



सत्यमेव जयते

THE 3R'S FOR CLEAN WATER - SAVING INDIA'S RIVERS: INDIAN EXPERIENCES

NATIONAL MISSION FOR CLEAN GANGA

MINISTRY OF WATER RESOURCES, RIVER DEVELOPMENT & GANGA
REJUVENATION

India's Share in World Resources

2

- Land Resources – 2.45%
- Renewable Water Resources – 4%
- Population – 17%

Land Resources



Renewable Water

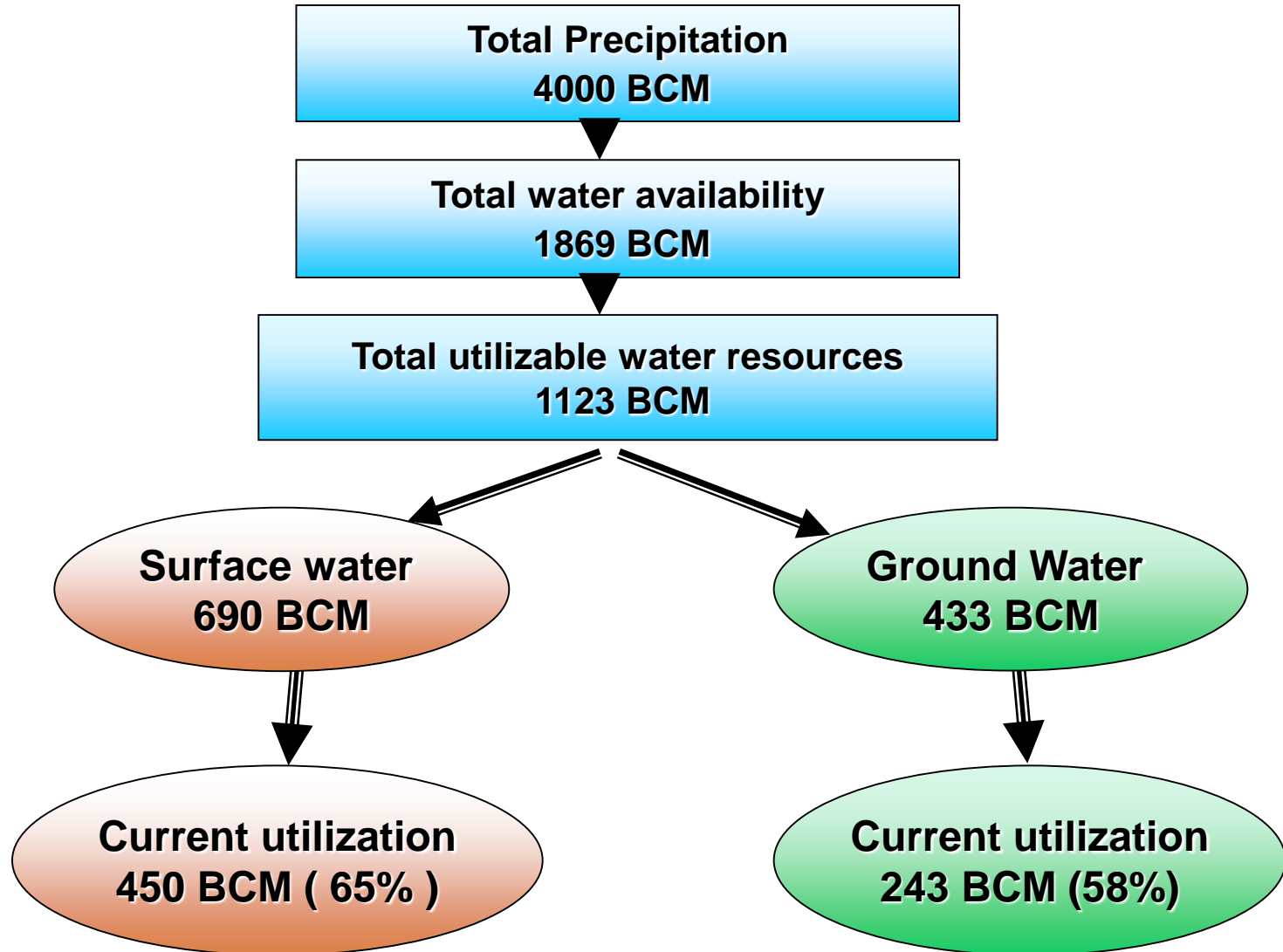


Population



