WATER RESOURCES MANAGEMENT STRATEGIES

by

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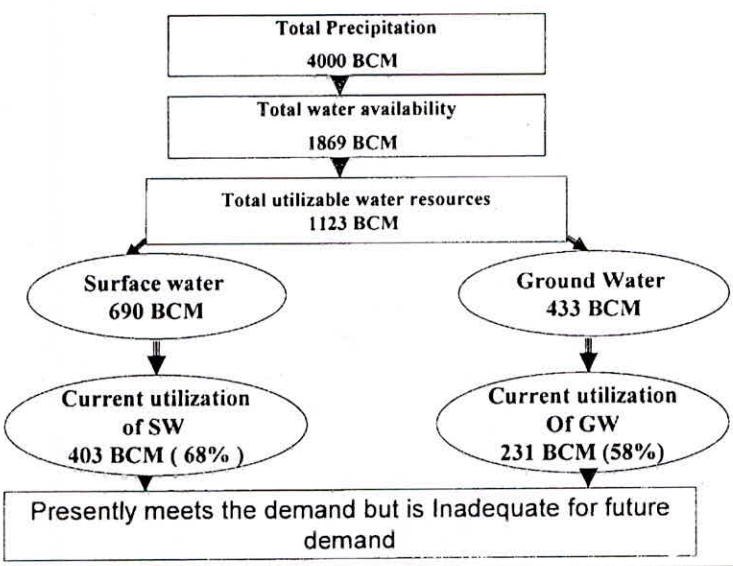
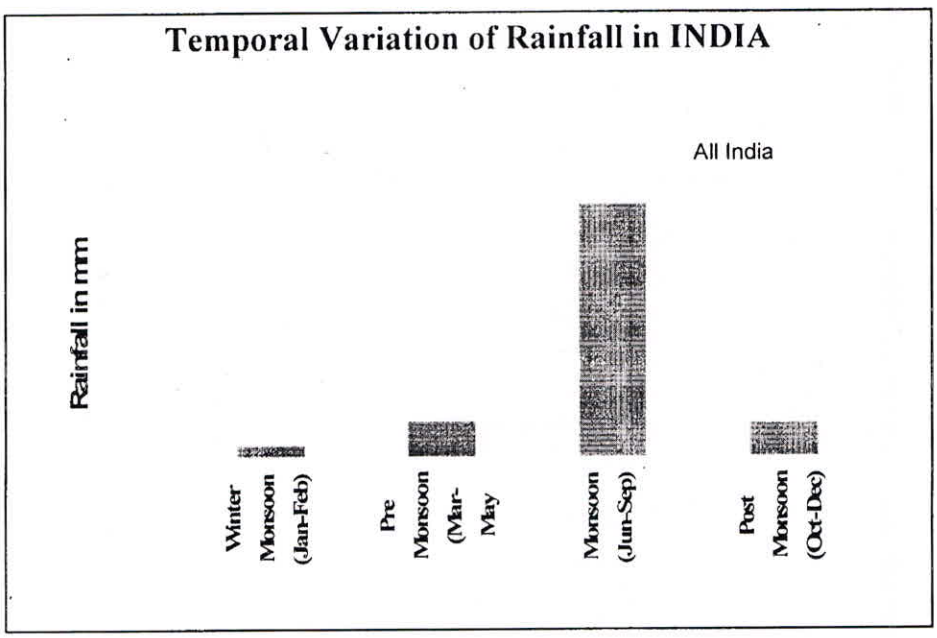
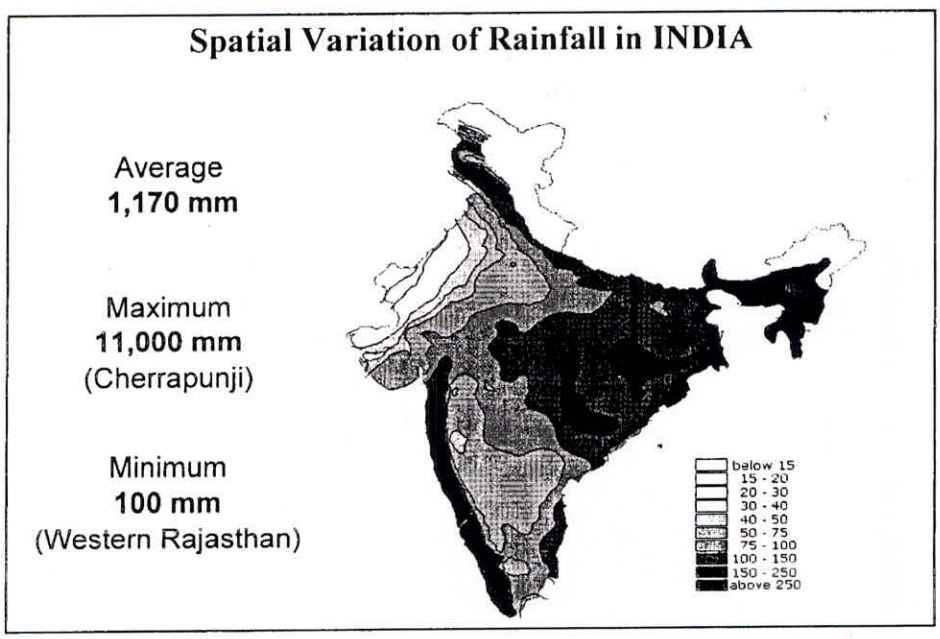
Central Water Commission

