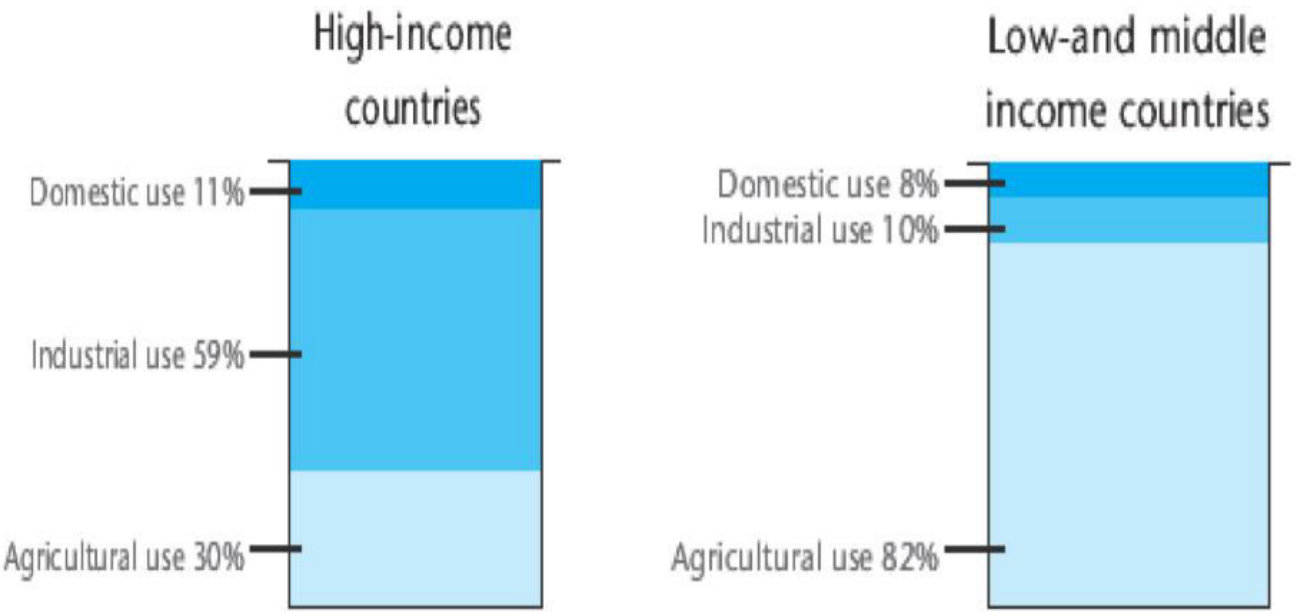
Current approaches of the Indian Industry in the face of Present and Future Water Challenges

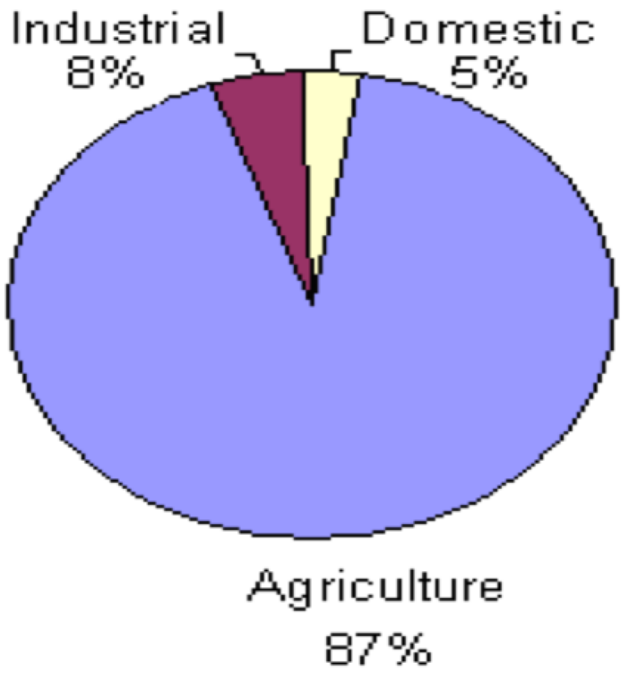
The Context: High vs Low Income Countries