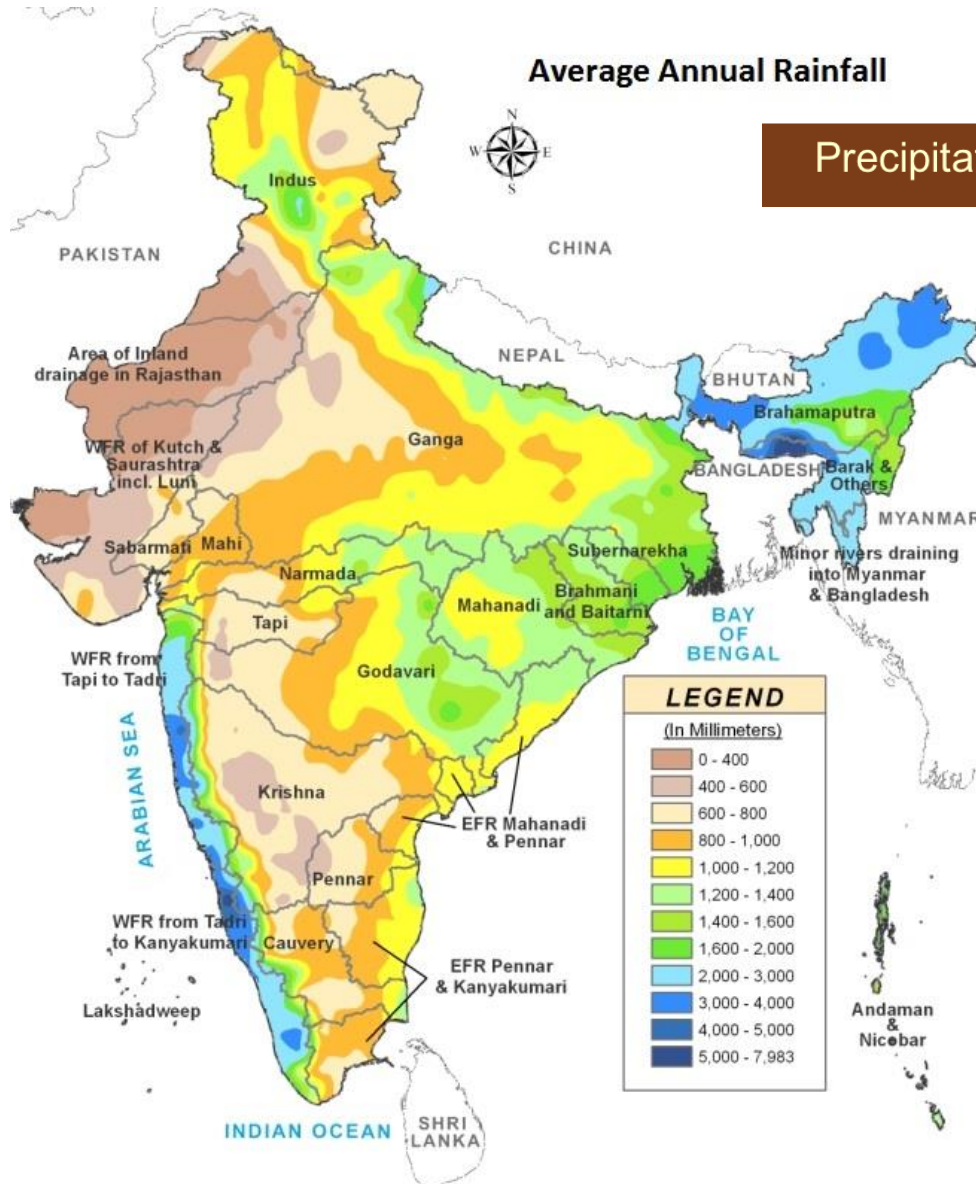
Water Availability

3



Spatial Variation of Rainfall

4



Precipitation during June to September 3000 BCM (75%)

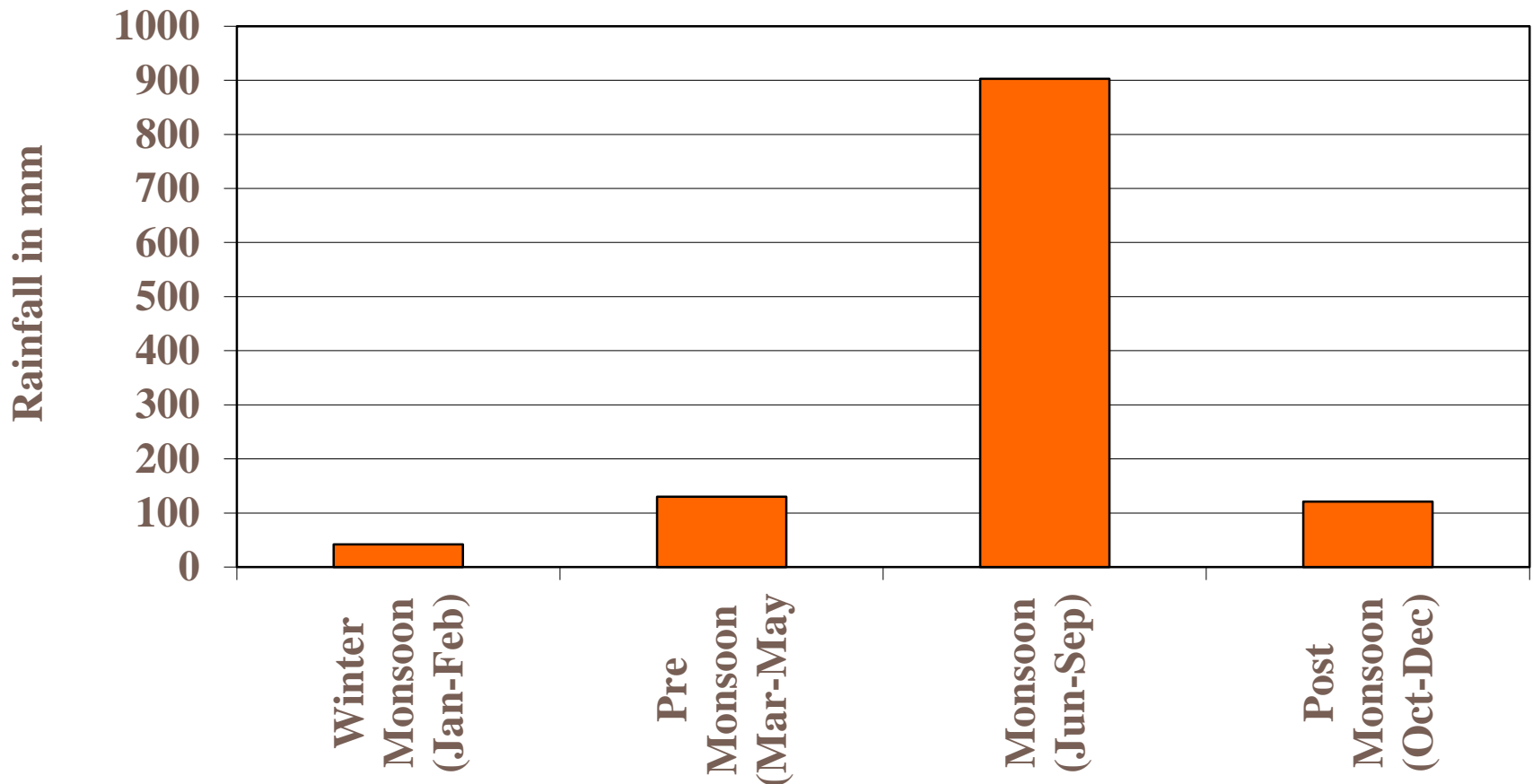
Rainfall in mm		
Average	1,170	
Max.	11,000	Mawsynram, Meghalaya
Min.	100	Western Rajasthan

Very high spatial variability – average annual rainfall varies from about 100 mm in western Rajasthan to about 10,000 mm in Meghalaya