Water Availability

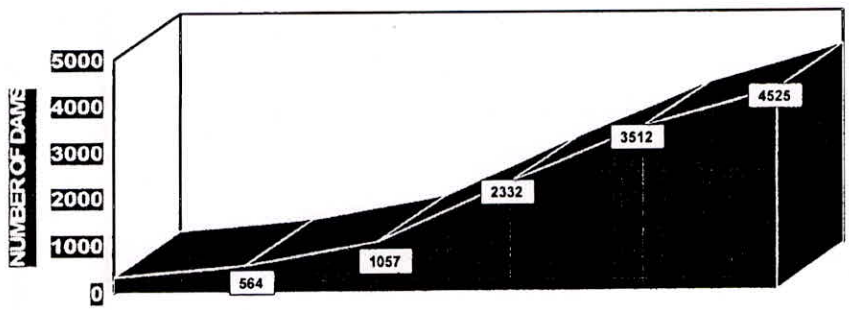



Temporal Variation of Rainfall in INDIA
All India
Rainfall in mm
Winter Monsoon (Jan-Feb)
Pre Monsoon (Mar-May
Monsoon (Jun-Sep)
Post Monsoon (Oct-Dec)

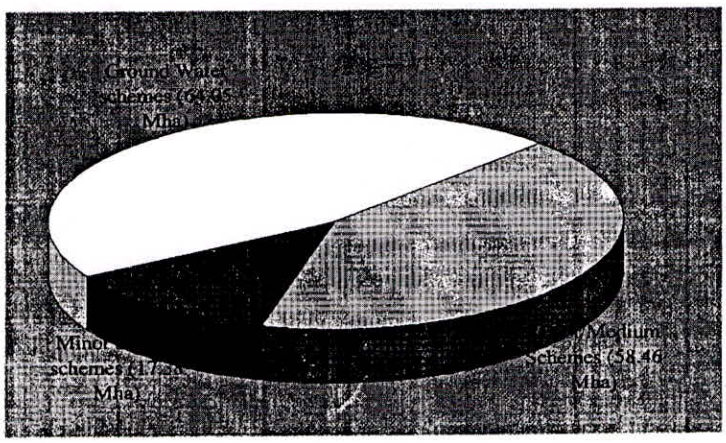

Spatial Variation of Rainfall in INDIA
Average
1,170 mm
Maximum
11,000 mm
(Cherrapunji)
Minimum
100 mm
(Western Rajasthan)
below 15
15 - 20
20 - 30
30 - 40
40 - 50
50 - 75
75 - 100
100 - 150
150 - 250
above 250