Global Industrial Water Use



The Context: INDIA

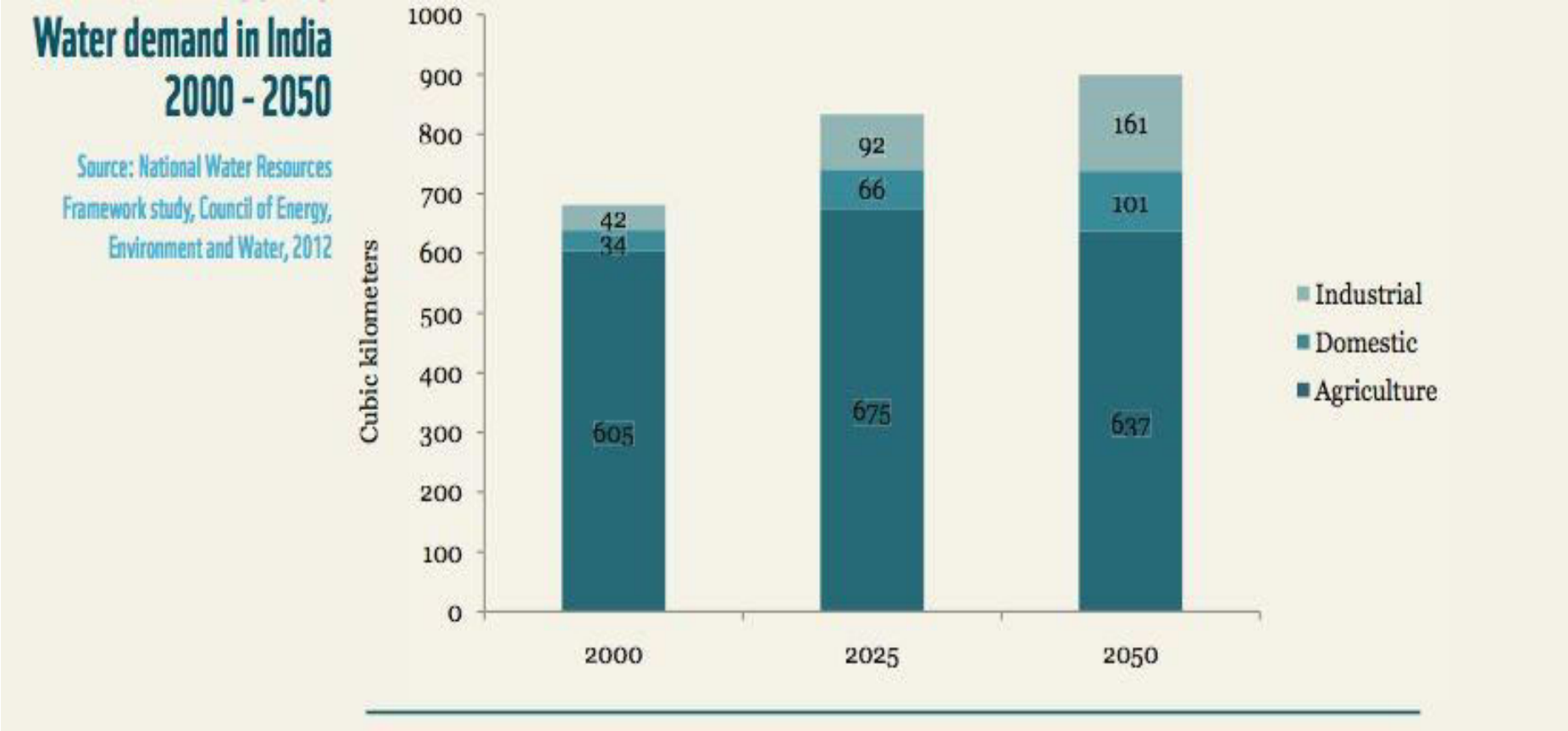
India: National Water Use



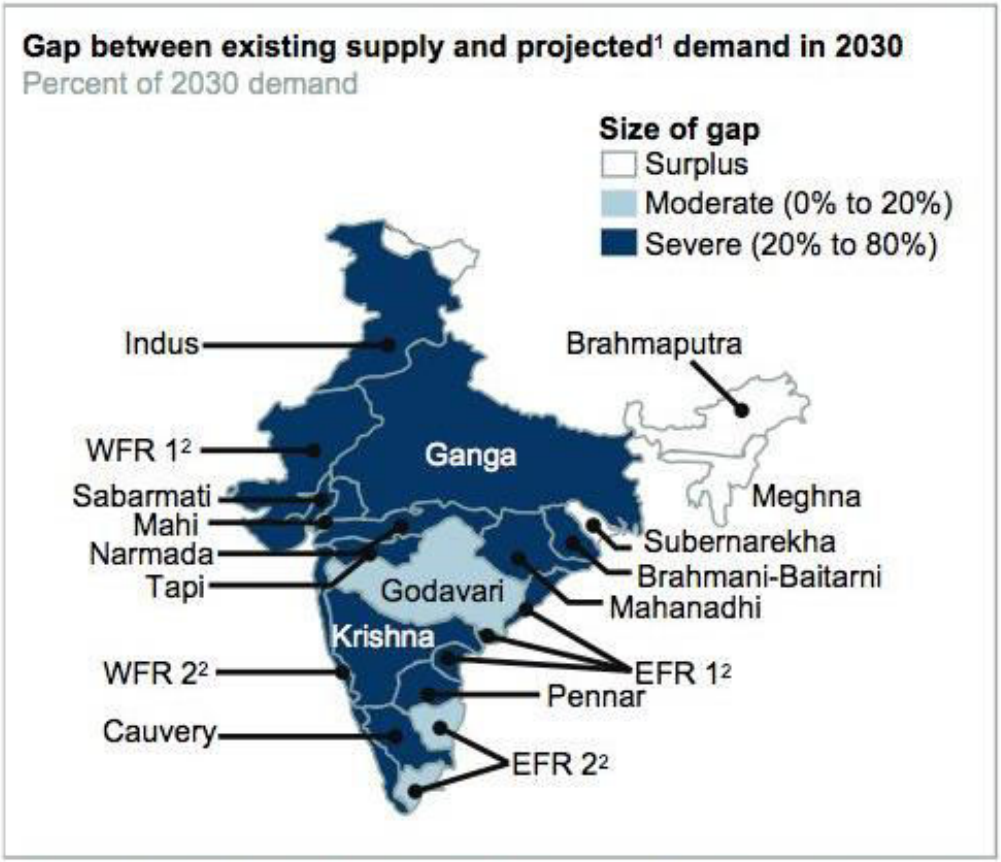
India, home to

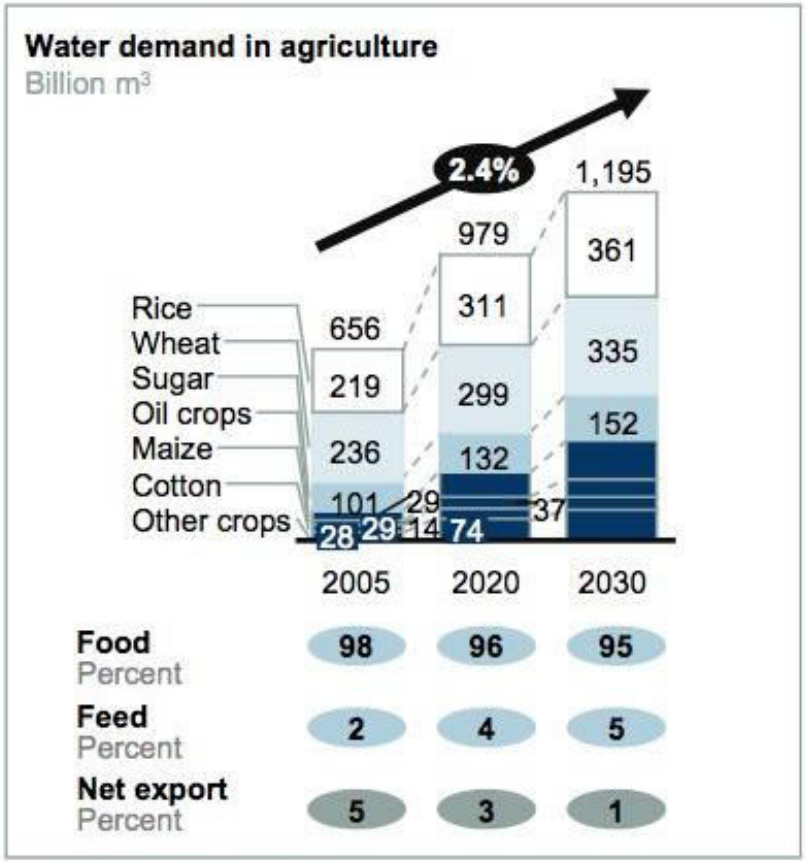
- 16% of the world's Population
- 2.5% of the world's Land area
- 4% of world's Water