Temporal Variation of Rainfall

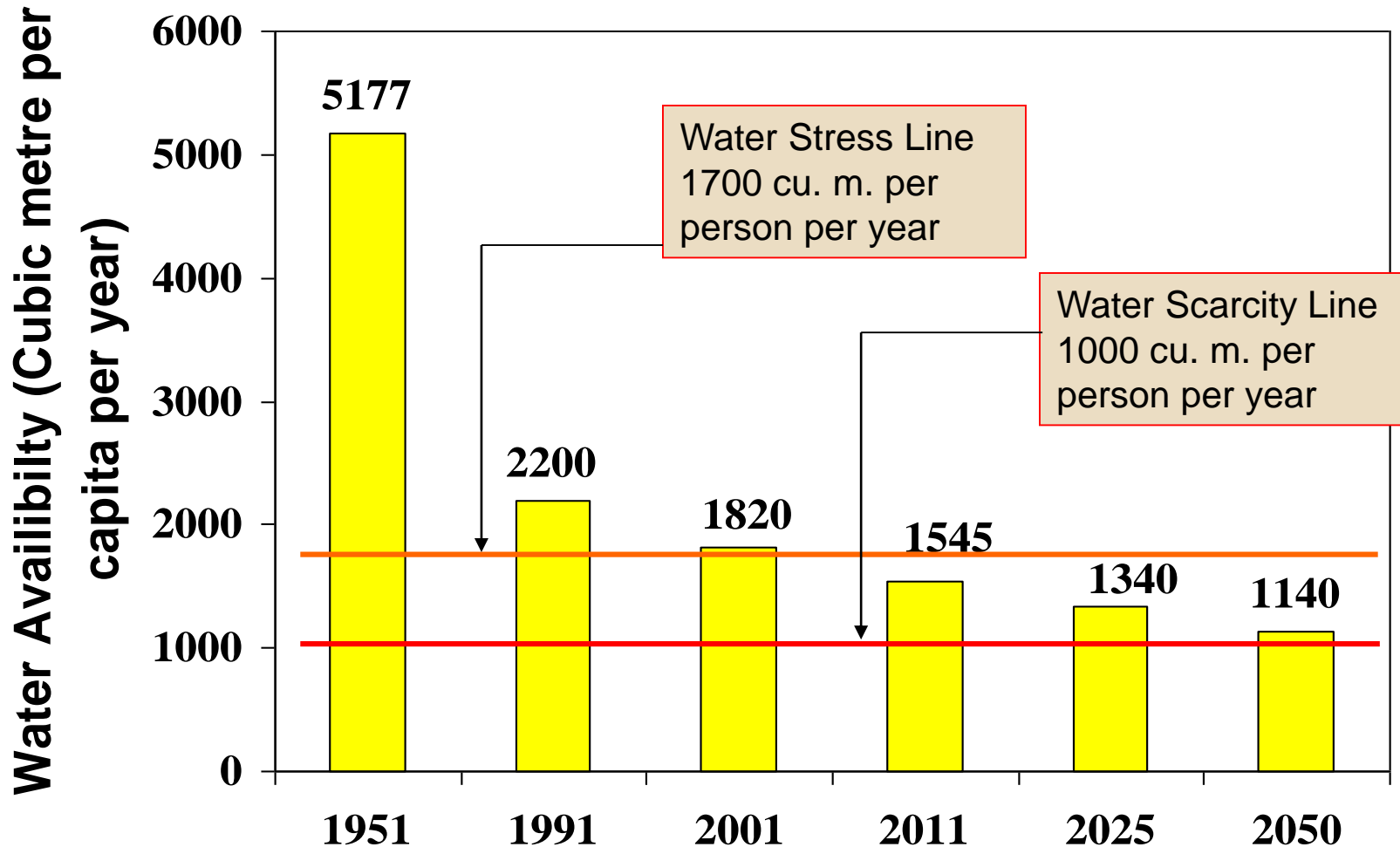
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High temporal variability – more than 80% of annual rainfall in five monsoon month



Per Capita Water Availability

(National Average)



Water demand scenario

7

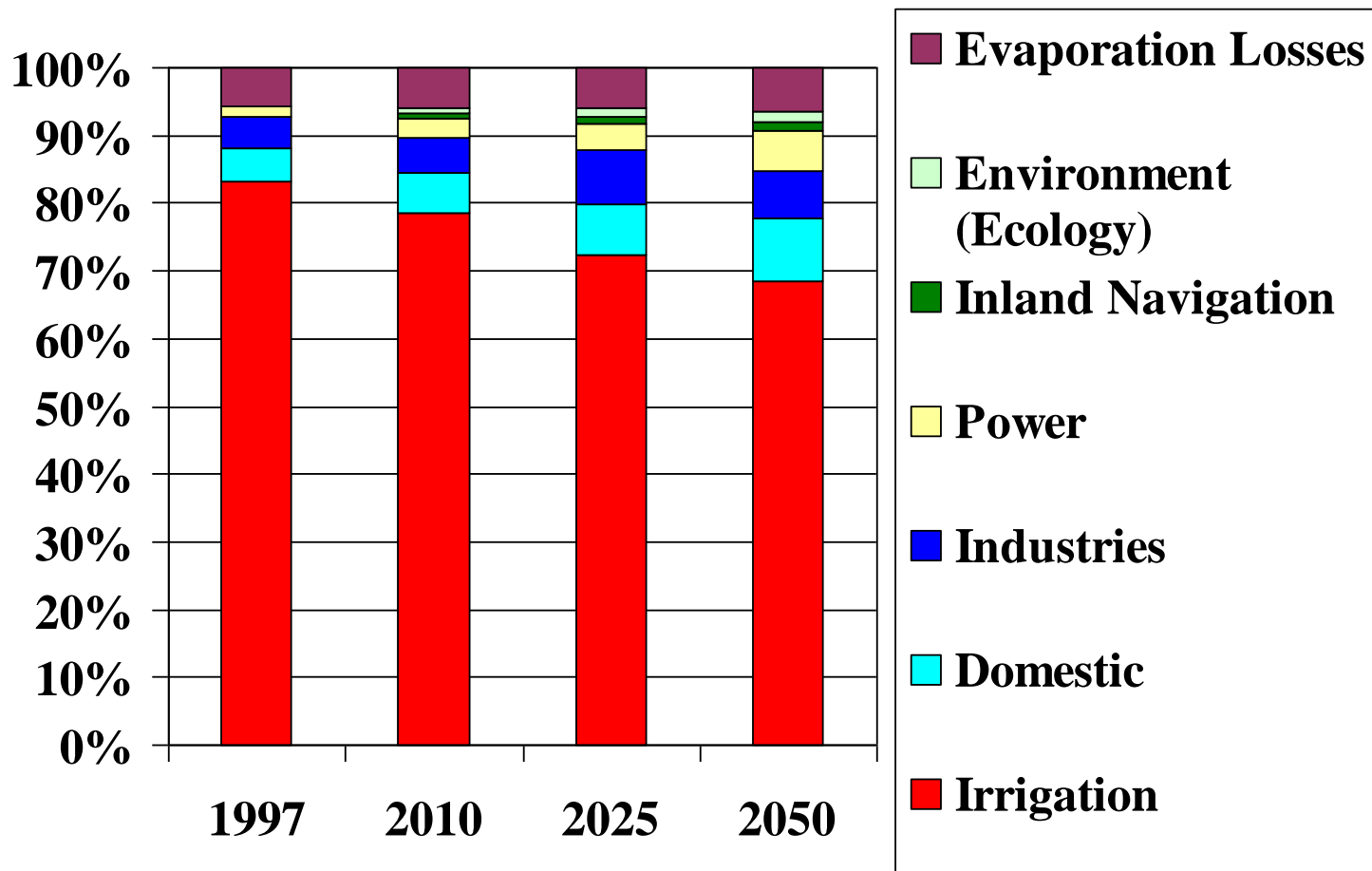
Sl No.	Total Water Requirement for Different Uses (in BCM)		
	Uses	Year 2025	Year 2050
1.	Irrigation	611	807
2.	Domestic	62	111
3.	Industries	67	81
4.	Power	33	70
5.	Others	70	111
	Total	843	1180
	Population Estimate	1.3 Billion	1.5 Billion

