

Water Use Efficiency (WUE)

Introduction to WUE



THE ENERGY AND
RESOURCES INSTITUTE

Creating Innovative Solutions for a Sustainable Future



ENERGY



AGRICULTURE



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HABITAT



RESOURCE
SECURITY

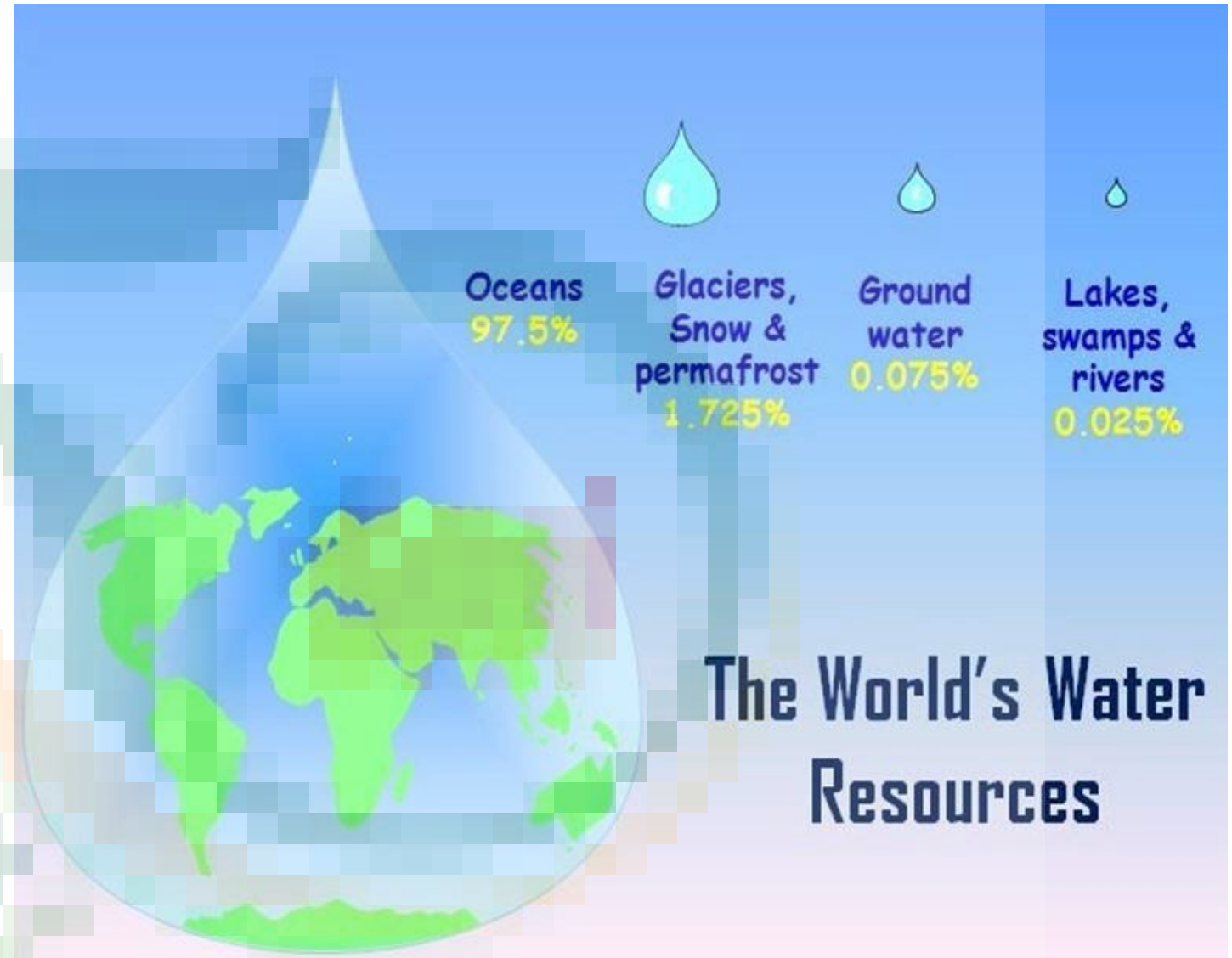


CLIMATE



HEALTH
& NUTRITION

- Sources of water for usage:
- Ground water
- Surface water (rivers, lakes, etc.)
- Rainfall
- Sea water - desalination
- **Glaciers**