Water Resources Development-Present Scenario

CREATION OF SURFACE STORAGE
LARGE DAMS COMPLETED/ONGOING

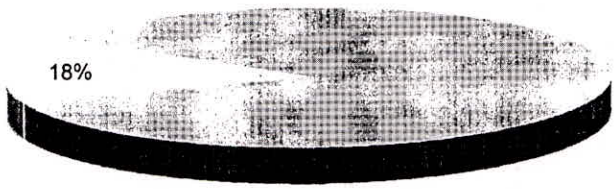


Sectorwise Ultimate Irrigation Potential



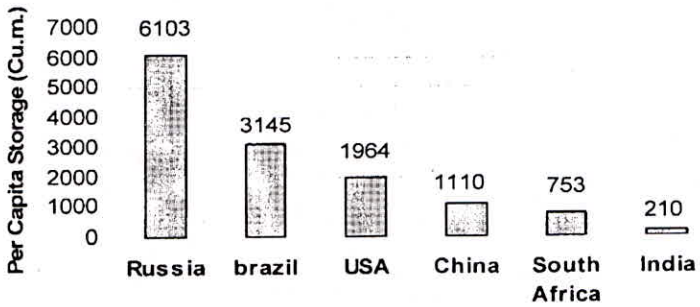
Hydropower Development

Hydropower Potential Created (15225 MW) as % of Ultimate Hydropower Potential (84044 MW) at 60% Load Factor

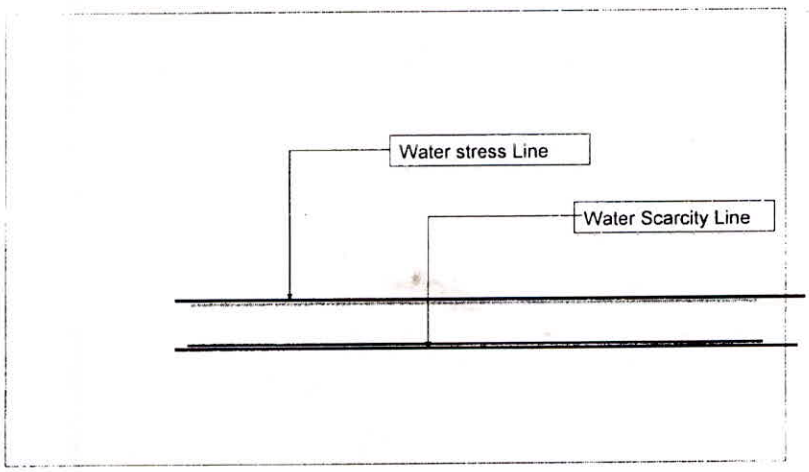


On 1st April 2005

Per Capita Storage



Per Capita Water Availability (National Average)



Sector wise Water Utilisation and Future Demand (BCM)