Assumptions:

- Increase in efficiency in irrigation from present level of 35% to 60% by 2050
- Increase in productivity for rainfed agriculture from 1 to 1.5 and Irrigated agriculture from 3.0 to 4.0 t/ha

Demands of various sectors

8

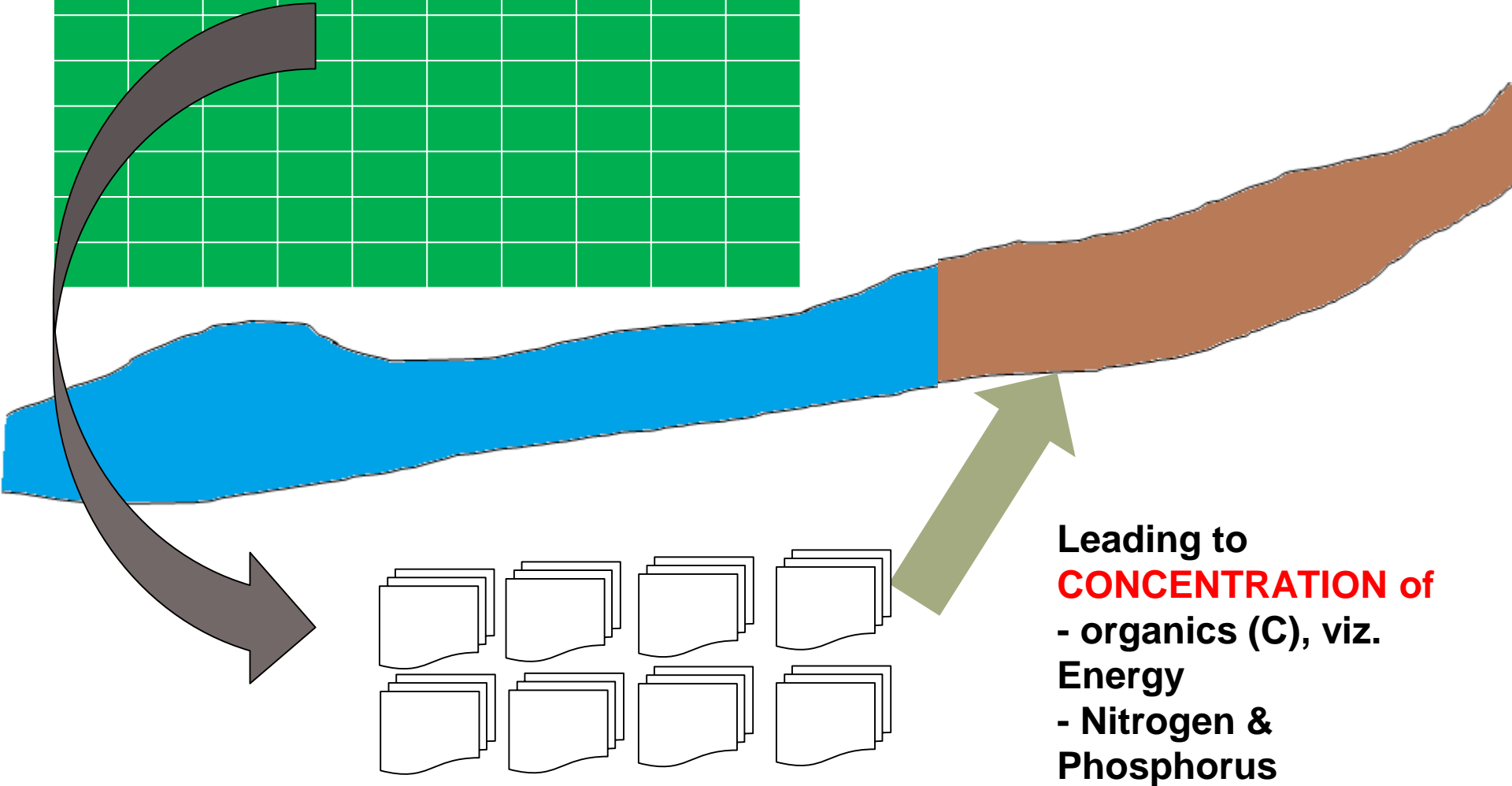


Challenges faced by Indian Rivers

9

- Pollution.
- Availability of water.
- Competitive Stakeholders demands

Farm produce → Cities



NAMAMI GANGE

- Approved by GOI on 13.05.2015 with a budget outlay of Rs. 20,000 for 5 years.
- With a mandate to ensure effective abatement of pollution, rejuvenation, protection and management of River Ganga and its tributaries.
- Focuses on restoring the wholesomeness of the river by ensuring *Aviral Dhara*, *Nirmal Dhara* and maintain the *ecological and geologic integrity*.
- The 3Rs – Reduce, Reuse and Recycle are being successfully incorporated in Namami Gange Programme.