Industrial, Domestic, Agricultural Demand for Water 2000 - 2050



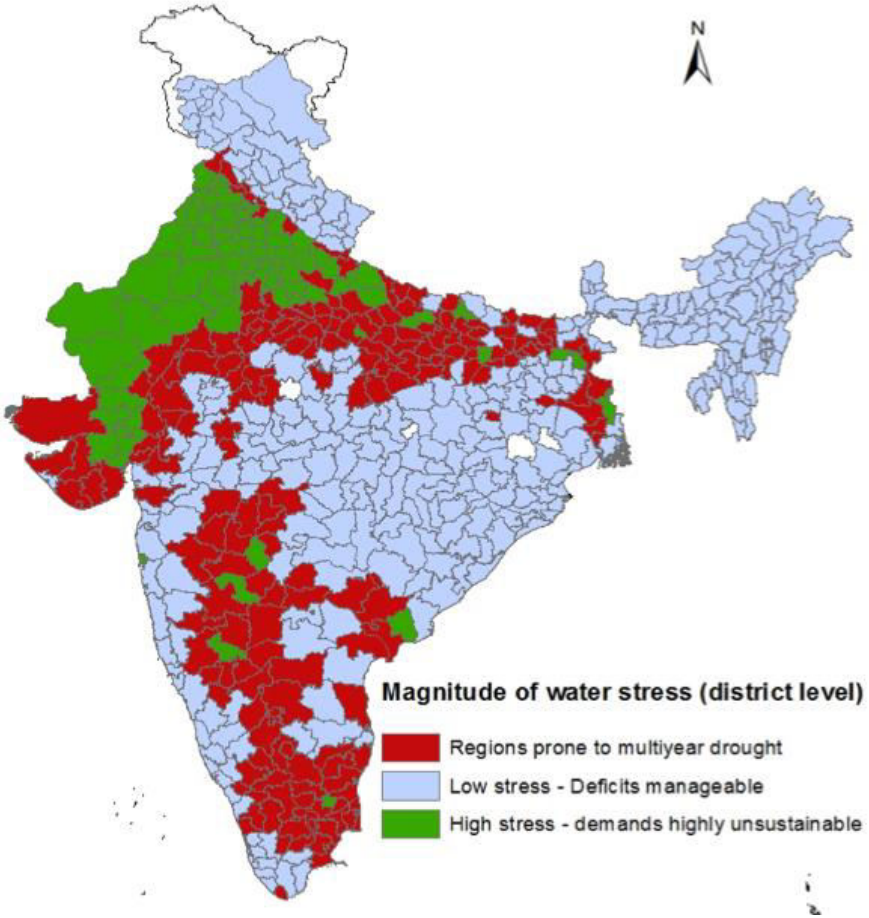
Water Supply and Demand Gap

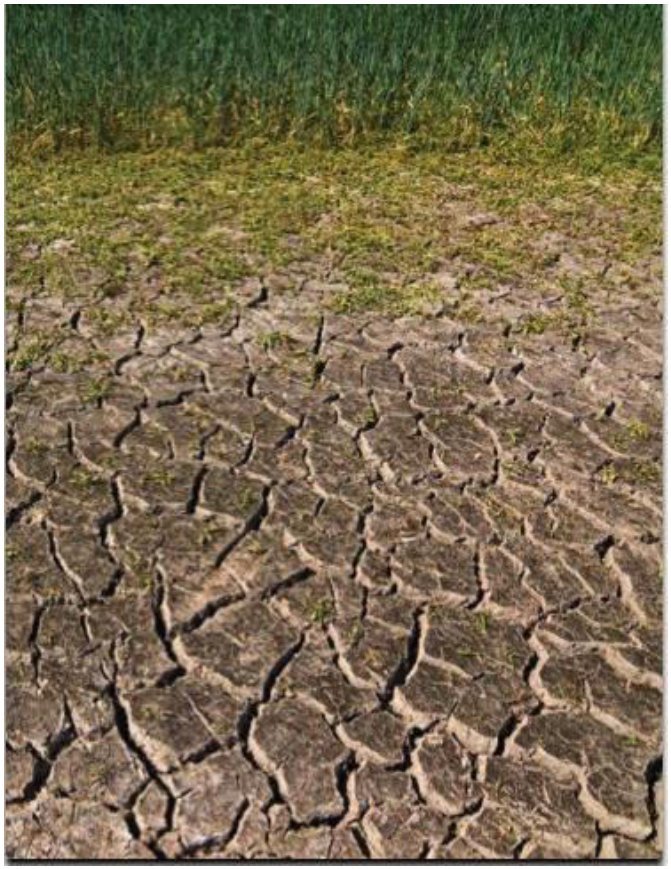




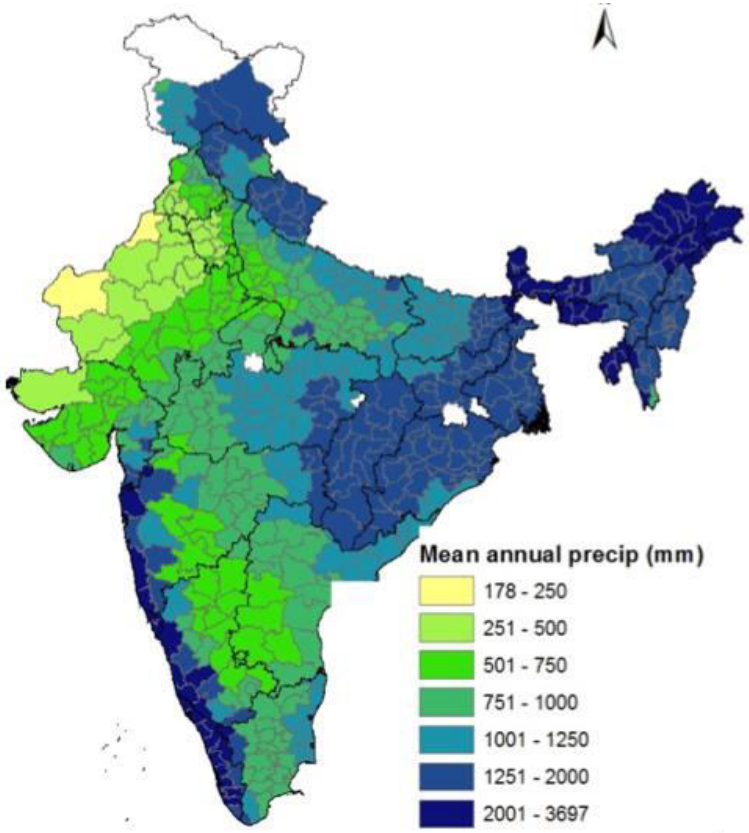
1 The unconstrained projection of water requirements under a static policy regime and at existing levels of productivity and efficiency
2 WFR = western-flowing coastal rivers; EFR = eastern-flowing coastal rivers
SOURCE: 2030 Water Resources Group

