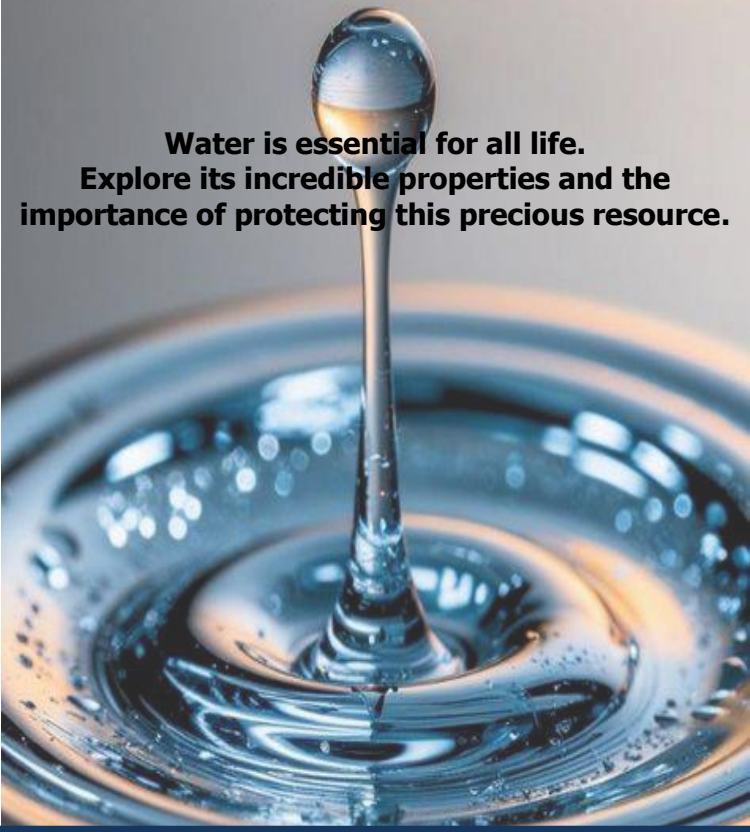
Miracle Water
The Lifeblood of Earth

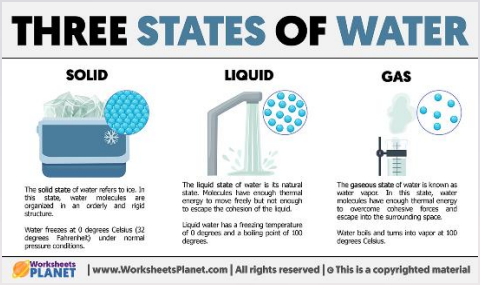


Water is essential for all life.
Explore its incredible properties and the importance of protecting this precious resource.

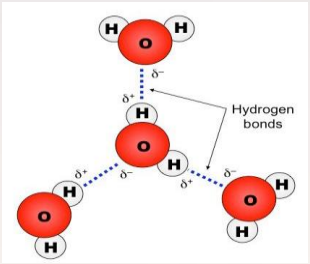
Celebrating World Science Day 2024

National Research Council (NRC)
in collaboration with
the National Institute of Fundamental Studies (NIFS)

The Unique Properties of Water



Hydrogen bonds:
Create unique structures that support life, from protein folding to cellular functions.



Water's anomaly: Water shrinks when heated from about 0°C to 4°C. The hydrogen bonds in ice create a caged structure that takes up more space, causing a decrease in overall density. As water warms up from freezing, these bonds weaken, causing the molecules to move closer together, reducing the volume. Once water reaches 4°C and above, it follows the typical behavior of liquids expanding as it heats up.

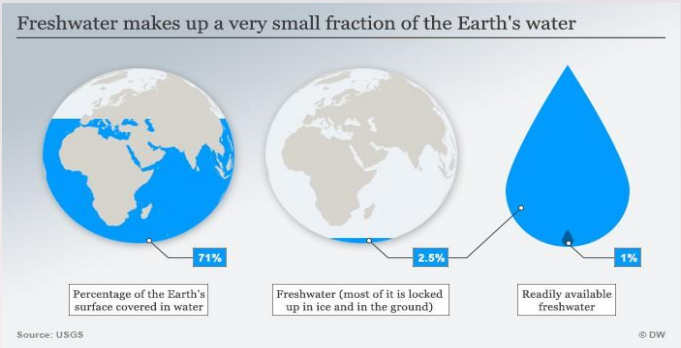
Universal Solvent: Water dissolves almost anything, making it crucial for biological processes.

A Key to Innovation: Research into behavior of water could lead to breakthroughs in new technologies.

E.g.: Stanford University Researchers[1] have built a synchronous computer that operates using the unique physics of moving water droplets.