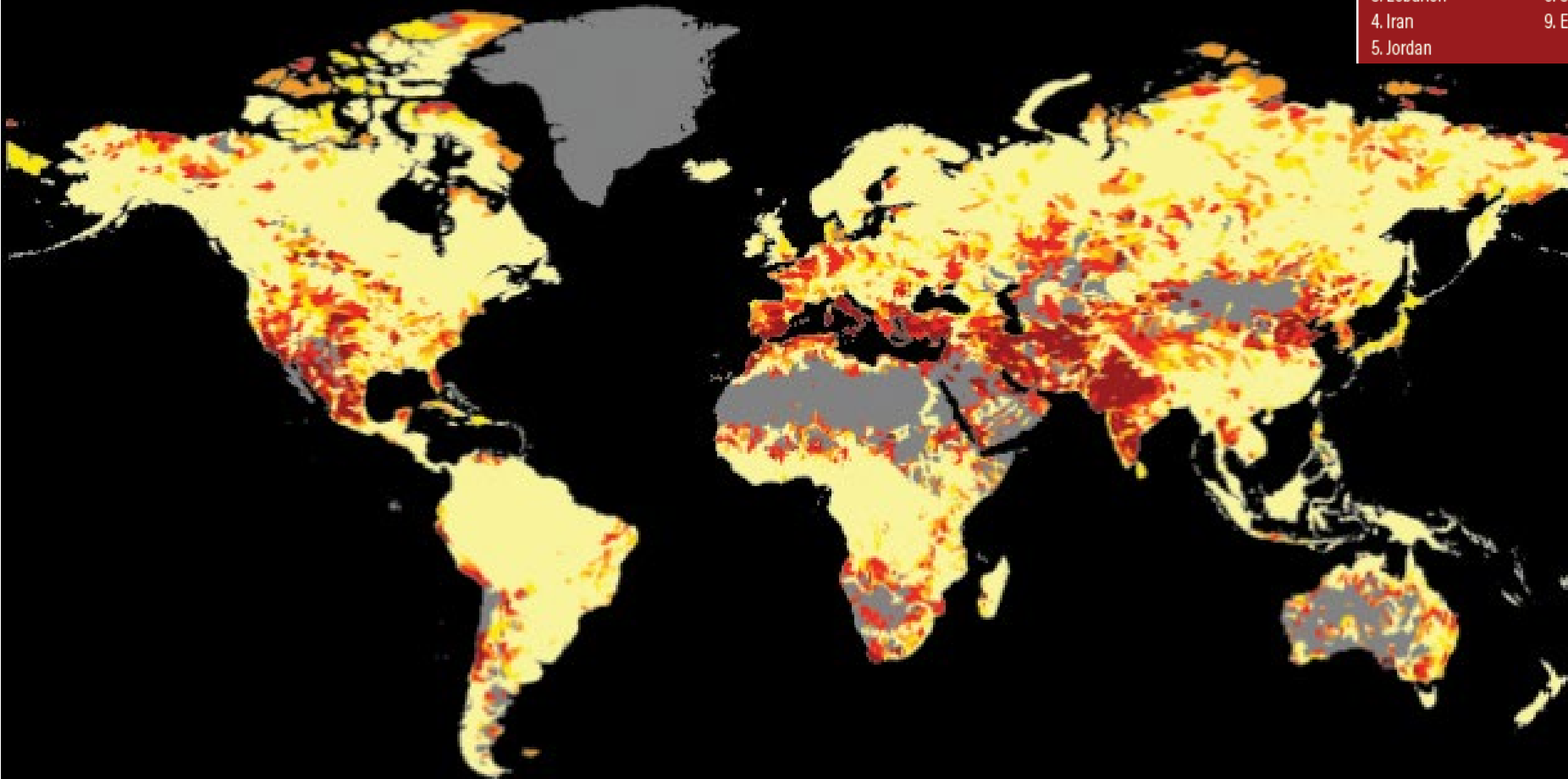


BASELINE WATER STRESS



EXTREMELY HIGH BASELINE WATER STRESS

- | | | | |
|------------|-----------------|--------------------------|------------------|
| 1. Qatar | 6. Libya | 10. United Arab Emirates | 14. Pakistan |
| 2. Israel | 7. Kuwait | 11. San Marino | 15. Turkmenistan |
| 3. Lebanon | 8. Saudi Arabia | 12. Bahrain | 16. Oman |
| 4. Iran | 9. Eritrea | 13. India | 17. Botswana |