Status of existing infrastructure and Interventions - 97 Towns along Ganga Main Stem

Sr. No.	State	Total Sewerage Generation (MLD)		Existing STP Capacity (MLD)	Treatment Capacity Gap (MLD)		Projects under Implementation (MLD)		
		2016	2035		2016	2035	Ongoing	Under Tendering	Tender to be floated
1	<u>Uttarakhand</u>	85	122	97	14	33	106	26	0
2	<u>Uttar Pradesh</u>	968	1221	815	276	444	440 [#]	122	73
3	<u>Bihar</u>	456	606	124	332	482	216	29	284
4	<u>Jharkhand</u>	13	16	0	13	16	12	4	0
5	<u>West Bengal</u>	1432	1638	548	517*	705*	80	23	192
Total		2953	3603	1584	1152	1680	854[#]	204	549
				48 Town			26 Town	14 Town	12 Town

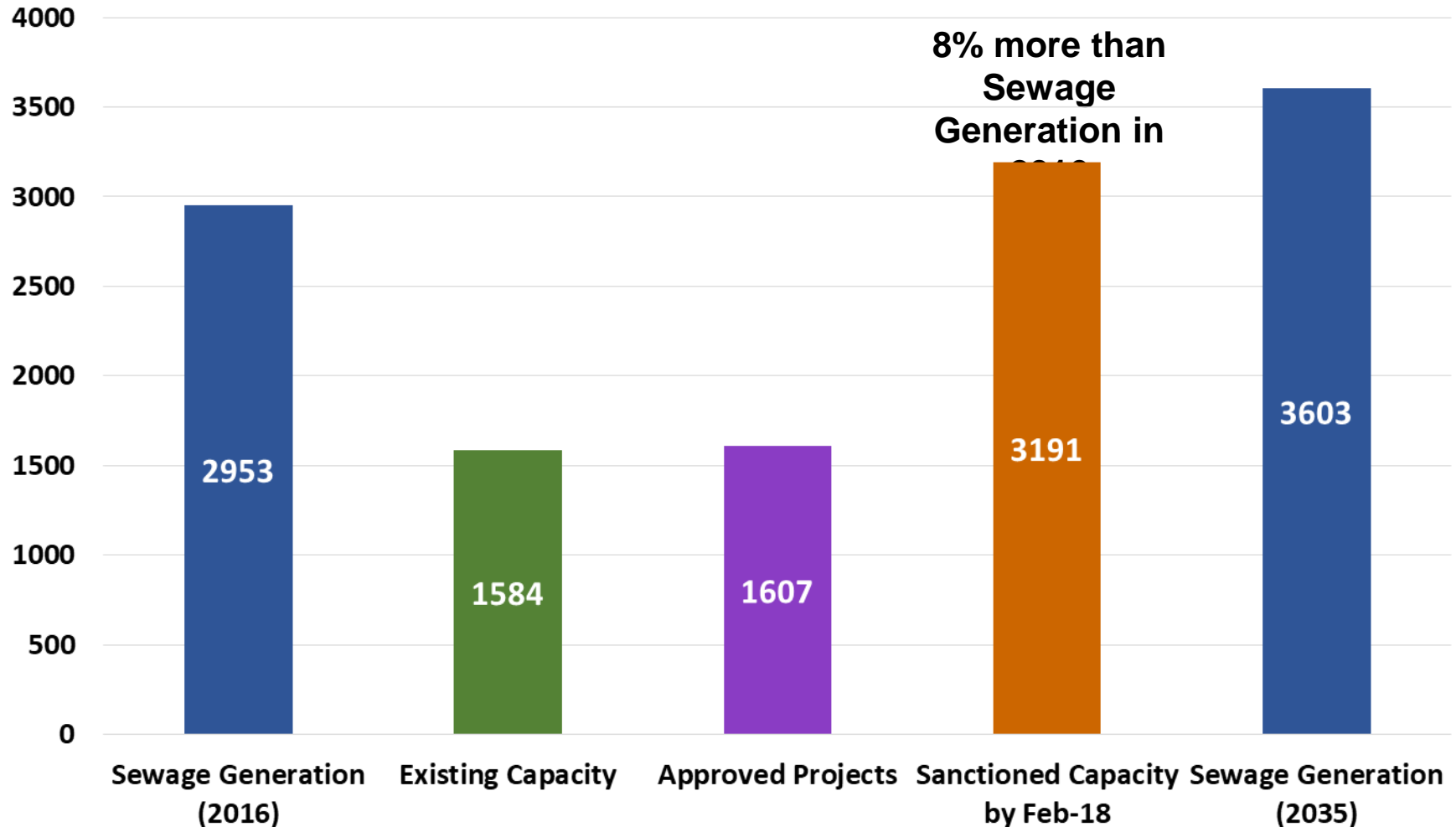
* Two- third of the sewage generated (410 Mld) from Kolkata reaches East Kolkata Wetland

Includes projects under AMRUT, State Sector (234 MLD)

