Water Scarcity and the Construction Industry: Implementation of Alternative Sources of Drinking Water for Civil Works

- Universidad Tecnológica Nacional, Facultad Regional Paraná, Civil Engineering Department, Inglés I
- Valentina Bonell and Eliana Canova

- English II - 2023

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Introduction

Drinking water demand

- Limited resource

- Inefficient use

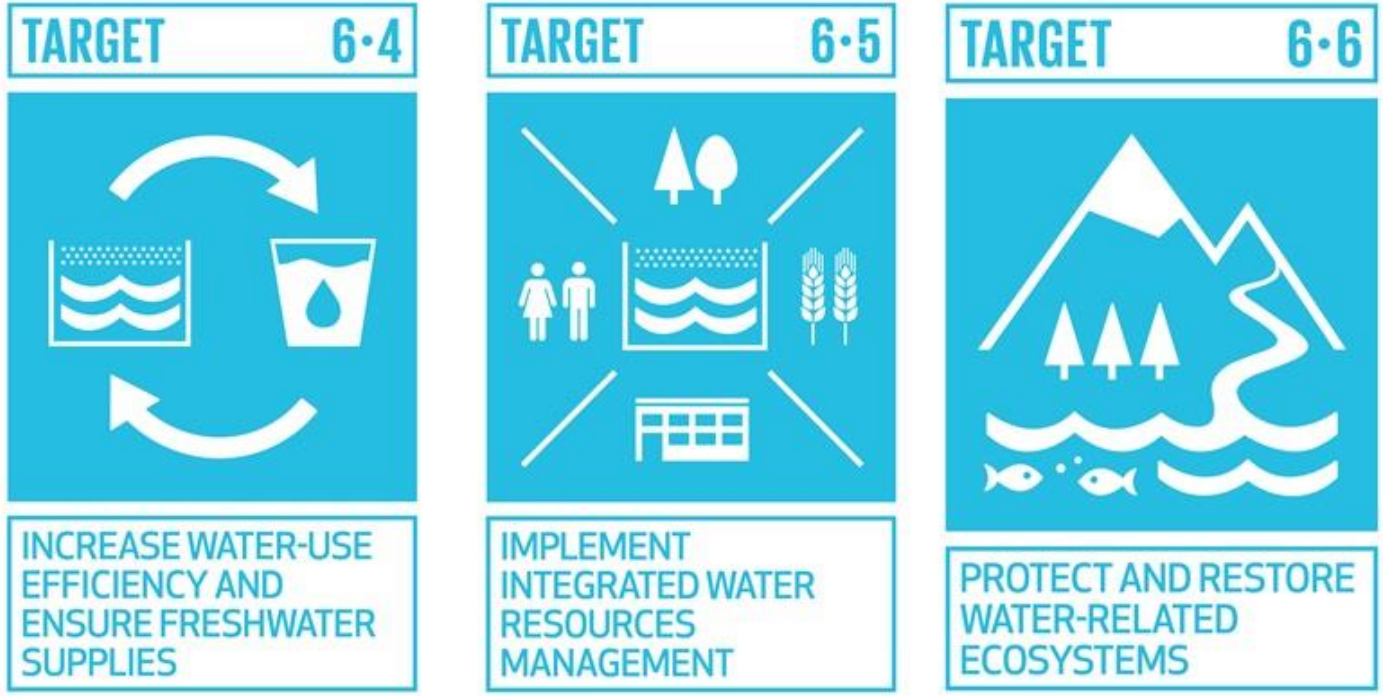
Introduction

6 CLEAN WATER AND SANITATION

Ensure availability and sustainable management of water and sanitation for all

Introduction

6 CLEAN WATER AND SANITATION