| 5. Jordan | | | |



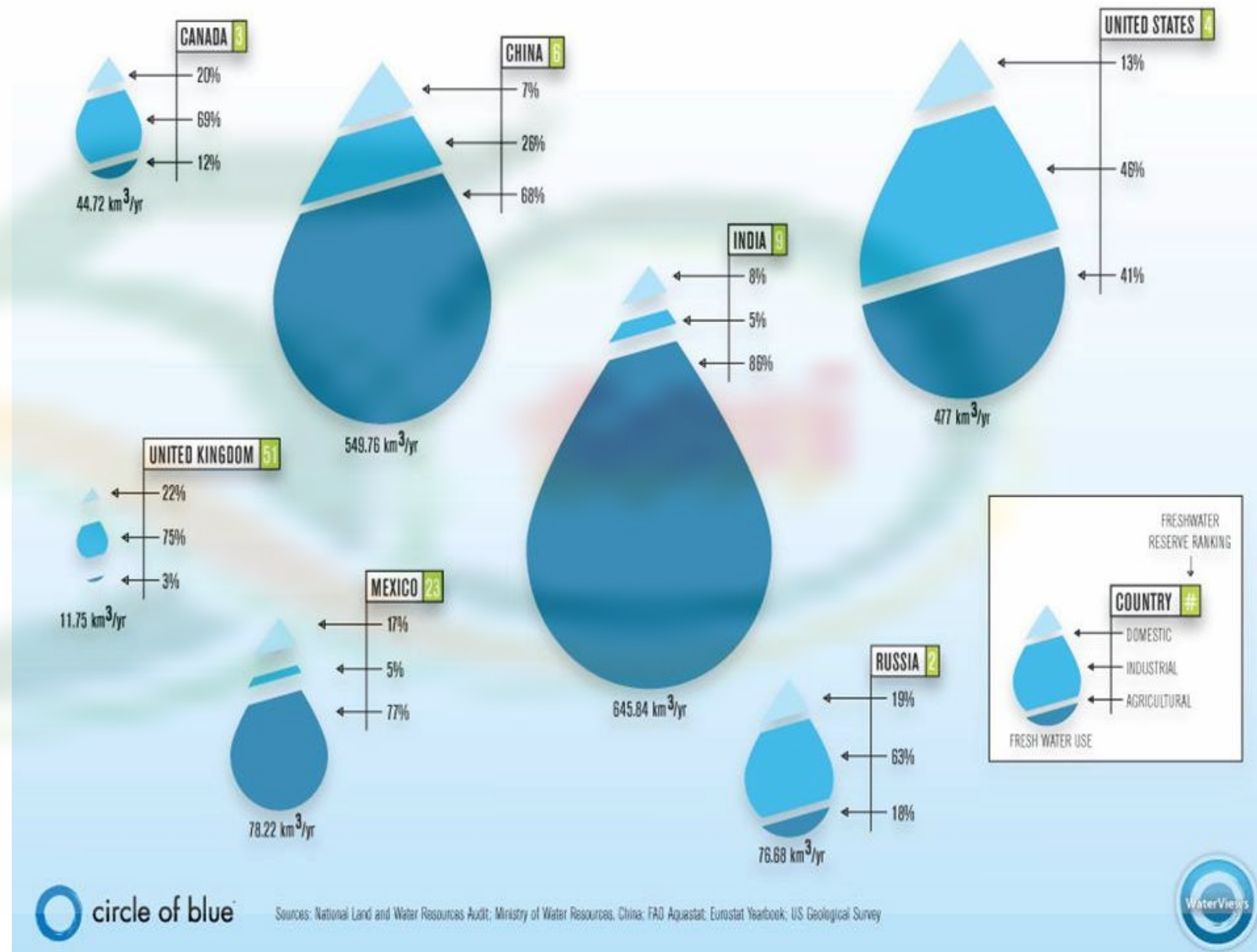
- **Declining per capita water availability**
- **Water stressed river basins**
- **Increasing & competing water demand**
- **Overexploitation/Depletion of groundwater**
- **Water quality issues**
- **Inefficient use of water: Agri/ Irrigation; Domestic (Urban & Rural); Industrial**
- **Climate change impacts**
- **Irrational Tariff, inequitable access**

