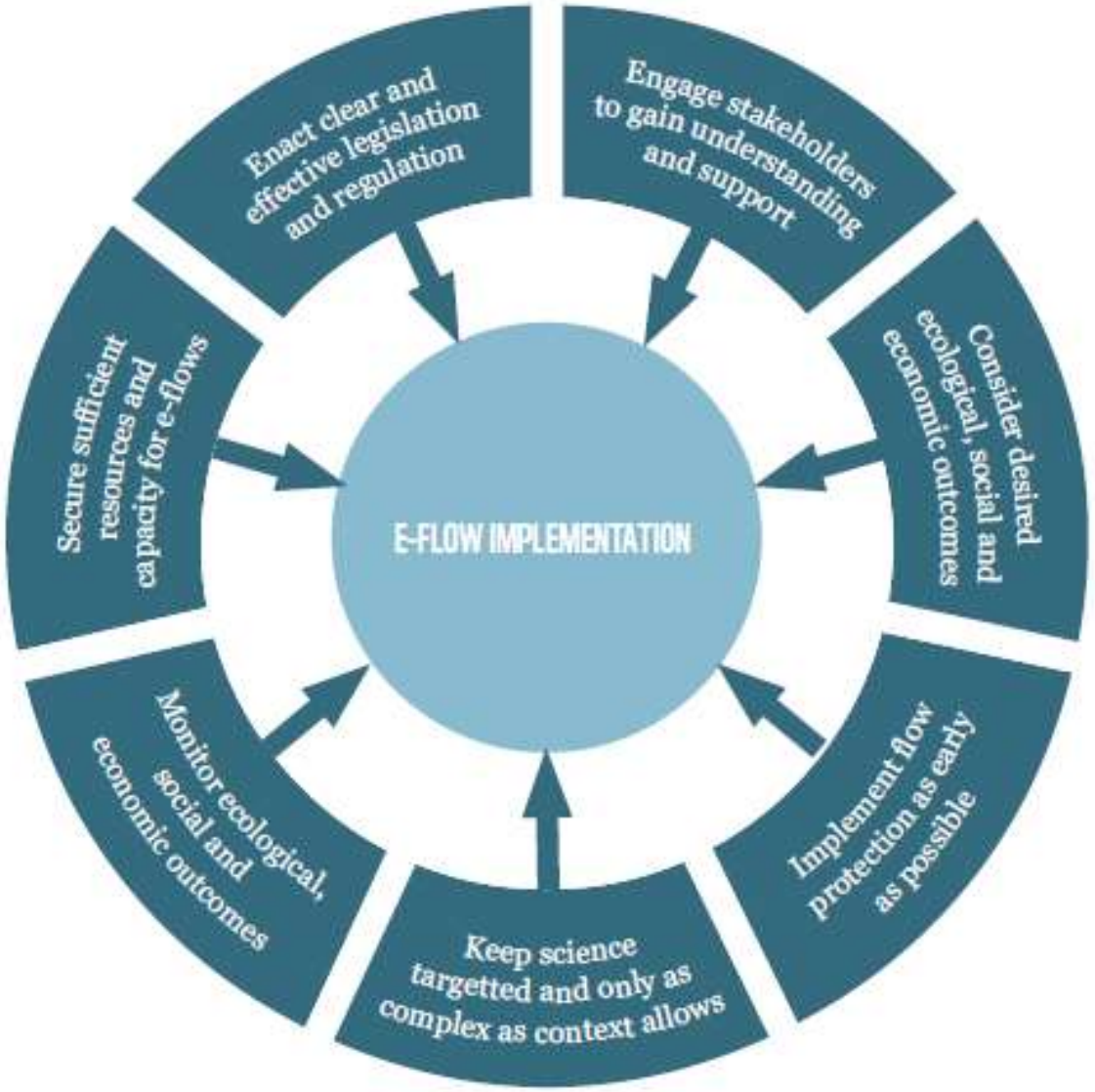

Moving the E-flows discussion forward

- **Embedding stakeholder processes needed to establish the desired state of the river, conservation/management objectives, set water allocation priorities**
- **Need ownership to the process and approach**
- **Institutional arrangements at basin/sub-basin level for restoring flows and health**
- Understanding **basin interactions**, including the range of hydrological, ecological, socio-cultural and economic systems and activities at work within a basin takes time and requires dedicated effort
- Plan and act, even without full knowledge. **Recognize iterative, adaptive nature of the e-flows process.**
  - **"Routinely monitor relationships between flow alteration and ecological response before and during environmental flow management, and refine flow provisions accordingly."**
- **E-flows need to be integrated into basin planning process**
  - Basin plan Environmental Flow Assessments Are Not Realizing Their Potential as an Aid to Basin Planning (Jackie King and Cate Brown)