Introduction

6 CLEAN WATER AND SANITATION

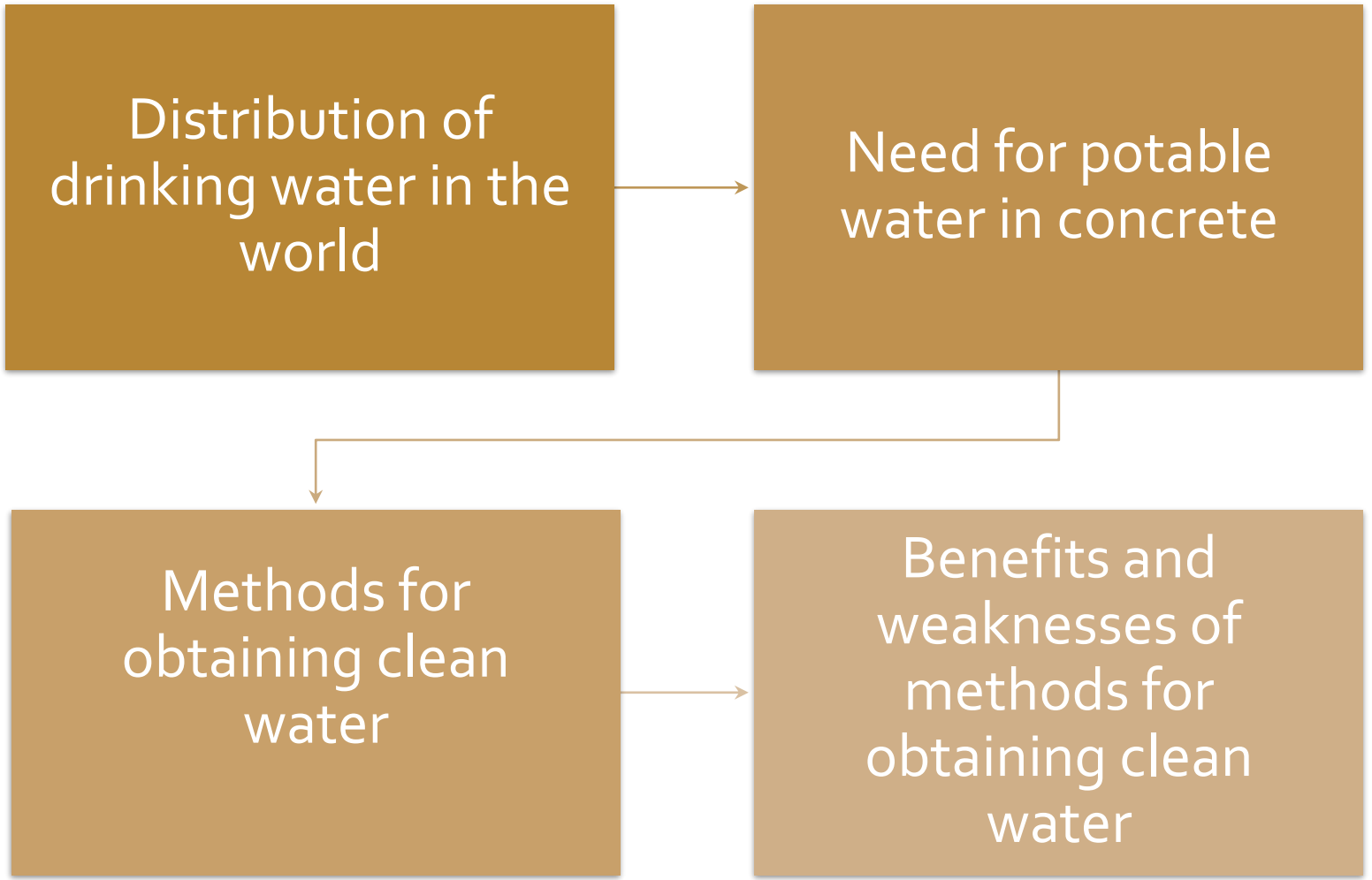
Introduction

New alternatives to obtain drinking water

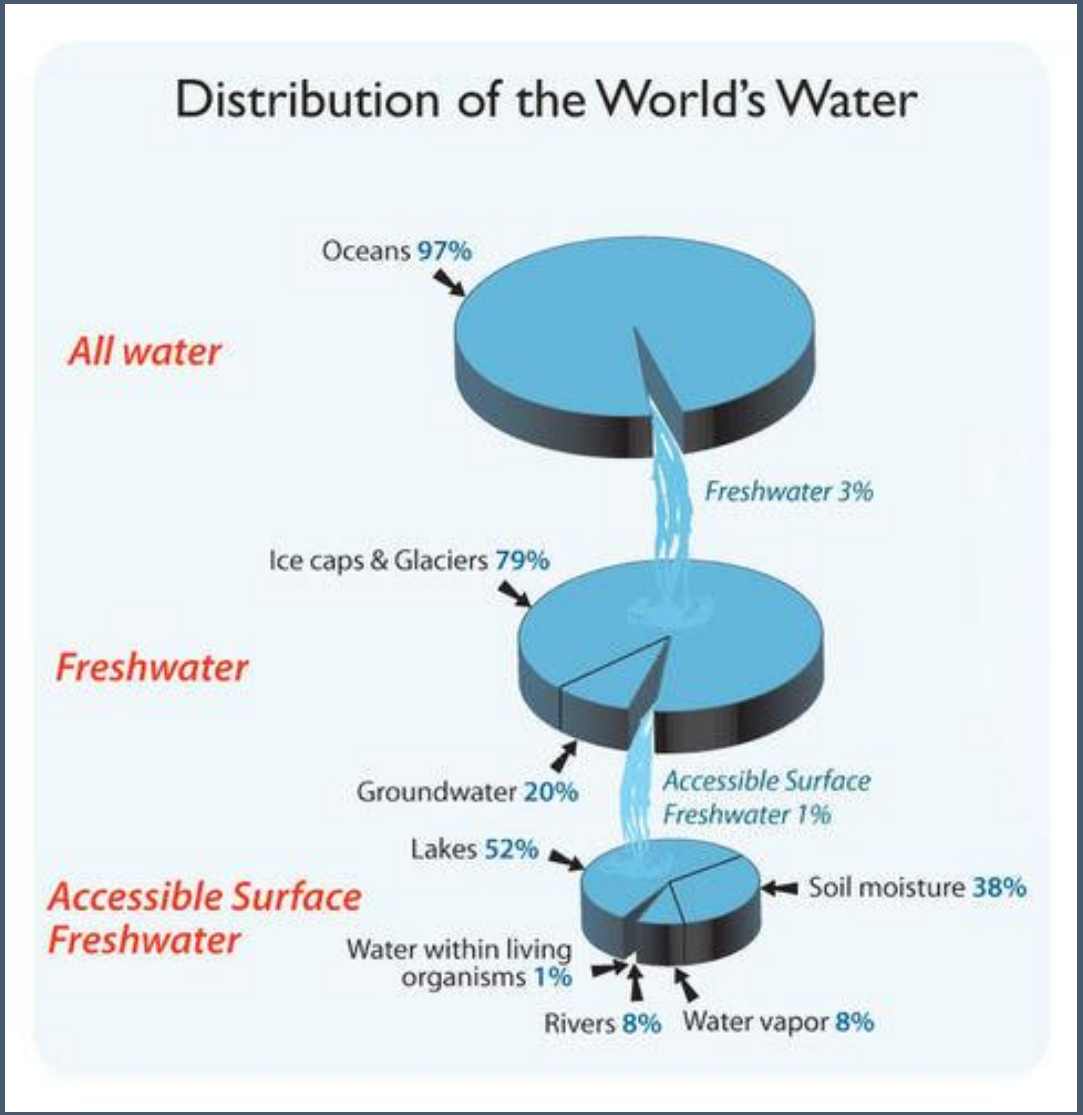
- Generating clean water that can be used in civil works
  - Not using drinking water that is within reach of people