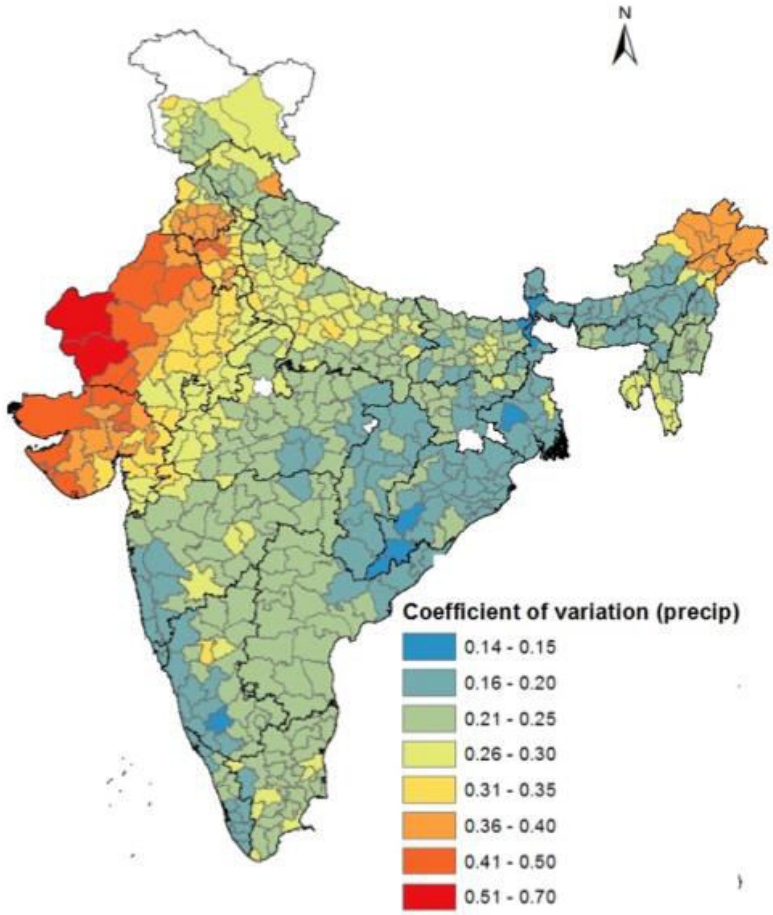
Water Stress at District Level



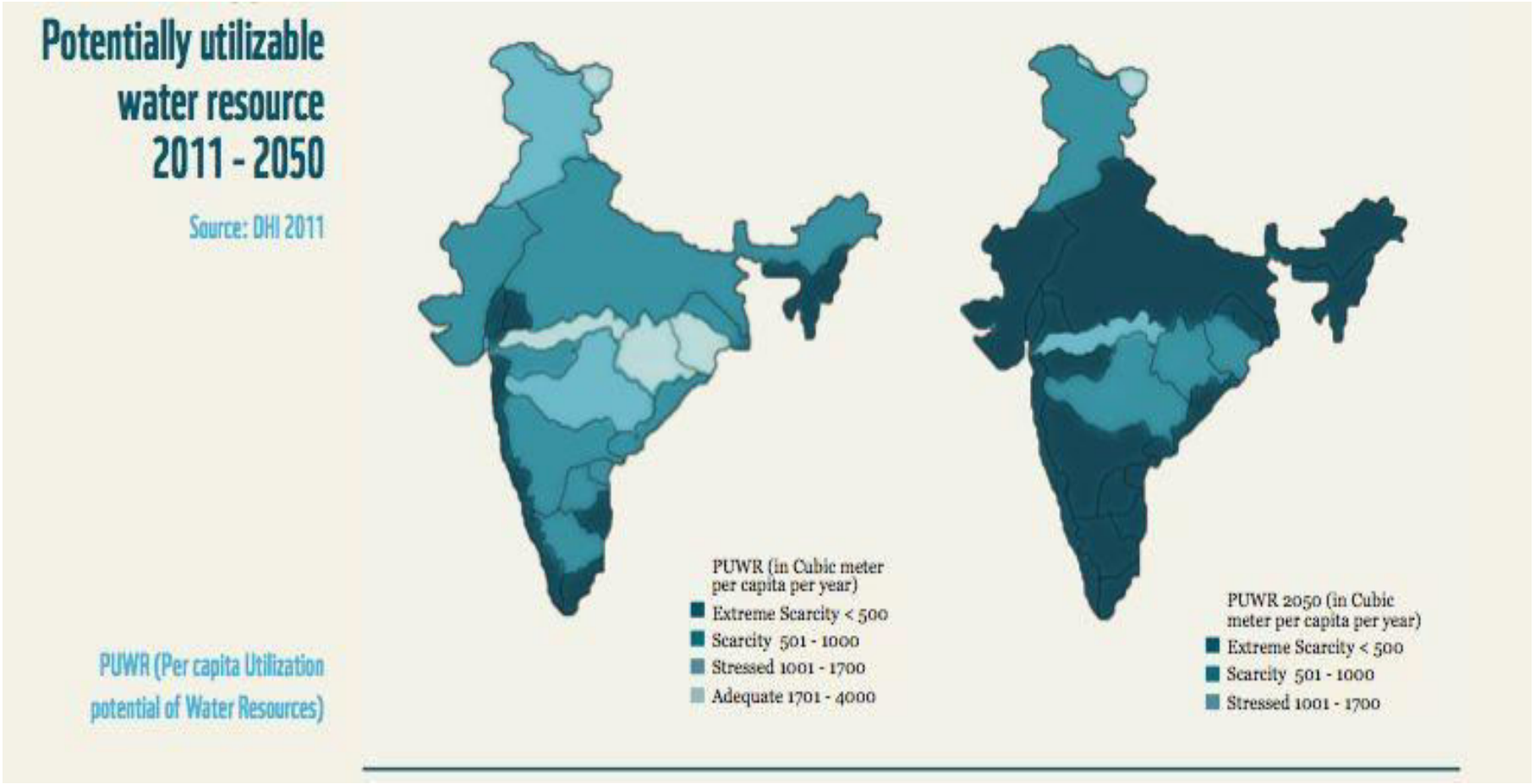


Annual Precipitation / Variation





Per Capita Utilization Potential of Water Resources 2011 / 2050



FICCI Water Mission

- To promote & provide Thought leadership in Water Efficiency
- Facilitate the sharing and dissemination of Best Practices across Industry Sectors to encourage industry to adopt a culture of Sustainable Water Conservation
- Create awareness of Water Scarcity, Quality with a sense of Urgency
- Formulate Policy Framework for better Water Resource Allocation, Conservation and Management
- Promote fresh water conservation strategies across the Agriculture, Industry and Domestic sectors
- Promote new innovative technologies of water-saving and management eg. rainwater harvesting, watershed management, desalination, water auditing through actual Projects, Workshops, Conferences, and Training Programs
- FICCI Water Awards: to recognise efforts & develop a knowledge base for sust. Water Mgmt practices by different stakeholders, in 3 Categories
  - Ind. Water Efficiency
  - Community Initiatives by Industry
  - Water Innovation

KEY RESEARCH QUESTIONS:

- How and where do water limitations constrain potential development and expansion of industries in India? How is the agricultural sector responding?
- In which locations and stages of the agricultural value chains is the highest exposure to water and climate risk?
- How can particular industrial sectors conduct contingency planning to be prepared to respond to water risks, such as loss of production, supply disruption, price increases and more stringent regulations?
- How can data-driven models, mobile technologies, and computing infrastructure provide the tools for risk management in agriculture and industries ensuring water sustainability and food security?

KEY POLICY/VISION QUESTIONS:

- How best can opportunities be created for private sector financed development and management of urban and rural water resources while regulating the use to ensure social and ecological goals, including equity in water allocation and access for the impoverished?
- What are the incentives that can be offered for private sector involvement in wastewater collection, treatment and reuse?
- What are the monitoring systems necessary to manage and regulate a mix of public and private sector water supply networks, and how should they be financed and administered?
- How should holistic analyses that protect the common social interests be developed and used in the policy framework to support National planning and policy reform?