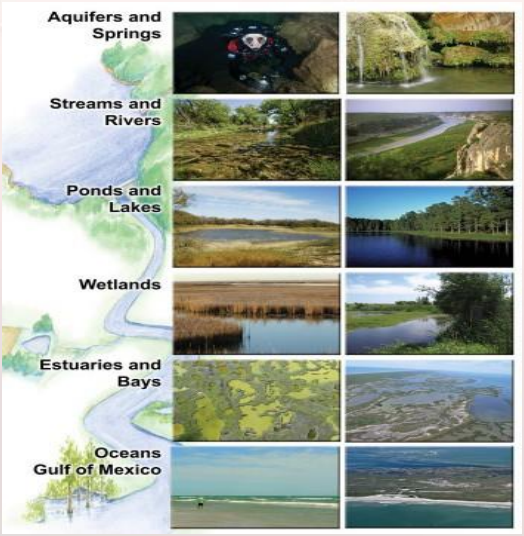
The Global Water Crisis

Finite Supply: Despite covering over 70% of the Earth's surface, only 2.5% of Earth's water is freshwater.



Under pressure: Pollution, overuse, and climate change are putting pressure on our water supplies.

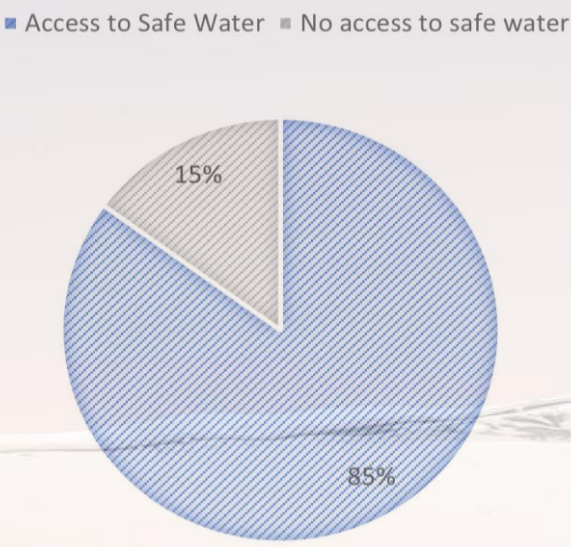
Shared resource: Belongs to the entire world from streams and creeks to rivers, lakes, oceans, and waterfalls.

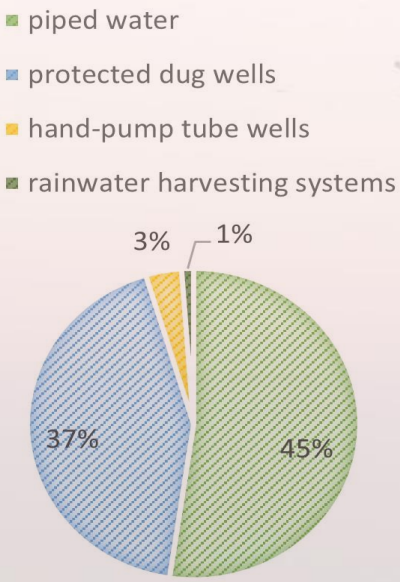


Water in Sri Lanka

Abundant, yet Uneven: Sri Lanka has diverse water resources, but water distribution is uneven, causing stress in certain areas.

Access to Safe Water:





Innovative Water Solutions

Water Desalination – a new paradigm:
Research: Developing tunable membranes for water desalination, improving water quality using Sri Lankan graphite.
Complies with "Water for All by 2025, Govt. of Sri Lanka" and the "UNSDG 6: Clean Water and Sanitation"

Method: Pseudo-tunability in membrane for water desalination by a unique reverse osmosis and nano membrane topology network without adding external chemicals.

Withstand nearly 100% fluctuations in TDS while consistently deliver treated water of predefined quality.

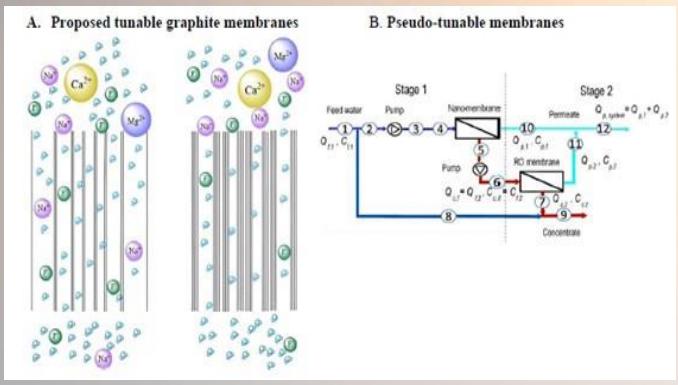
Over 95% of the feed water was utilized for community use in compliance with the UNESCO Water, Sanitation and Hygiene (WASH) program.

Routine maintenance & operation of treatment plant conducted by using mobile phone-fabricated controller

Data is added to the cloud system via a 4G signal transmission

The database, which contains big data, will optimize operational processing using a data mining algorithm

Funding agency: National Research Council



Remember: Water is Life. Protect it.

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NRC TO 16-015 Research Grant, National Institute of Fundamental Studies, Sri Lanka

References:

1. http://www.nature.com/nphys/journal/vaop/ncurrent/full/nphys3341.html
2. https://www.unesco.org/reports/wwdr/en/2024/s

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