Status of Ongoing Sewerage Projects

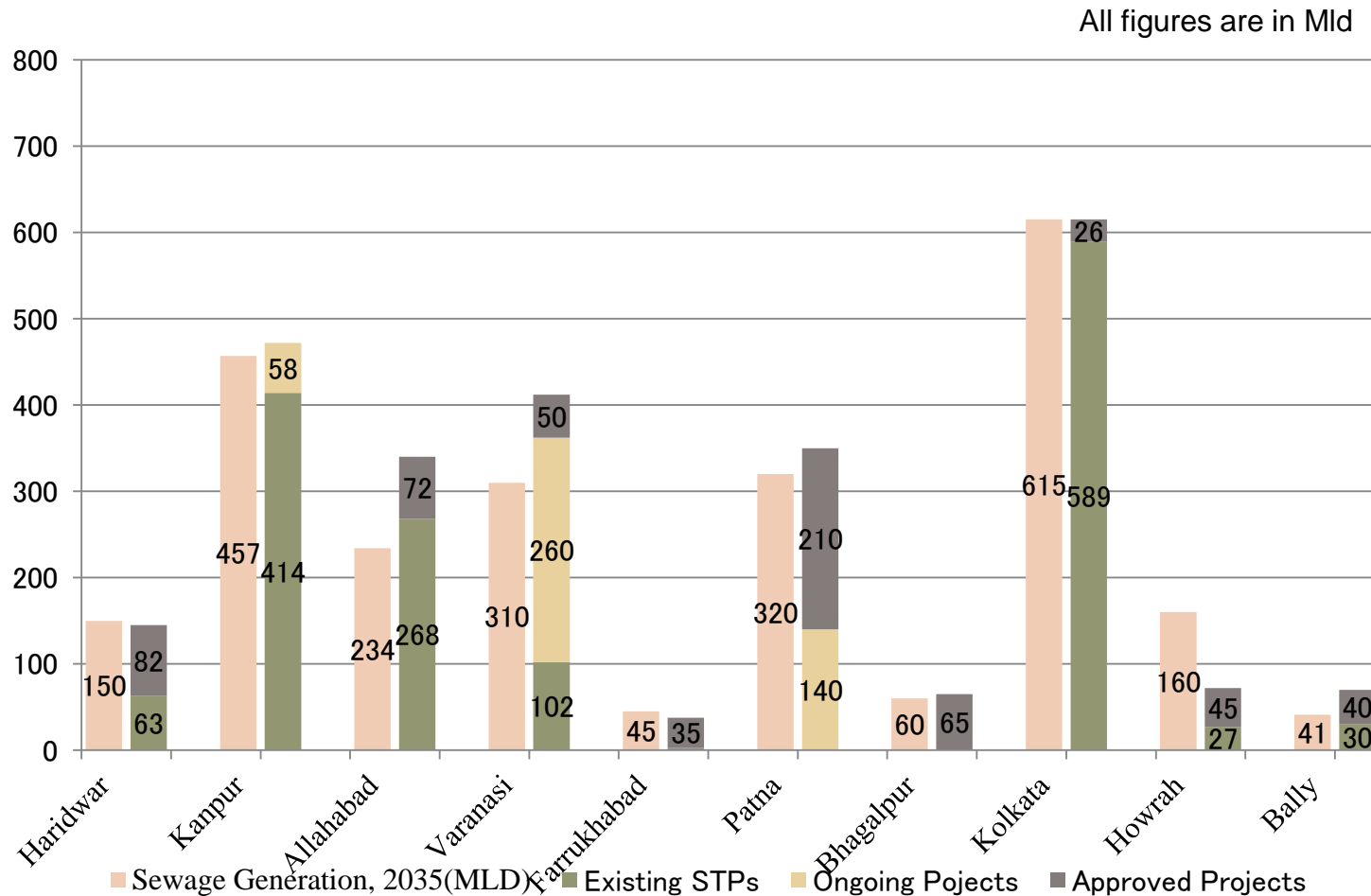
13

Sewage Generation Vs. Treatment Capacity



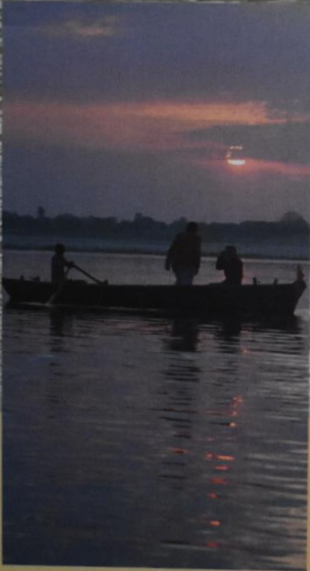
Focus on Large Cities of Ganga Main Stem

10 towns with a total sewage generation of 1897 MLD contribute almost 64% of total sewage (2953 MLD) discharge from the 97 towns to river Ganga



नमामि गंगे

Development of Sewage Treatment Infrastructure Through Hybrid Annuity Based Public Private Partnership Mode



Innovative Public Private Partnership Model Hybrid Annuity Projects under Namami Gange

India's first PPP projects in the Sewerage sector

Paradigm shift in the sector

Performance based contracts with enhanced responsibilities to private sector

Equal focus on sustainable performance and development.

Model approved in Jan 2016 by Government of India

Promotes structural reforms in the sector

Incentive to develop market for effluent re-use by industries

Incentive to utilize by-products and generate additional revenues

Incentive to generate power from sludge

Robust Payment Security Mechanism

Payments to be made directly by NMCG, subject to sustained performance

Innovative escrow mechanism with 2-years' payments deposited in advance

Fine example of Cooperative Federalism

NMCG and state Government Executing Agencies partner to design and implement the projects

Funding assistance from NMCG while implementation oversight and regulation by the state Government

NMCG, in collaboration with the state Governments of Uttarakhand and Uttar Pradesh, has successfully designed and bid out the first two hybrid annuity projects in the cities of Haridwar and Varanasi respectively.

The hybrid annuity PPP program is now being rolled out in Mathura, Allahabad, Kanpur, Patna and Kolkata. NMCG endeavors to integrate

NATIONAL MISSION FOR CLEAN GANGA (NMCG)
Ministry of Water Resources, River Development & Ganga Rejuvenation
Government of India

Advisory Partner
IFC International Finance Corporation
WORLD BANK GROUP
Creating Markets, Creating Opportunities