Introduction

Presentation Route



Problem Description: WATER FOR HUMAN CONSUMPTION VS. WATER USE IN CONCRETE

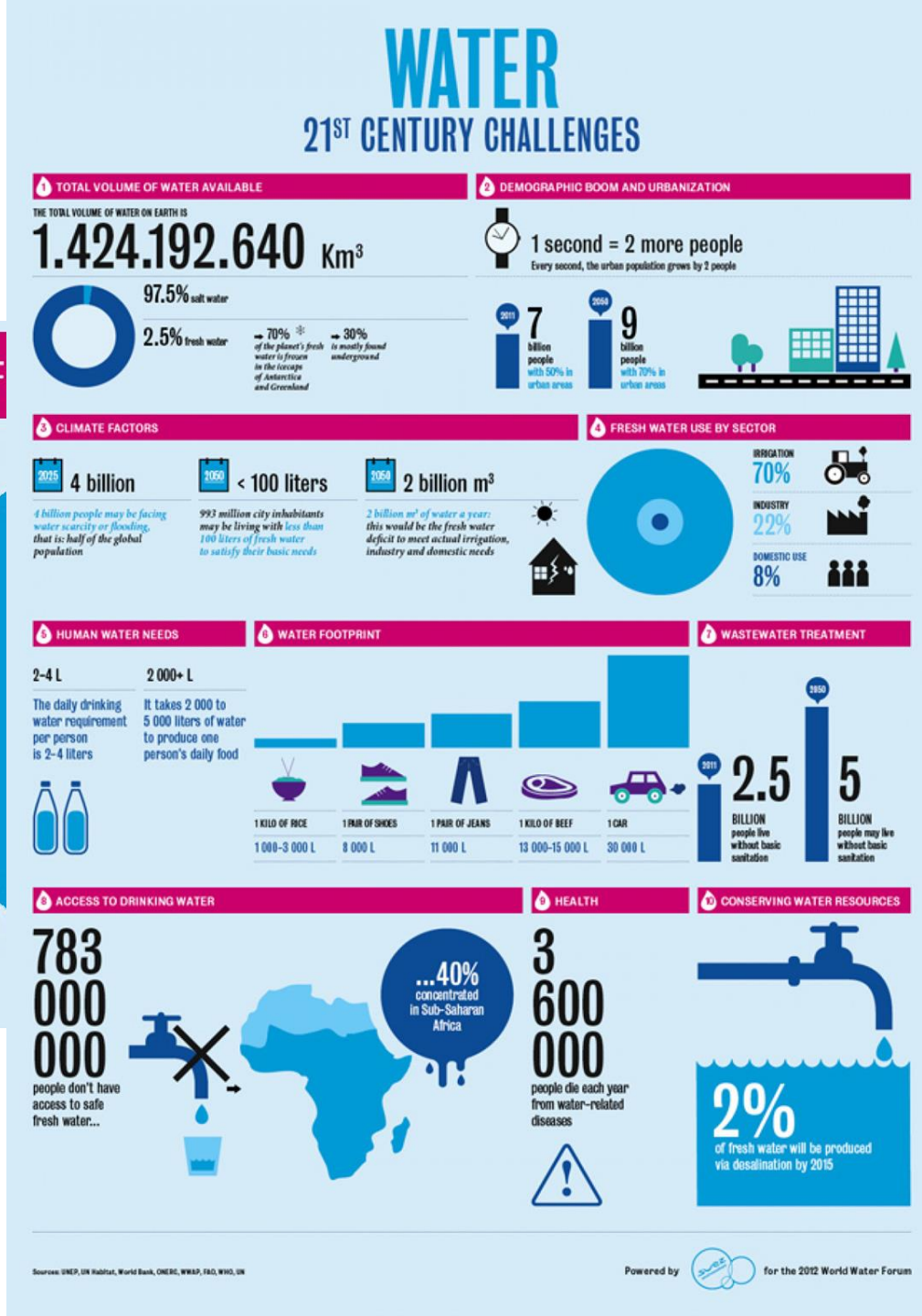


LibreTexts, "Distribution of Water on Earth", libretexts.org. https://k12.libretexts.org/Bookshelves/Science_and_Technology/Earth_Science/08%3A_Earth%27s_Fresh_Water/8.01%3A_Distribution_of_Water_on_Earth (accessed Sep. 5, 2023).

