**Part1:**

**SDG 6: Clean Water and Sanitation**.

### **Problem Statement**

The lack of access to clean drinking water in rural areas is a significant global issue with far-reaching consequences. Many rural communities, particularly in developing countries, struggle to obtain safe and potable water for their daily needs.

### **Effects**

1. **Health Issues:**
   * **Waterborne Diseases:** Contaminated water can transmit diseases like cholera, typhoid, and diarrhea, leading to high rates of illness and mortality, especially among children and the elderly.
   * **Malnutrition:** Lack of clean water can hinder proper hygiene practices, contributing to malnutrition and stunted growth.
   * **Reduced Productivity:** Ill health and lack of energy due to water scarcity can limit productivity and economic opportunities.
2. **Economic Impact:**
   * **Limited Development:** Lack of access to clean water can hinder economic development, as it affects agriculture, livestock, and other industries.
   * **Increased Costs:** Communities may have to spend significant resources on purchasing or transporting water, reducing their disposable income.
3. **Social and Environmental Impacts:**
   * **Gender Inequality:** Women and girls often bear the burden of collecting water, which can interfere with their education and economic opportunities.
   * **Environmental Degradation:** Overexploitation of water resources can lead to environmental degradation, such as deforestation and soil erosion.

### **Solutions**

1. **Infrastructure Development:**
   * **Piped Water Systems:** Constructing and maintaining piped water supply systems can bring clean water to rural communities.
   * **Wells and Boreholes:** Drilling wells and boreholes can provide access to groundwater in areas where piped systems are not feasible.
2. **Water Treatment:**
   * **Point-of-Use Treatment:** Providing households with simple water treatment technologies like filters, chlorinators, or solar disinfection can purify water at the source.
   * **Community Water Treatment:** Establishing community-based water treatment plants can serve larger populations.
3. **Water Conservation:**
   * **Rainwater Harvesting:** Collecting rainwater for domestic use can reduce reliance on other sources.
   * **Efficient Irrigation:** Promoting efficient irrigation practices can conserve water in agricultural areas.

**Part2:**

**Design an ERD:**

* **Entities:**
  + **Region (RegionID, Name, Population, Area)**
  + **WaterSource (SourceID, Type, Capacity, Location)**
  + **WaterUsage (UsageID, RegionID, SourceID, AmountUsed, Date)**
  + **Infrastructure (InfrastructureID, Type, Status, Location)**
* **Relationships:**
  + **Region to WaterUsage (One-to-Many)**
  + **WaterSource to WaterUsage (One-to-Many)**
  + **Region to Infrastructure (One-to-Many)**

**Write SQL Statements to Create the Database Schema:**

**CREATE TABLE Region (**

**RegionID INT PRIMARY KEY,**

**Name VARCHAR(100),**

**Population INT,**

**Area FLOAT**

**);**

**CREATE TABLE WaterSource (**

**SourceID INT PRIMARY KEY,**

**Type VARCHAR(50),**

**Capacity FLOAT,**

**Location VARCHAR(100)**

**);**

**CREATE TABLE WaterUsage (**

**UsageID INT PRIMARY KEY,**

**RegionID INT,**

**SourceID INT,**

**AmountUsed FLOAT,**

**Date DATE,**

**FOREIGN KEY (RegionID) REFERENCES Region(RegionID),**

**FOREIGN KEY (SourceID) REFERENCES WaterSource(SourceID)**

**);**

**CREATE TABLE Infrastructure (**

**InfrastructureID INT PRIMARY KEY,**

**Type VARCHAR(50),**

**Status VARCHAR(50),**

**Location VARCHAR(100),**

**RegionID INT,**

**FOREIGN KEY (RegionID) REFERENCES Region(RegionID)**

**);**

**Populate the Database with Relevant Sample Data:**

**INSERT INTO Region VALUES (1, 'Rural Area A', 50000, 1500);**

**INSERT INTO WaterSource VALUES (1, 'Well', 10000, 'Location A');**

**INSERT INTO WaterUsage VALUES (1, 1, 1, 5000, '2024-01-01');**

**INSERT INTO Infrastructure VALUES (1, 'Pipeline', 'Operational', 'Location A', 1);**

### **Part 3: SQL Programming**

1. **Data Retrieval:**

**Retrieve all water usage records for a specific region:  
sql  
Copy code  
SELECT \* FROM WaterUsage WHERE RegionID = 1;**

1. **Data Analysis:**

**Calculate total water used in each region:  
sql  
Copy code  
SELECT RegionID, SUM(AmountUsed) AS TotalWaterUsed**

**FROM WaterUsage**

**GROUP BY RegionID;**

**Analyze water usage trends over time:  
sql  
Copy code  
SELECT Date, SUM(AmountUsed) AS DailyWaterUsage**

**FROM WaterUsage**

**GROUP BY Date**

* + **ORDER BY Date;**