WATER CONSERVATION

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Water footprints and Virtual water

A rough measure of the volume of fresh water that we use directly and indirectly to keep us alive and to support our lifestyles

Accordingly to Eco-Business report, While India's water footprint — 980 cubic meters per capita – ranks below the global average of 1,243 cubic meters, its 1.2 billion people collectively contribute to a significant 12 per cent of the world's total water footprint.

This number, say experts, is simply not sustainable and urgent measures need to be adopted by the government, corporates and citizens to optimally manage this fast dwindling precious resource.

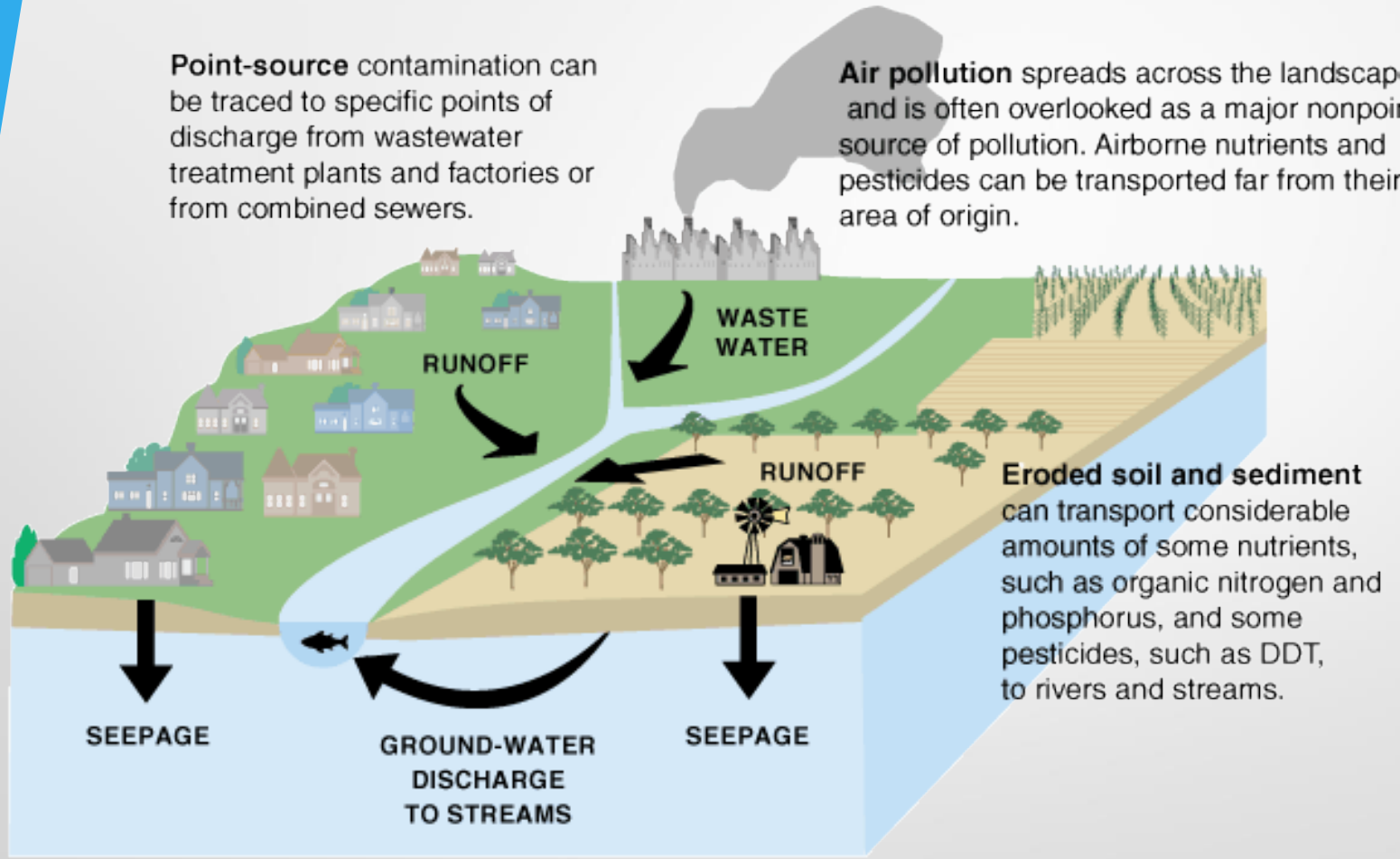
India has four per cent of the world's water which has to cater for 16 per cent of the world's population, says a 2013 report *Sustaining India's Water Resources* by the Carbon Disclosure Project. This requirement will, it states, lead to a steady shrinking of per-capita availability.