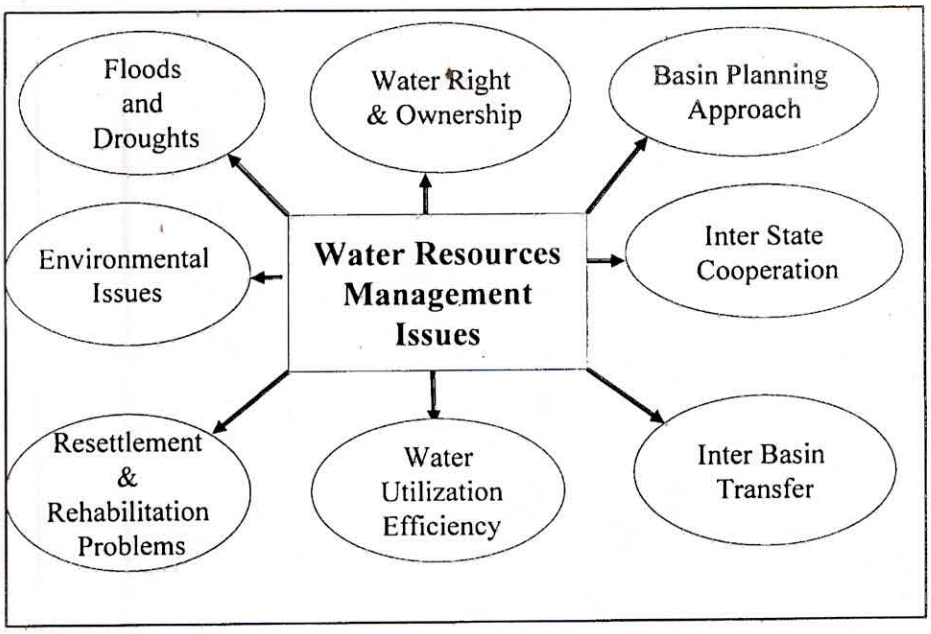
Sector	Present Water Utilization	Future Water Demand		
		2010	2025	2050
Irrigation	**541**	**688**	**910**	**1072**
Drinking Water	**42**	**56**	**73**	**102**
Industry	**8**	**12**	**23**	**63**
Energy	**2**	**5**	**15**	**130**
Others	**41**	**52**	**72**	**80**
Total	634	813	1093	1447

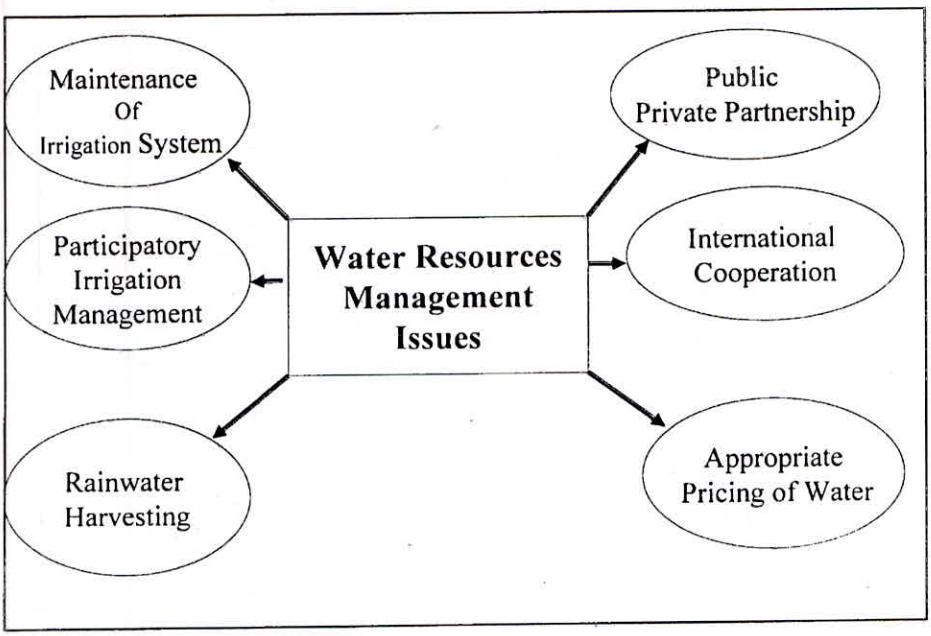
INDIA

- **2% of World's Land Area**
- **4% of World's Fresh Water Resources**
- **16% of World's Population**