पायनियर
नई दिल्ली, पंचमवार, 29 अप्रैल, 2017

तीन जलमल शोधन सं करने के लिए किया ग

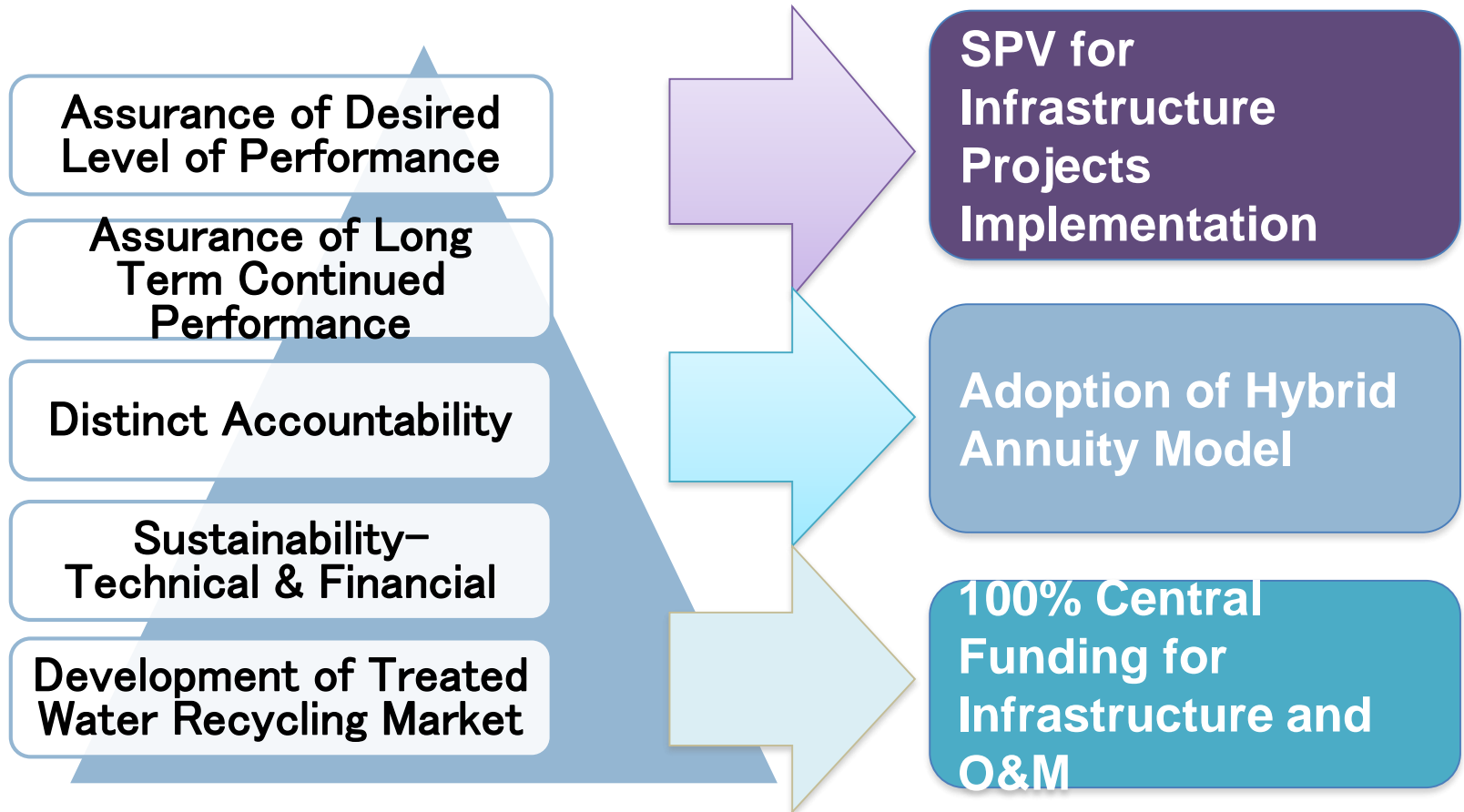
समाजिक न्याय परिषद

नई दिल्ली

समाजिक न्याय परिषद की नई दिल्ली स्थित एक बैठक में गंगा नदी के जलमल शोधन सं करने के लिए किया गया।

Government of India Initiative on Sewerage Management in Ganga Basin

16



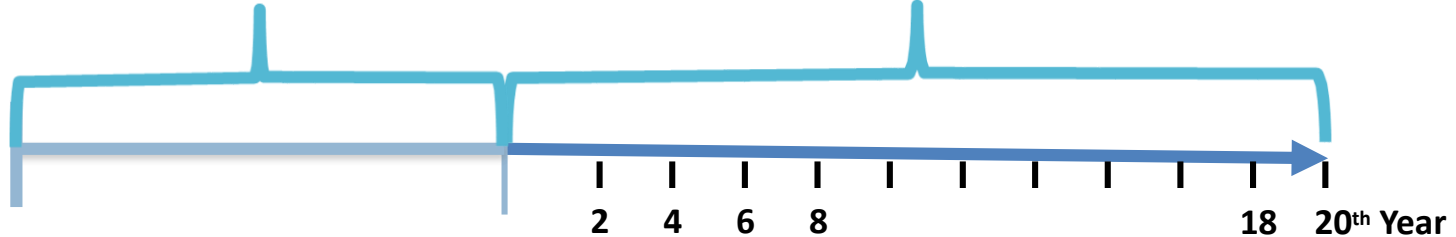
BUSINESS AS USUAL ?

Hybrid Annuity Model

17

Construction Phase

O&M Phase



**Upto 40% of
Capital Cost by
Government**

Annuity payments

- *Remaining capital investment*
- *Annual O&M cost*
- *Payments linked to performance standards*
- *Independent of treated water recycling revenue*

Status of Ongoing Sewerage Projects - Hybrid Annuity

- Awarded projects:

Project
82 MLD STP at Haridwar
50 MLD STP at Varanasi

- Approved/Pipeline projects:

S.No	Name of the Package	New Capacity in MLD
(i)	Mathura	30
(ii)	Allahabad - Jhusi, Naini, Phaphamau	72
(iii)	Digha & Kankarbagh in Patna	150
(iv)	Unnao, Shuklaganj and Kanpur	49
(v)	Kolkata, Howrah and Bally; Kamarhati & Baranagar	131 +60
(vi)	Mirzapur, Gazipur and Farrukhabad	73
(vii)	Bhagalpur	65

Adopting Zero Liquid Discharge (ZLD) based technologies in various industrial sectors for regulating water consumption

19

I. Pulp & Paper

For enforcing zero black liquor discharge, 100 chemical pulping digesters dismantled in 33 pulp & paper mills and 7 chemical recovery plants commissioned in 10 agro based pulp & paper mills.

Upgradation of process technology, ETPs up to tertiary treatment level reduces fresh water consumption and effluent generation (reduced by 45% -50% as compared to the level in 2012).

II. Distillery

ZLD achieved in 32 molasses based distillery. Spent wash generation from 12-15 KL/KL to 6-8 KL/KL of alcohol production (halved) through process technology upgradation.

III. Sugar

Effluent generation reduced from 400 to 200 litres per tonnes of cane crushed, with up-gradation of process technology and adoption of waste minimization process.

IV. Textile

Feasibility of ZLD based CETP is being explored at 4 textile clusters at Rooma, Farrukhabad, Mathura, Philkuwa of Uttar Pradesh.

An action plan/ charter for upgradation of manufacturing process technology, ETP System and adoption of best practices has been formulated for sugar and textile industries.

II. Enforcing/incentivizing water reuse for industries and municipalities

- I. Implementation of PPP model under Hybrid Annuity models, incentivizes development of market for effluent re-use by industries as well as utilization of by-products of STP.
- II. Signing of MoUs with various Ministries for reuse of treated wastewater from STPs.
- III. Government has made mandatory for Thermal Power Plants located within 50 km of STPs to reuse the treated sewage water for its operations.

Road Ahead...