VIRTUAL WATER

Water that is not directly consumed but is used to produce food and other products is called **virtual water**, and it makes up a large part of our water footprints, especially in more-developed countries. Figure 13-A shows examples of the amounts of virtual water used for producing and delivering products. These values can vary, depending on how much of the supply chain is included, but they give us a rough estimate of the size of our water footprints.

Because of global trade, the virtual water used to produce and transport the wheat in a loaf of bread or the coffee beans used to make a cup of coffee (Figure 13-A) is often withdrawn as groundwater or surface water in another part of the world. For some countries, it makes sense to save real water by importing virtual water through food imports, instead of producing all of their food domestically. Such countries include Egypt and other Middle Eastern nations in dry climates with little water. Five countries—the Netherlands, Jordan, the United Kingdom, Japan, and South Korea—depend on virtual water imports for more than 62% of their water needs.

Water quality : Point-source and Non-point source




Catchment Water Quality Management
WATER CYCLE
Condensation
Evaporation
Transpiration
Rainfall
Run-off
Infiltration
Storage
Streamflow reduction activity
Irrigation with waste
Treated water
Waste water treatment works
Abstraction
Aquatic ecosystem
Industrial discharge
Impeding the flow
Industry
Disposal of heated water
Power station
Mining operations
Discharge of water found underground
Recreation
Recreation
Altering the banks of a watercourse
Agriculture
Borehole
Drinking water
Nitrates and other agrochemical pollution
Industrial pollution and solid waste disposal
Domestic
11 Water uses
5 Water users
Potential impacts
Water Quality Management
For more information contact Tel: (012) 336 7542 www.dwaf.gov.za/dir_wqm

Water conservation

- Decreasing run-off losses.
  - Contour cultivation
  - Conservation bench terracing
  - Water spreading
  - Chemical wetting agents (surfactant)
  - Surface crop residues
  - Chemical conditioners like gypsum, HPAN-Hydrolysed Polyacrylonitile
  - Water storage structures

- Reducing evaporation losses
  - Eg. A co-polymer of starch and acrylonitrile called "**super slurper**" – absorbs water upto 1400 times its weight.
- Storing water in soil
- Reducing irrigation losses
- Re-use of water
- Preventing the wastage of water
- Increasing block pricing