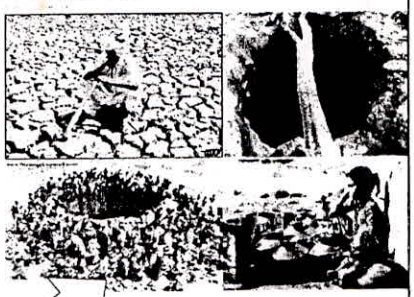
Issues and Challenges in Water Sector

- Declining Per Capita Water availability
- Rising Multi-sectoral Demand
- Reducing Trend of Budget outlay for Irrigation Sector
- Equity in supply of water for irrigation
- Difficult sites for projects
- Environment and Water Quality
- Over-exploitation of Ground Water


Floods and Droughts
Water Right & Ownership
Basin Planning Approach
Environmental Issues
Water Resources Management Issues
Inter State Cooperation
Resettlement & Rehabilitation Problems
Water Utilization Efficiency
Inter Basin Transfer


Maintenance Of Irrigation System
Public Private Partnership
Participatory Irrigation Management
Water Resources Management Issues
International Cooperation
Rainwater Harvesting
Appropriate Pricing of Water

Flood and Drought Situation



Flood affects – 8 major river valleys spread over 40 million hectares of area in the country affecting 260 million people.

Drought affects 86 Million people in 14 states covering 116 districts

Global Evidence of Environmental impact

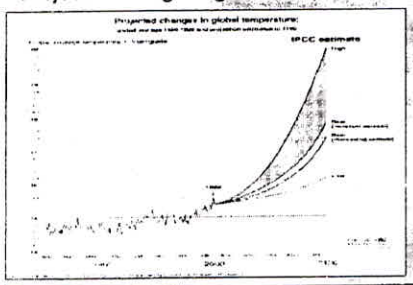
Extreme weather events are becoming more common and severe...

Floods

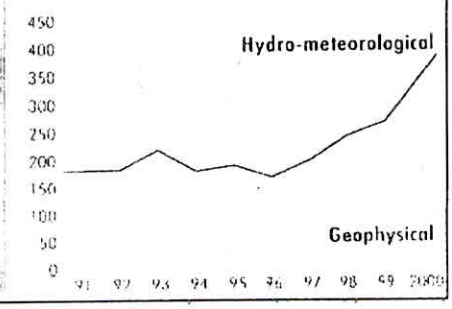
Droughts

Storms

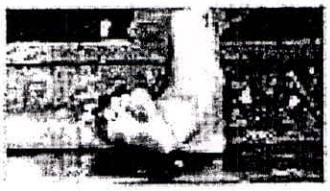
Projected change in global temperature



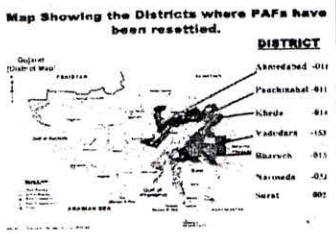
Number of disasters reported



Resettlement and Rehabilitation Problems



National Policy on Resettlement & Rehabilitation of Project Affected Families is under implimaentation