22

- I. Recognizing the wastewater circular economy.
- II. Emphasizing on Energy recovery and nutrient recovery from WWTPs.
- III. Interventions in water distribution losses will reduce stress on fresh water resources. Example – Delhi
- IV. Reuse/ recycle of treated wastewater for the non-domestic purposes.
- V. Economical and judicious use of available water by laying Dual Pipe system in group housing societies and new colonies.

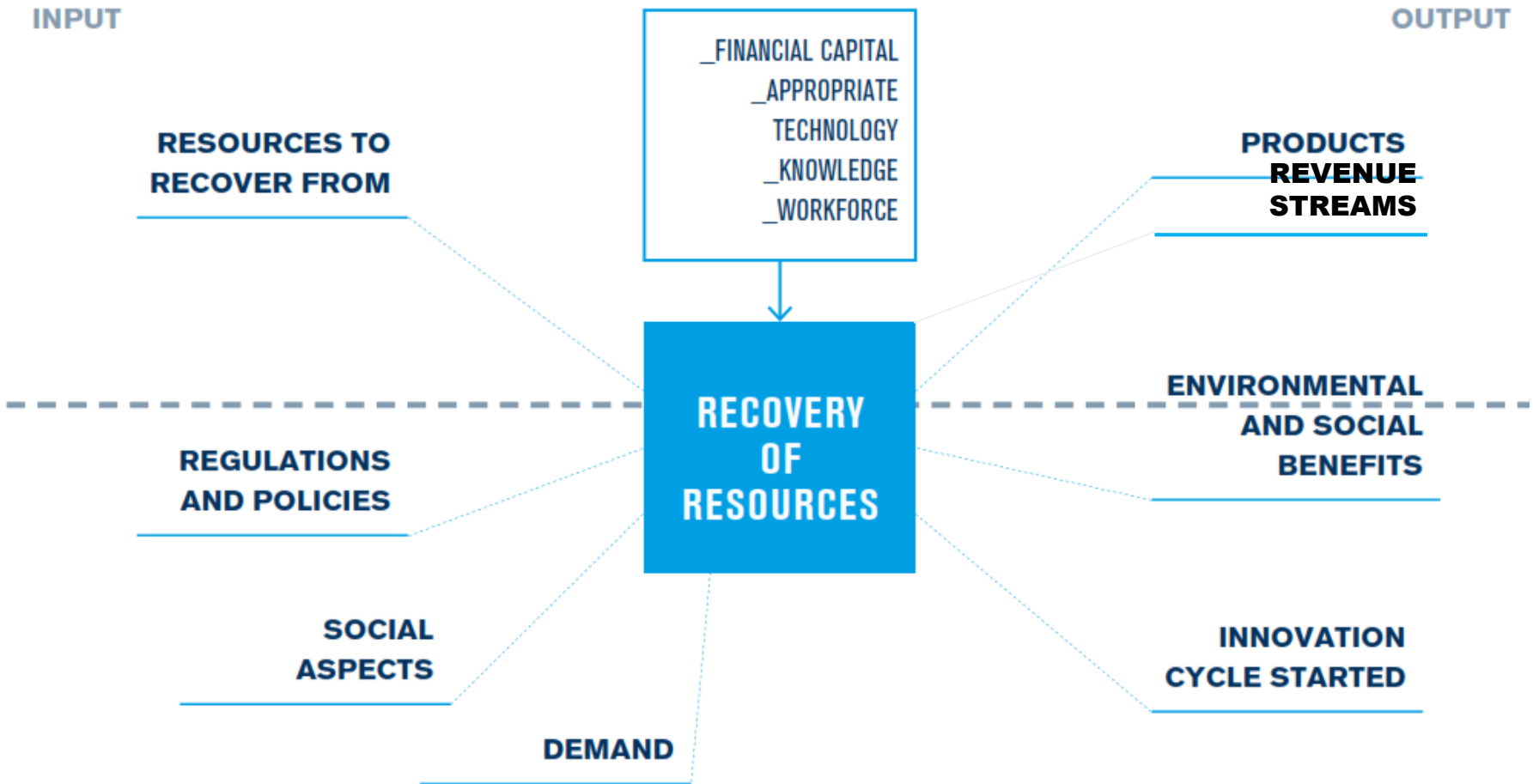
Key Drivers for Resource Recovery

23

1. **Need & urgency** for circular economy operations
2. **Cost of recovery** vs **value of recovered products**
3. Research and Innovation
4. Policy & regulations

Enabling Environment for Resource Recovery

24



MoU with IOCL Mathura

- MoWR, RD&GR (NMCG) signed a MoU with Indian Oil Corporation Ltd, Mathura on 17.08.2016.
- It is proposed to construct a 20 MLD STP at Laxmi Nagar to meet the quality requirement of Mathura refinery. IOCL shall utilize the treated sewage water from the STP for its industrial uses, excluding industrial and domestic uses.
- The proposal is at tendering stage. Agreement of cost sharing basis yet to be finalized, either IOCL to pay the cost as per Hybrid Annuity Model or payment through tariff basis.

MoU with Railway

26

- MoWR, RD&GR (NMCG) signed a MoU with Ministry of Railways on 03.12.2015.

Power

- Government of India has notified new Tariff Policy on 28.01.2016 wherein it is mandated that the thermal power plant(s) including the existing plants located within 50 km radius of sewage treatment plant of Municipality / local bodies / similar organization shall, in the order to their closeness to sewage treatment plant, mandatorily use treated sewage water produced by these bodies and the associated cost on this account be allowed as pass through in the tariff.

Jajmau-Kanpur

28

- 3 tannery cluster at Kanpur – Jajmau (340), Unnao (40) and Banthar
- All 3 clusters have non-compliant CETP
- ZLD based system although technically feasible but socio-economically not accepted, concern of business mortality
- Dilution based approach considered with acceptable OM cost of CETP
- NMCG approved Rs. 554 crore worth 20 MLD CETP for tannery cluster at Jajmau with water reuse component.
- Financial constraints with industry holding up the project.

Policy Decisions

- Reuse, recycle of treated water is core policy strategy under authority order 2016.
- Government of Bihar has taken a policy decision that no effluent coming out of STP will be discharged in Ganga rather shall be used only in agriculture.
- They have also coupled the necessity of undertaking organic farming all along the designated corridor of River Ganga within the State, in its Agricultural Road Map 2017-2022.

30

THANKS