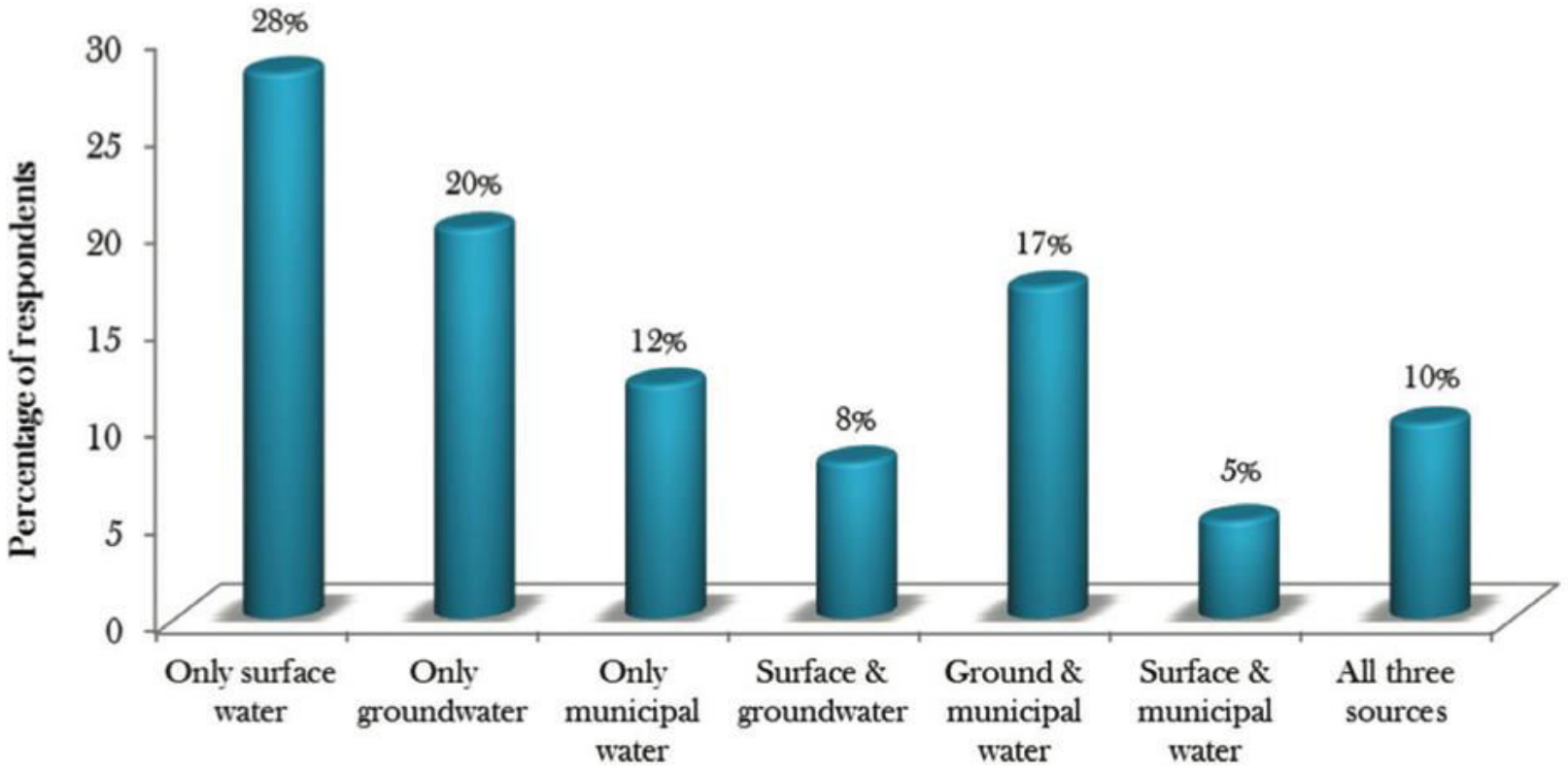
Consumption by Indian Industry

- India's fresh water withdrawals: ~500 b.cu.m
- Indian Industry used:

  ~10 b.cu.m as process water;

  ~30 b.cu.m as cooling water
- Acc to World Bank: Ind. Demand will grow @ 4.2%/year, from 67 b.cu.m in 1999 to 228 b.cu.m by 2025, currently industry in India uses 13% of fresh water withdrawal.
- Cost of Water varies between **Rs.0.09 to Rs.50.00** /cu.m.

Sources of Industrial Water



Perceived Risks: Physical Qlty/Qty

TABLE 1
Perceived Physical Risks

Industry	Risk Rating	Industry Perception of their water risks
Thermal Power		• Committed water allocation from local/central governments during environmental clearance ensuring continuous supply of required amounts of water • Technological advancements like use of closed loop cooling system which uses substantially less water compared to open loop cooling system • Availability of alternate sources of water like sea water for internal operations without affecting the output of the plant or causing any damage to the machinery
Steel		• Committed water allocation from local/central governments during environmental clearance ensure reliable supply of water for their operations • Plants using advanced technology have a much higher productivity in comparison to old plants
Sugar		• Decline in quality and quantity of water that affects the availability of sugarcane for sugar production • Farmers looking for less water intensive crops as an alternate option, increases threat in raw material sourcing • The industry realizes that self-sufficiency is achievable in the manufacturing process if water in sugarcane itself is used optimally

Perceived Regulatory Risks I

TABLE 2
Perceived Regulatory Risks

Industry	Risk Rating	Industry Perception of their water risks
Thermal Power Steel		• Specific water consumption and discharge norms are being adhered to, especially in the plants adopting new technology
Sugar		• Necessary steps are being taken for closure of loop and that all stipulated norms are being achieved
Paper Textiles		• Effects of multiple government regulations - with zero discharge being made mandatory and technology compliance • Restrictions on groundwater abstraction as per the recent CGWA notification
Beverages		• Criticism and global outcry on account of reports of overuse of available water has increased regulatory pressures and believes to be one of the first industries to be hit by stringent policies • Restrictions on groundwater abstraction as per the recent CGWA notification