SECTORAL WATER USE

A faint, stylized diagram of the water cycle is visible in the background. It shows a large green cloud at the top, with a blue line representing a river or ocean at the bottom. A yellow line indicates evaporation or transpiration, and a red line indicates precipitation or condensation.

Three main sectors for water use:

- Agriculture
- Industry
- Domestic



Types of irrigation:

- Flood irrigation
- Furrow irrigation
- Micro irrigation:
 - Drip
 - Sprinkler

Main water intensive crops grown:

- Rice
- Cotton
- Sugarcane



Water using industries:

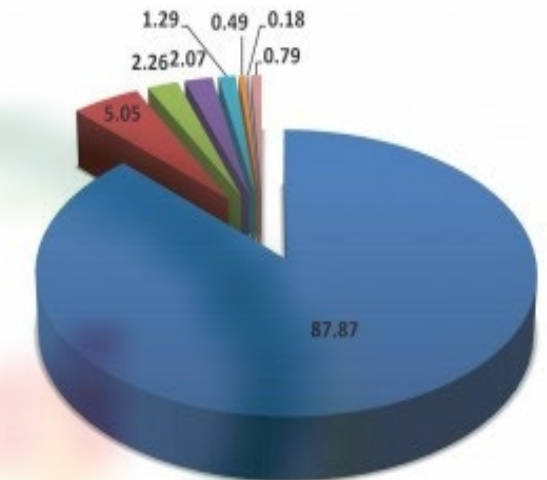
- Thermal power plants
- Heavy engineering
- Pulp & paper
- Textiles
- Steel

Main areas where water is used

- Process water
- Cooling Process
- Domestic



Proportion of water consumed in industry (In %)



- Water uses in a household:
- Bathing: 55 litres
- Toilet flushing: 30 litres
- Washing of clothes: 20 litres
- Washing the house: 10 litres
- Washing utensils: 10 litres
- Cooking: 5 litres
- Drinking: 5 litres



INTRODUCTION TO WATER AUDITS

“Water Audit is a quantitative and qualitative analysis of water consumption/use to identify losses and options for water conservation by means of recycling and reuse of water.”

Benefits of Water Audit:

- Helps in conserving water
- Reduce wastage and unnecessary use
- Financial savings

Significant savings in water usage by simple water conservation measures

Sl. No.	Water Use and methods	Efficiency (%)
a	Irrigation efficiencies	
	• Conveyance	
	– through unlined canal for surface water	55-60*
	– through lined canal for surface water	70-75*
	• Application for both surface and ground water	
	– Flood irrigation	65
	– Furrow irrigation	80
	– Sprinkler	85
	– Drip	90
	• Overall efficiency for surface water system	30-65
	• Overall efficiency for ground water system	65-75
b	Urban water supply	50-60
c	Rural water supply	60-70
d	Industrial use	80

*Conveyance efficiency of the canal depends on many factors such as length of the canal, type of soil, material used for lining etc.