Problem Description

WATER FOR HUMAN CONSUMPTION VS. WATER USE IN CONCRETE

Distribution of fresh water



Problem Description: Water for human consumption Vs. Water use in concrete

Construction Industry Water Usage

- Concrete dosing
- Grouting
- Dust suppression
- Soaking tests
- Pond filling
- Hydraulic demolition
- Drilling and piling

Problem Description

Impact of Non-Potable Water on Concrete Quality

- Concrete Structure

  Non-drinking water negatively affects durability and structural performance.

- Quality Parameters

  Properties and quality parameters fall below permitted values with wastewater usage.

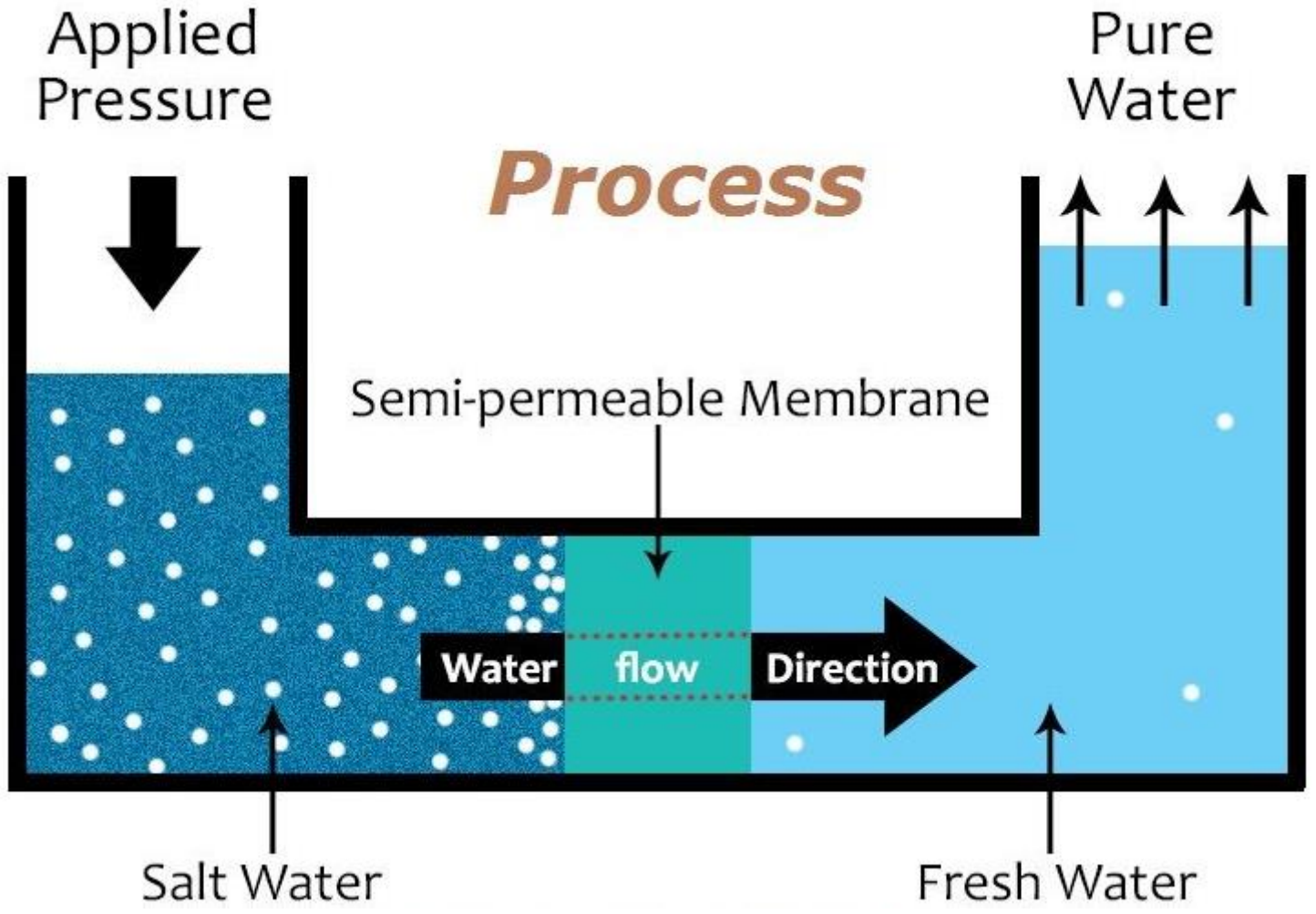
- Compressive Strength

  Values are approximately 1/3 lower when compared to concrete with drinking water.