Perceived Regulatory Risks II

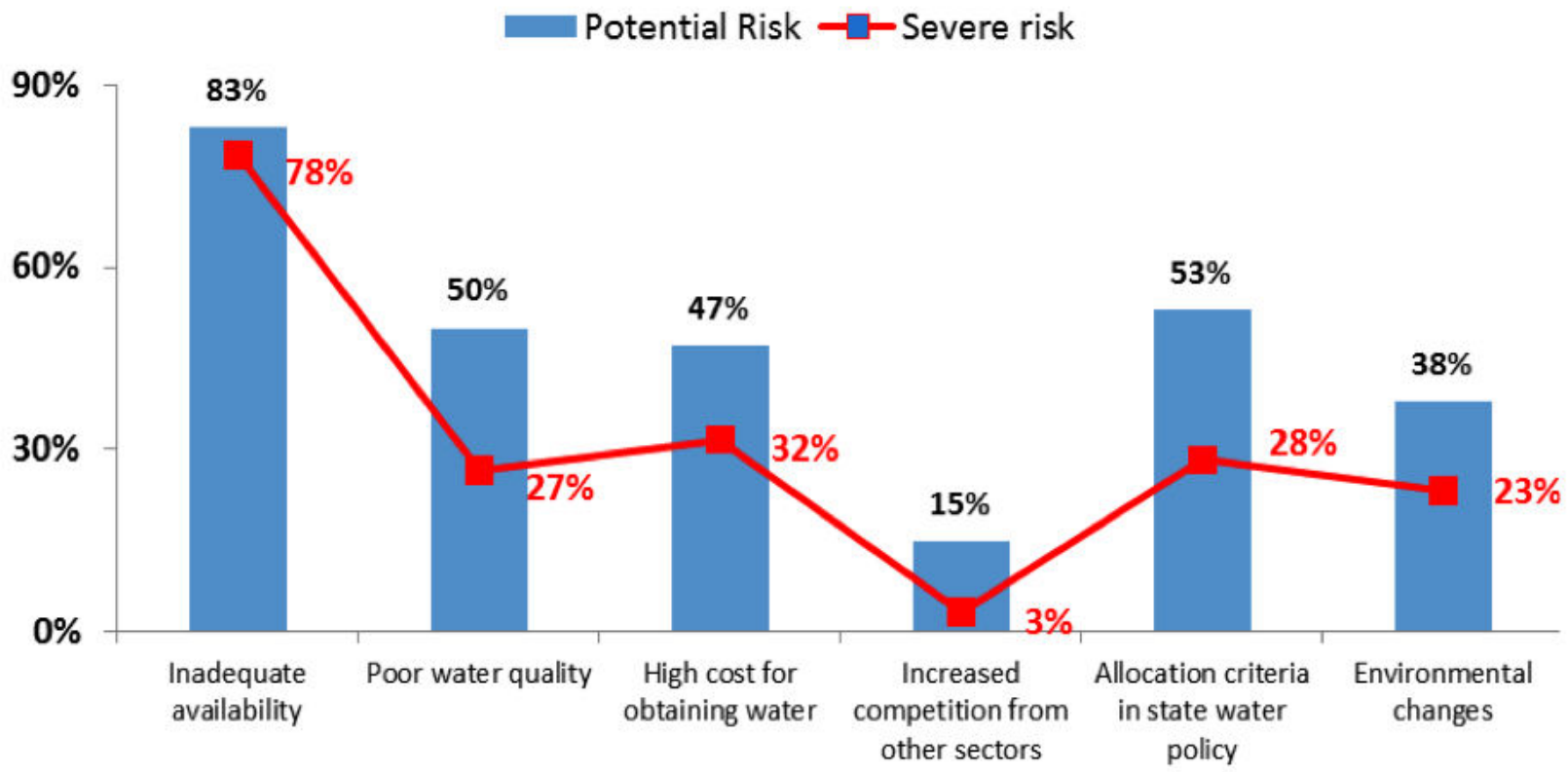
Paper		• Water scarcity and quality continues to remain the points of concern • Droughts have forced mills to shut down operations. To tackle such issues, mills have been forced to create storage reservoirs • Decline in quality of water, specifically in terms of high conductivity (e.g.: River Cauvery) has made it imperative for companies to invest extensively in high-end technologies to make the water usable for operations • Alternative sources of water such as seawater are also not viable options as treatment technologies are cost prohibitive
Textiles		• Non availability of good quality water poses significant risks to the industry's survival • Unavailability of a perennial, surface water source for withdrawal across some of the textile clusters • Pumping groundwater in huge quantities leads to high cost because of high TDS (Total Dissolved Solids) levels • Declining water quality has forced the industry to make substantial investment in high-end technologies, thereby increasing costs of production • Enormous dependency on the availability of agricultural raw material, such as cotton, which in itself is a highly water-intensive crop, dependent on rains and severely impacted by droughts
Beverages		• Usage of fresh water across supply chain, non-availability of a substitute as an input and usage of raw materials like sugar, molasses etc., which are produced from agricultural products poses a high water scarcity risk • Water scarcity in the Cauvery basin impacted the operations of a leading distilleries company that forced them to look for alternate water sources, which increased the overall costs. Quality controversies have necessitated high investments in advanced technologies to treat the input water

Perceived Risks: Reputation

TABLE 3
Perceived Reputational Risks

Industry	Risk Rating	Industry Perception of their water risks
Thermal Power Steel Sugar Paper Textiles		• Across the industries interviewed, the general perception towards reputational risks was low. One of the key reasons cited for this perception was the lack of interest from customers or investors regarding water policies and risks
Beverages		• Increased consumer awareness and conflicts with local communities that have had impacts not just locally but also around the globe Being a water intensive business, investors are concerned about the risks

Water-related Risks to Industry



Current Approaches of Indian Ind.

- Improve Process Technology
- Recycling Wastewater
- Rainwater Harvesting
- Water Use Disclosure
- Water Audits
- Understanding on creating Shared Value

Government Initiatives

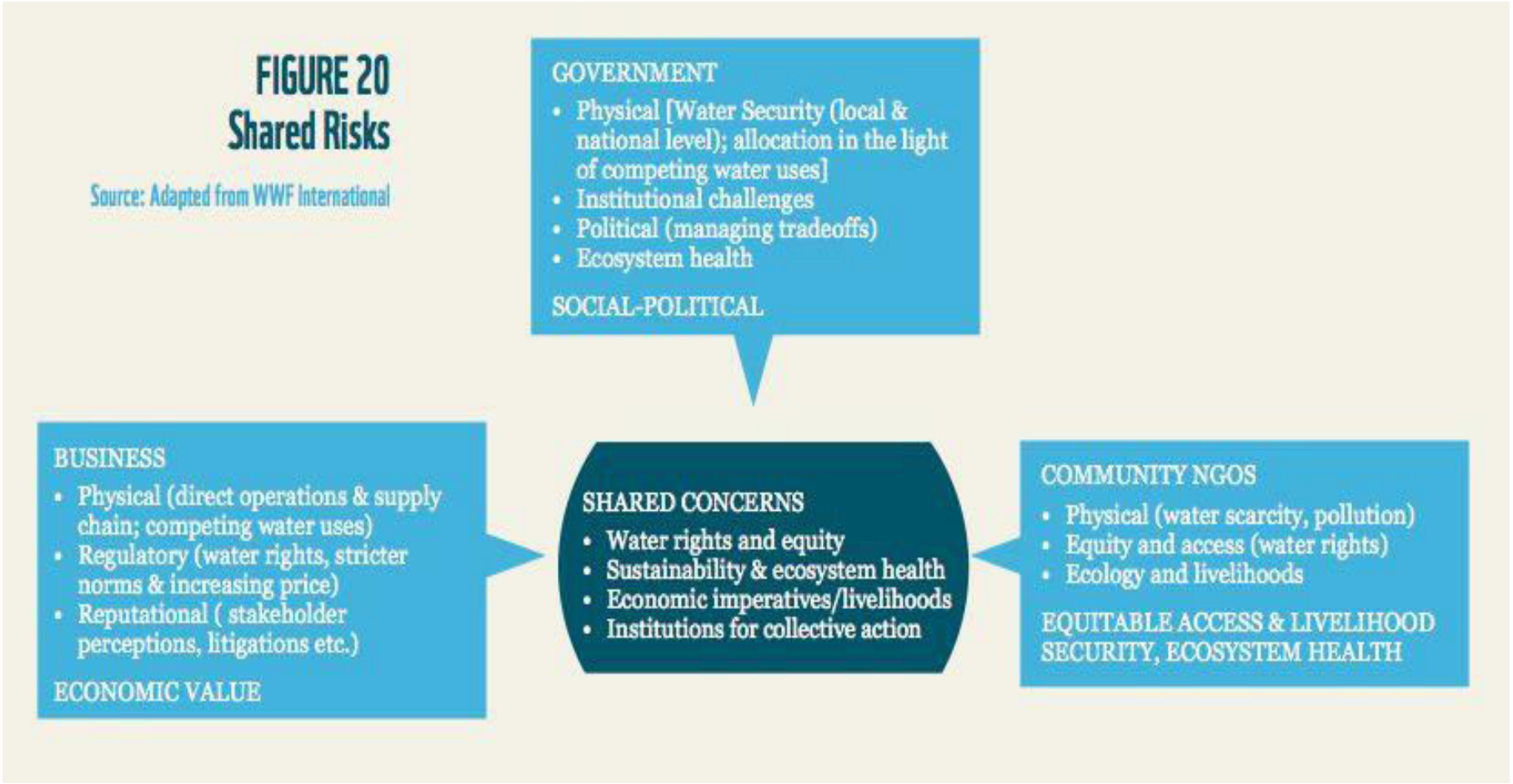
- 12th FIVE YEAR PLAN
- Supreme Court Directive to Dept of Science and Technology: WAR for Water
- Ministry of Water Resources
- Ministry of Urban Development
- Ministry of Rural Development
- Ministry of Environment and Forests
- Ministry of Agriculture
- Ministry of Commerce & Industry
- Central Pollution Control Board
- Central Ground Water Authority
- Water Quality Assessment Authority (apex body set up by MoWR & MoEF)