Source: Guidelines For Improving Water Use Efficiency in Irrigation, Domestic & Industrial Sectors, CWC (2014)

For efficient industrial water use:

- Better technologies
- Wastewater recycling
- Tapping leakages
- Water conservation (RWH, GW recharge)

For efficient irrigation:

- Drip & Sprinkler systems
- Crops suitable to the area should be grown (e.g., Rice in East & North – eastern India)

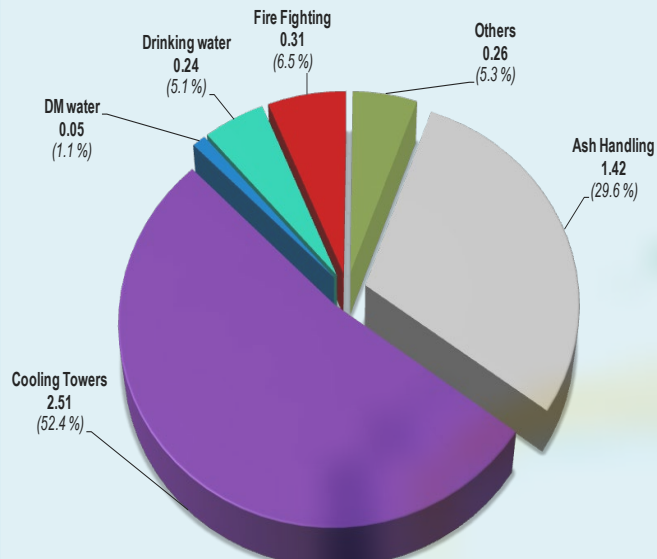
For efficient domestic water supply/usage:

- Reduction in Non-Revenue Water (NRW)
- Water conservation
- Reclamation and reuse of wastewater

EXAMPLES FROM EXPERIENCE

Industries (TPP, Heavy Engineering, Pulp & Paper, etc.)

Specific Water Consumption (Overall for VSTPS)
(m³/MW)



Thermal Power Plants: The potential of daily water saving was about **18% to 23% of intake water** (e.g. *Actual reduction from 4.8 m³/MW to 3.2 m³/MW*)

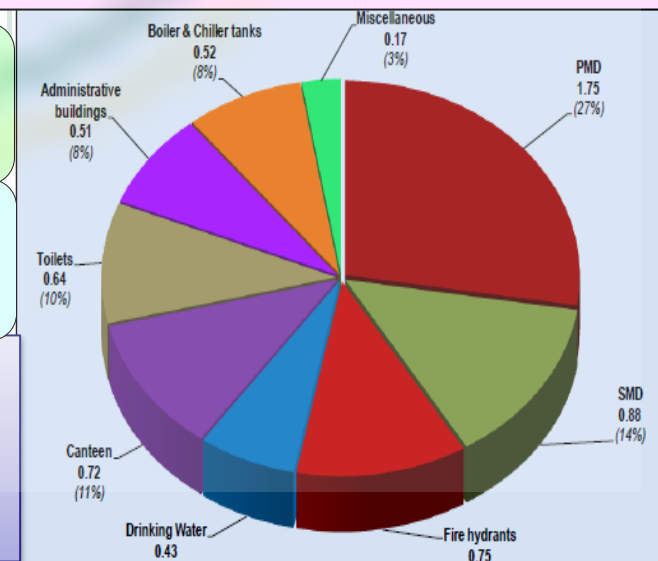
Heavy Engineering: Water Saving Potential = **46.8 % of Intake Water** (675 m³/day)

Healthcare (GSK): (Water footprint reduction in value chain-Wheat, Barley, Milk); Water saving potential of **20.69 MCM** (e.g., *RT/RWH, Farm Ponds, Artificial recharge of GW, Drip/ sprinkler irrigation*)

Tobacco Industry: Water saving potential – about **55 m³/day** (~ **22.2% of the freshwater intake**)

IT Industry (WIPRO): Water saving potential – about **638 m³/day** (~ **43% of total plant water consumption**)

Railways: Recycling Wastewater can **save ~0.23 MLD water at one cluster of washing line**. (Overall recycling wastewater could save ~**1-2 MLD water** (almost **45%-60% of demand-supply gap** of fresh water))





Thank You