Rain Water Harvesting

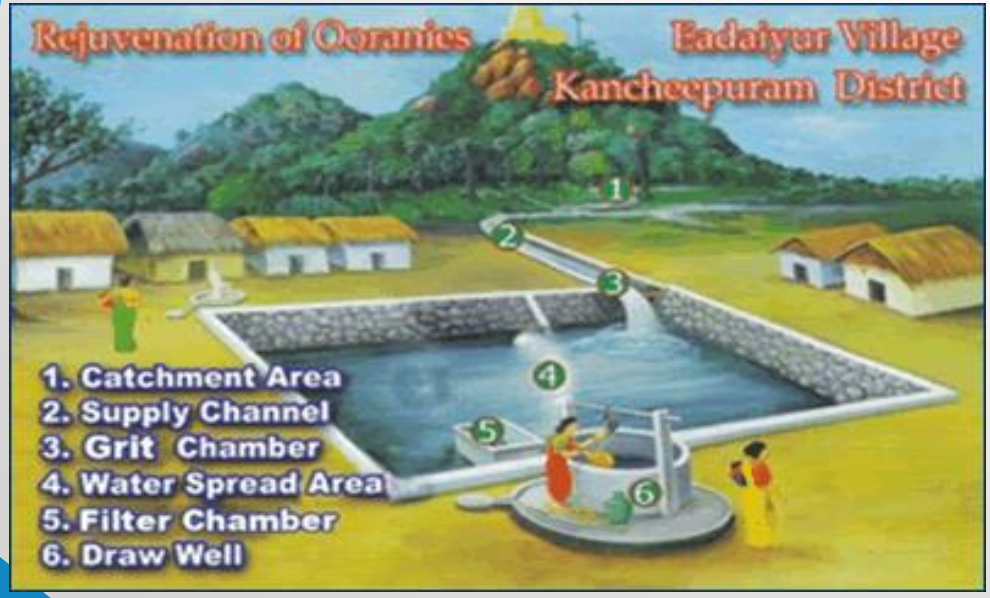
- Rain water harvesting is a technique of increasing the recharge of groundwater by capturing and storing rain water.
- This is done by dug-wells, percolation pits, lagoons, check dams etc..
- The annual average rainfall in India is 1200mm. (Jun-Sep)
- **Cherapunji** second highest rainfall as 11000mm.

Objective of rain water harvesting

- To reduce run off loss
- To avoid flooding of roads
- To meet the increasing demands of water.
- To raise the water table by recharging the ground water.
- To reduce ground water contamination.
- To supplement ground water supplies during lean season.

Harvesting methods

- To store in big tanks, reservoirs above or below the ground.
- Constructing pits, dug-wells, lagoons, trench etc
- By recharging the ground water.



Traditional rain water harvesting

- In Himalayas, The foot hill people use hollow bamboos as pipelines to transport the water of natural springs.
- In Rajasthan, 'Tankas'- underground tanks.
- Khadins – embankment
- In ancient times, talaabs, Baawaris, Johars, Hauz etc……

Modern Techniques of Rain Water Harvesting

Magsaysay award

- checks dams made of any native material, like rocks, plants, loose rocks…..
- They constructed for harvesting runoff from large catchment's area.
- Rajendra Singh of Rajasthan popularly known as "Water man"

Roof Top Water Harvesting

- Low cost
- Effective technique for urban and rural areas.
- Recharge the aquifer.
- Improves groundwater quality by dilution
- Improves soil moisture.
- Reduces soil erosion by minimizing the runoff water.

Watershed Management

- The land area drained by a river is known as the **river basin**.
- Thus watershed is defined as the land area from which water drains under gravity to a common drainage channel.
- Ranges from **few KM to 1000 Kms** in size.
- The management of watersheds treating them as basic fundamental unit.
- Was adopted in 1949 by **Damodar Valley Corporation.**

Watershed degradation

Objective of Watershed Management

- To rehabilitate the watershed through proper land use.
- To manage the watershed for beneficial development activities.
- To Minimize the risks of floods, droughts, and landslides.
- To develop rural areas in the region with clear plans.

Watershed Management Practices

- Water harvesting
- Afforestation and agroforestry
- Mechanical Measures for reducing soil erosion and runoff
- Scientific mining and quarrying
- Public participation.

Resettlement and Rehabilitation Issues

- Displacement problems due to dams.
  - Hirakund dam has displaced more than 20,000 peoples residing in about 250 villages.
  - Bhakra Nangal Dam was constructed during 1950's – Rehabilitate was not done till now.
  - Tehri Dam on river Bhagirathi.(3 decade) long compaign - Sunderlal Bahuguna the propagator of chipko movement.
  - 10,000 residents of tehri town.
  - Displacement due to mining.

Tehri Dam

Conserve Water

Thank You