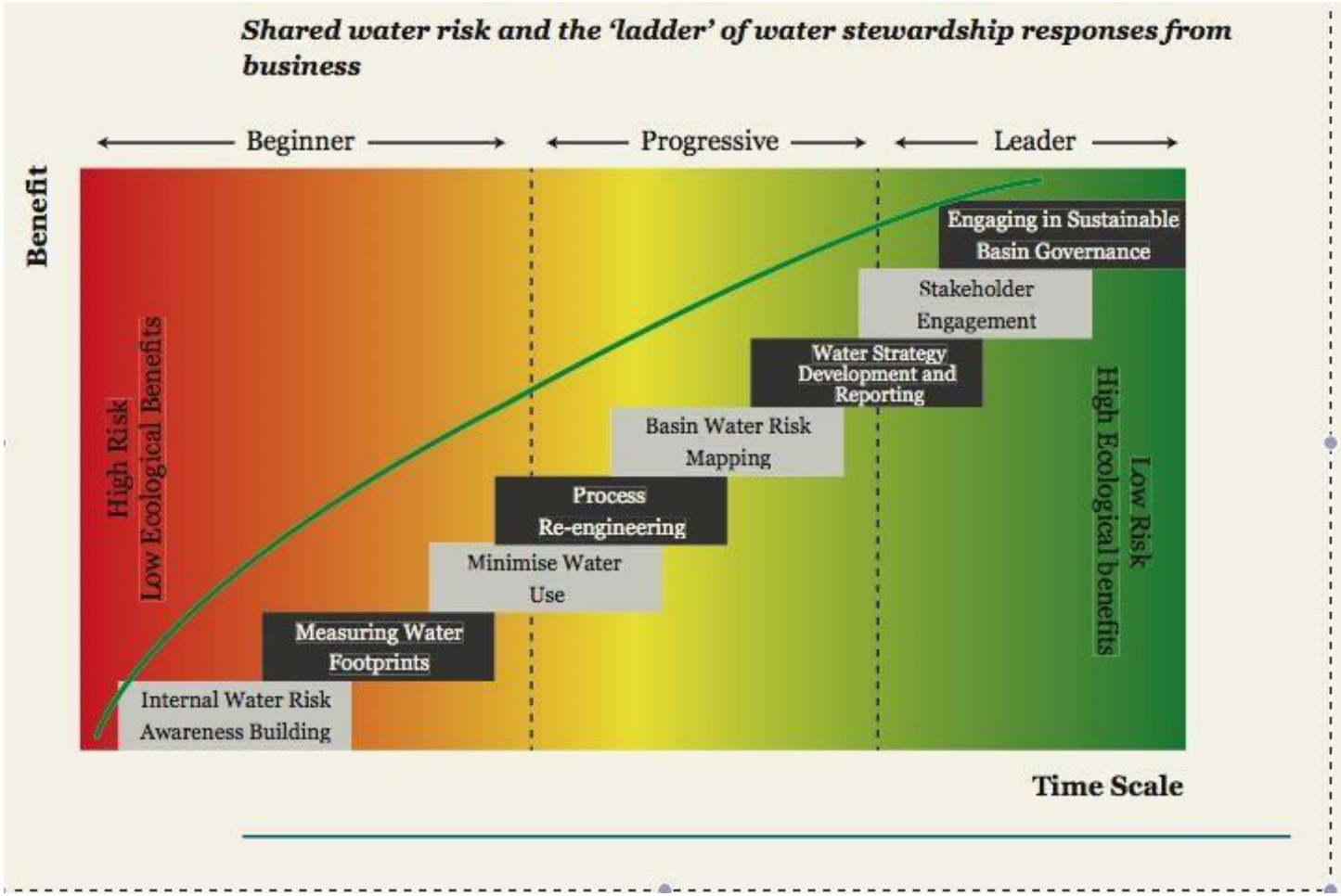
National Bureau of Water Use Efficiency (NBWUE), a Water Regulatory Body

- Water Credit to India Inc Cos adopting water conservation
- Introduction of Water-efficiency tags on home appliances
- Study on Water Usage by various industries
- Corporate Water Footprint (disclose volume of fresh/recycled water; commitment to reduce ft.print)
- Water Audit: tax incentives to cos, qtly/qty of water discharged

Need to advance a solutions-driven dialogue among stake-holders in Indian industry.

Shared Risks




Shared water risk and the 'ladder' of water stewardship responses from business
Beginner
Progressive
Leader
Benefit
High Risk
Low Ecological Benefits
Engaging in Sustainable Basin Governance
Stakeholder Engagement
Water Strategy Development and Reporting
Basin Water Risk Mapping
Process Re-engineering
Minimise Water Use
Measuring Water Footprints
Internal Water Risk Awareness Building
Low Risk
High Ecological benefits
Time Scale

Industry approaches to face water scarcity submitted as part of a knowledge Initiatives Case-study to FICCI Water Mission,
Indian Industry Response - Improving irrigation efficiency

Company	Region	Intervention	Impacts
Coca Cola India Inc.	Rajasthan	Drip and Sprinkler Irrigation – 507 acre	**Water Savings : 1200 cubic metre annually** **Savings on electricity: Rs. 2000 per ha/ year** **Economic benefit: 20-80 % higher yields**
ITC Ltd	8 states - AP, Bihar, Karnataka MP, Maharashtra Raj, TN and UP	Watershed development programmes	**Watershed development programme – 90,000 ha; 756 water user associations, maintain funds!** **Civic work generated 2.6 million person** **Impacted 90,000 households**
Pepsico India	Punjab, Maharashtra	Direct seeding of paddy (DSP) – 14,000 acre Drip irrigation (DI) for potato – 4,150 acre	**Water savings – 11.2 billion litres (DSP) and 0.9 billion litres (DI)** **Savings on electricity (200 units per acre), man days (10 man days per acre), 75% less methane emission.** **20-40% higher yields**
Columbia Water Centre (CIPT)	Punjab, Gujarat	Developing low cost tensiometer and better irrigation scheduling	**Adopted by 525 farmers** **Water savings in the order of 22 per cent per acre**
Monsanto	Across India	Drip irrigation – 2285 acre	**Water Savings - 49,78,285 – 817,029 – KLD**