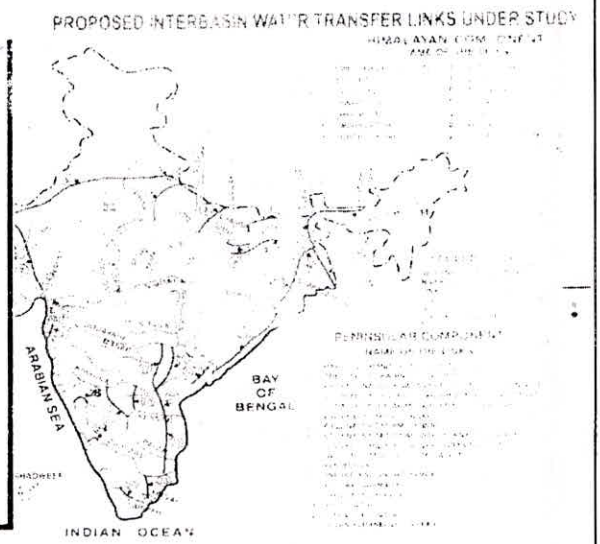
Water Utilization Efficiency

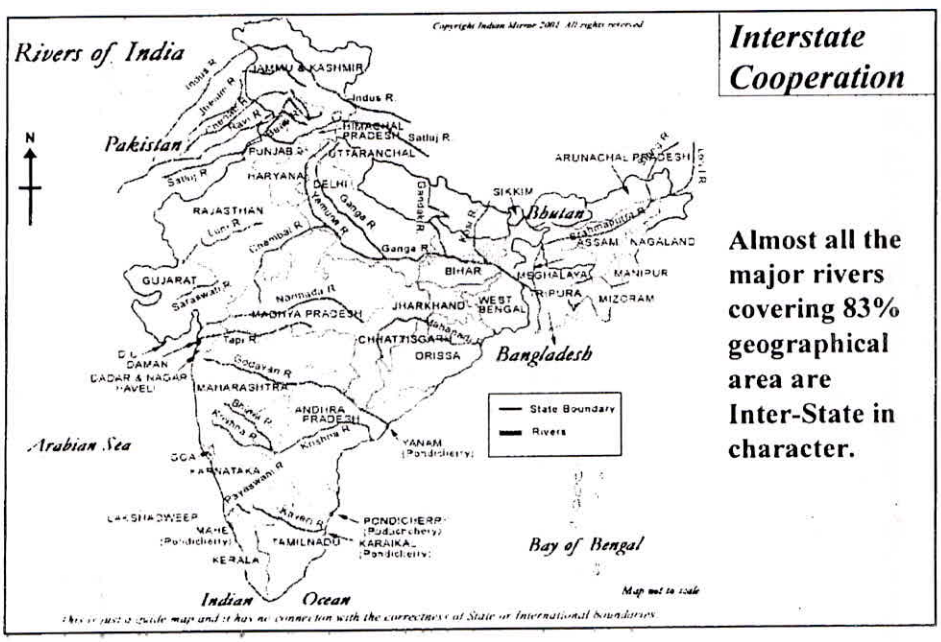
- Improving water utilization efficiency has been identified as one of the thrust areas of the Government
- Present and future efficiencies

	Present	Future Target
- Surface water	35-40 percent	50-60 percent
- Ground water	65-70 percent	72-75 percent

Interlinking of Rivers

1. Increased Cultivation Land
2. Increased Power Generation
3. Flood & Draught Control
4. Drinking Water Availability
5. Employment Potential in the above areas
6. Environmental Improvements
7. Rehabilitation plan integrated
8. Integration of nation





Basin Planning Approach

- National Water Policy stresses need for integrated water resources development and management for sustainable development
- River basin organizations need to be established, wherever necessary
- Special multi-disciplinary units will be required to prepare comprehensive plans taking into account not only the needs of irrigation but harmonizing various other sectors

Water Rights and Owner Ship

- Water rights
  - * Natural (Customary)
  - * Legal (Granted by Law)
- Riparian rights to use water
- Groundwater ownership
- Regulatory, Legal and other measures
- Draft National Policy guidelines for water sharing amongst States