Innovative Solutions

Desalination / Wastewater to Drinking Water

- Reverse Osmosis

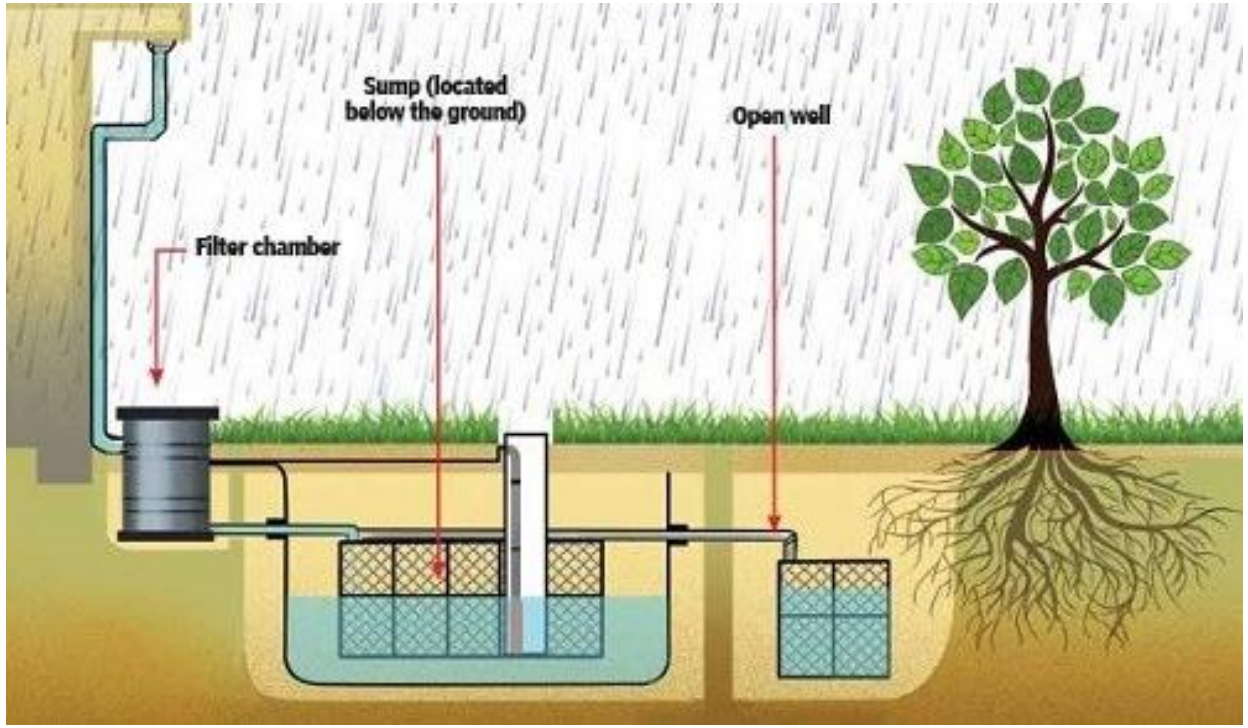


"Reverse Osmosis Desalination", .com. https://reverseosmosissystemexpert.com (accessed Oct. 10, 2023).

Innovative Solutions

Rainwater Harvesting / Concrete Mix Modification

- Large scale rainwater harvesting



- Investigation of alternative concrete mixes that are less sensitive to the type of water used

"How to harvest rain?", .in. https://www.therainharvesting.in/latest-update/what-is-rainwater-ha/40 (accessed Oct. 20, 2023).

Advantages and Disadvantages

Advantages

- Resource Conservation
- Alignment with Sustainable Goals
- Reduced Environmental Impact
- Reputation Benefits

Disadvantages

- Concrete Strength
- Infrastructure Investment
- Environmental Impact Assessment Required

Conclusion

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