eg. Low-cost prefabricated Tensiometer for testing soil moisture in fields

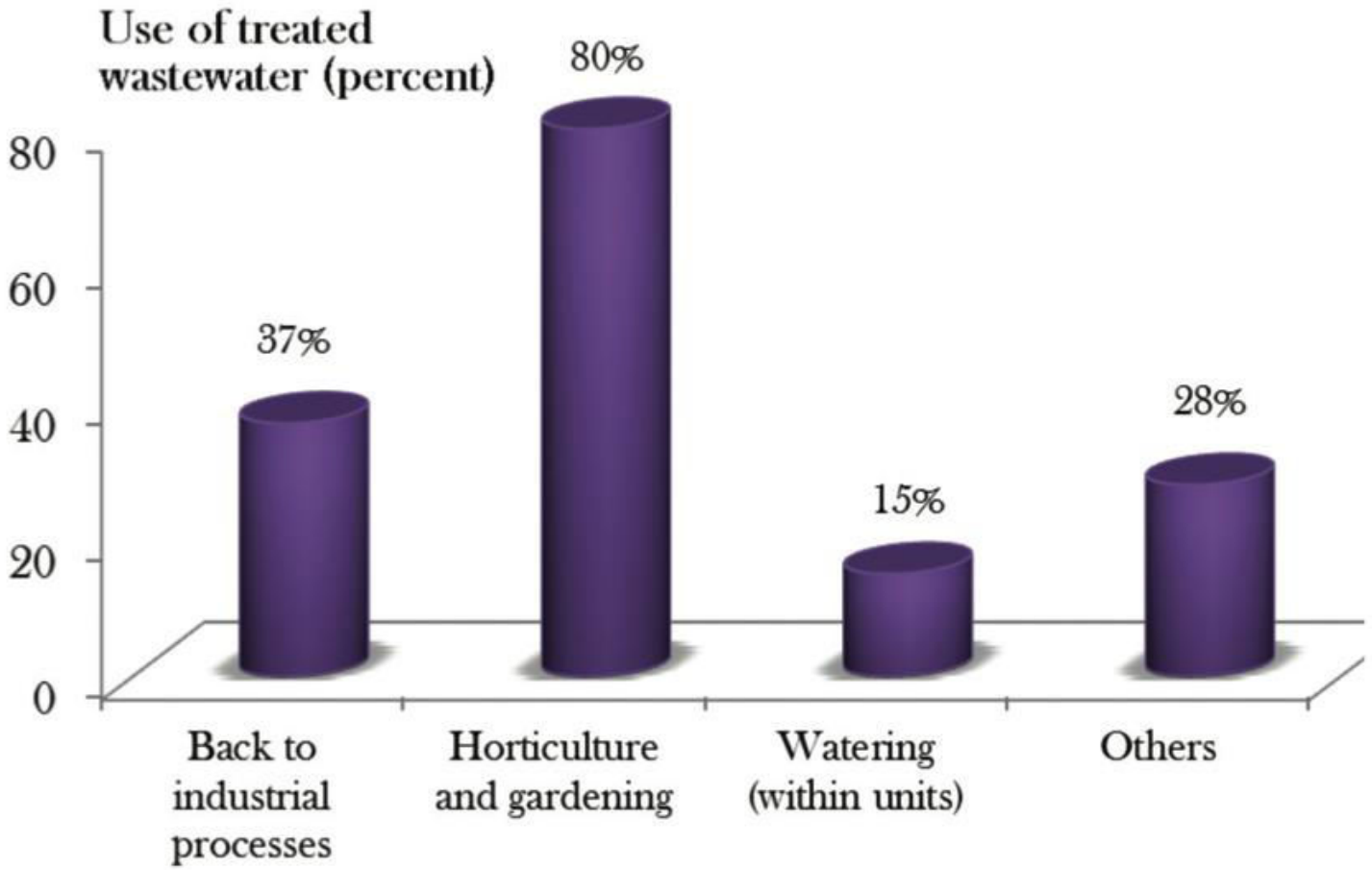
Industry Response:Water Conservation in Thermal Power Projects

Company	Region / Capacity	Intervention	Impacts
Essar Power	Hazira, Surat – 515 MW	Increase CoC Waste water recycling and use Recharge	**Water Savings : 11,03, 000 KL per annum**
Adani Power	Mundra, Kutchh – 4620 MW	ETPs, STPs, Coal runoff treatment (660 MW commissioned)	**Water Savings : 7,84, 000 KL per annum**
Jindal Power	Raigad Dist Chhattisgarh – 1000 MW	Waste water treatment and usage for ash handling	**Water Savings – 65,000 KL per annum**
NTPC	Singrauli, MP – 3260 MW	Reducing specific consumption of water in cooling towers - 2.5 to 1.5 WW recycling and reuse Plugging leakages	**Specific water consumption lowered to 4.80 m^3/MW**
TATA Power	Jamshedpur	Optimizing water usage in ash handling WW treatment	**Total Water Saving 12,77 million litre per annum**

INDUSTRY RESPONSE: Chemical Industries

Company	Region	Intervention	Impacts
Chemplast Sanmar Limited	Mettur Dam, District-Salem, Tamil Nadu	Use of treated sewage water to cooling tower Zero Liquid Discharge and other water saving measures	**Total Water Savings : 103,840 KL per annum**
Jubilant Life Sciences Ltd.	Gajraula, District – Jyotiba Phule Nagar, Uttar Pradesh	Optimising Cycle of Concentration (COC) of cooling towers Recycling of steam condensate after heat recovery as a substitute of soft water Rainwater harvesting	**Total Water Savings : 1,677,996 KL per annum**
LANXESS India Pvt. Ltd.	Jhagadia, District - Bharuch, Gujarat and Nagda, District - Ujjain, Madhya Pradesh	Recycling of sewage water Sprinkler system for gardening Self-closing taps	**Total Water Savings – 30,627 KL per annum**
Solvay Specialitites India Pvt. Ltd	Panoli, District - Bharuch, Gujarat	Groundwater remediation (ACQUA project) Waste minimization program implementation (RIPPLE project) Reverse osmosis project (RO)	**Total Water Savings – 1,92,000 KL per annum**
Tata Chemicals Limited	Mithapur, District – Jamnagar, Gujarat	Water pinch- Sea Water as raw material Internal Water generations (Weak Liquor Distiller Still, Make up Water Plant etc.)	**Total Water Savings – 5,560,497 KL per annum**

Use of Treated Waste Water



eg. Water Purification

Recycling Wastewater for non-potable use

Recharging Acquifiers through Rainwater Harvesting

27 Industrial Sectors Surveyed
Agriculture & Food Processing
Automobile & Automotive
Banking
Cement
Chemicals/Fertilizers/Petrochemicals
Education
Electronics
Engineering & Construction
Fast Moving Consumer Goods (FMCG)
Health Care Diagnostic
Horticulture
Hospitality
Information Technology (IT)
Infrastructure
IT Services
Manufacturing
Metals and Mining
Mobile Manufacturing
Oil & Gas
Petroleum and Natural Gas
Pharmaceutical & Life Sciences
Power & Power Transmission
Real Estate
Steel
Textile & Machineries

FICCI – Columbia Univ Water Center (CWC) Joint survey of 27 Industrial Sectors to

- Gauge the industrial perceptions and impacts pertaining to water-climate risks/challenges,
- Identify major risks
- Response to risks
- Which sectors were most affected

For Water security decisions and the long-term Industrial Water Policy in India.

MEGA TOXICITIES

Polluted air doesn't just make you cough, wheeze and sicken. It kills. There's even an estimate for the number of people stricken dead by just breathing: 6.2 lakh

Future of Industrial Water Management in India

WVLN approach is timely, appropriate

Water scarcity is a fundamental challenge to India's Economic and Social Development. Industry will need to adopt a *Total Resource View* where water is seen as a key, cross-sectoral input for Growth, together with a mix of optimal technical approaches for sustainable water sector reforms.

Any strategy to achieve water resource security must be a *joint effort* --integrated with broader economic decision-making-- involving Governments and their affiliated Organisations, Investors, NGOs, and Water Users in Agriculture, Industry and civil society.

Water is Everyone's Business