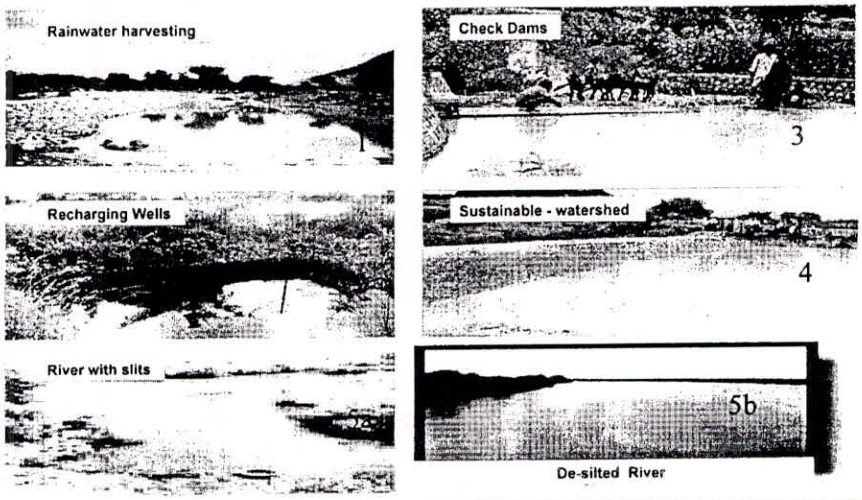
Maintenance of Irrigation Systems

- Poor maintenance of head works and distribution system mainly due to inadequate allocation
- Major portion gets spent on staff salary component
- A committee has been set up under Member (WP&P), CWC with members from States for "Fixing norms for establishment component for O&M".

Participatory Irrigation Management (PIM)

- Stakeholder's progressive involvement in the operation, management and maintenance of irrigation system for sustainability
- Being one of the thrust areas guidelines on PIM are available
- For promotion of PIM, States to amend the existing Irrigation Act or enact a new legislation to put a proper legal and organizational framework in place for PIM
- Eight States have already enacted/amended legislations
- More than 53000 WUAs covering an area of about 10 mha have been constituted

Water Table Improvement



Appropriate Pricing of Water

- Under pricing of water adversely affects the availability of resources for the management of irrigation systems
- Revision in the level and structure of water rates is necessary in the interest of both efficiency and equity.
- A proposal for "State Regulatory Authority for Rationalisation of Water Rates – a model" has been prepared by CWC and submitted to MoWR.
- Efficiency and equity through appropriate pricing of water

Ground Water Development & Management :

- Ultimate irrigation potential through ground water resources assessed as 64.0 mha out of which a potential of 46.03 mha created till end of X Plan. During XI Plan a potential of 4.50 mha is proposed to be added.
- GW development in the country is not uniform. Its exploitation is very high in the alluvial tracts of Punjab & Haryana, while it is very much low in Bihar, Orissa, West Bengal, NE states etc.
- Different strategies for diversified geological formations – alluvial areas of East & NE regions, hard rock areas of peninsular India, hilly areas of North and NEast, deeper confined acquifers in the alluvial plains of North (Uttar Pradesh, Haryana & Punjab).

- Need to undertake studies to estimate "safe yield" of deep confined aquifers.
- Flood plain aquifers in the vicinity of rivers. Over development of shallow aquifers in flood plains creates the necessary subsurface space (regional drawdown of about 5m in the flood plain area of Yamuna at Palla) for augmentation of groundwater from river flows during monsoon.
- Induced recharge is an effective management tool to meet the gap between demand and supply in areas adjacent to rivers with active flood plains.

- Replacement of old ground water abstraction structures in safe and semi-critical blocks.
- Lay adequate stress on artificial recharge and rain water harvesting as a means of sustainable ground water development & management.
- Management of salinity ingress in coastal regions, conjunctive use of surface and ground water, regulation of ground development.
- GW development provides plenty of scope for employment of unskilled labour forces and there is need to link it with NREGA.

International Cooperation

- Cultural assimilation in dealing with our neighbours on matters of common interest concerning water
- Fostering a culture of good neighbourly relations in sharing the water resources
- Recognition of the right of the other party in the utilisation of the common resource
- Lay stress on equity
- Address problems of neighbouring country consequent to planned measures in our country

Initiative to Avoid Water Conflicts

- Need to optimize the use and distribution of the current supplies to meet needs of all stakeholders
- To create knowledge based society by data collection, assessment and publication of information
- To evaluate water allocation formula in between competing States by honest evaluation of future water demand and maximising the efficiency with the limited sources

Water is life
Conserve it
Use it judiciously

We know the malady
There is a remedy
Need is will for implementation

Live and let live

THANK YOU