

# Group W3

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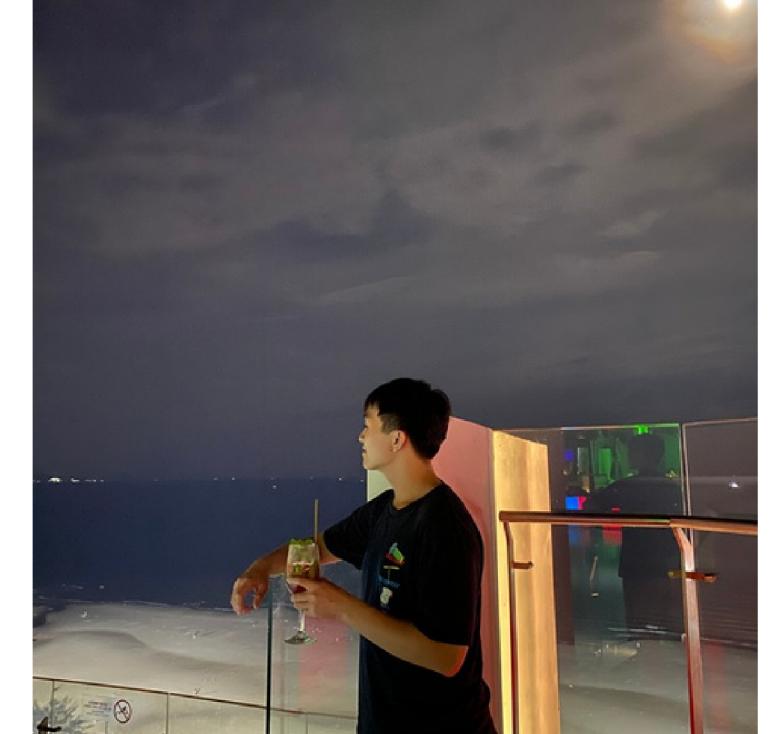
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# Part A: Project Overview



- **1.1 Project Overview**

- Our project aims to solve Tanh Linh Town's severe water shortage by installing a solar-powered water purification system. This system will ensure a steady supply of clean drinking water using renewable energy and advanced filtration technology.

- **1.2 Introduction to the Identified Challenge/Problem**

- Tanh Linh Town faces serious water scarcity due to over-extracted groundwater, polluted sources, and climate change. These issues lead to health problems and financial difficulties. Traditional water sources are unreliable, and using non-renewable energy for water purification is unsustainable. Our solar-powered solution is cost-effective and eco-friendly, providing clean water and improving the community's quality of life.





# Design 1: Solar-Powered Water Purification System

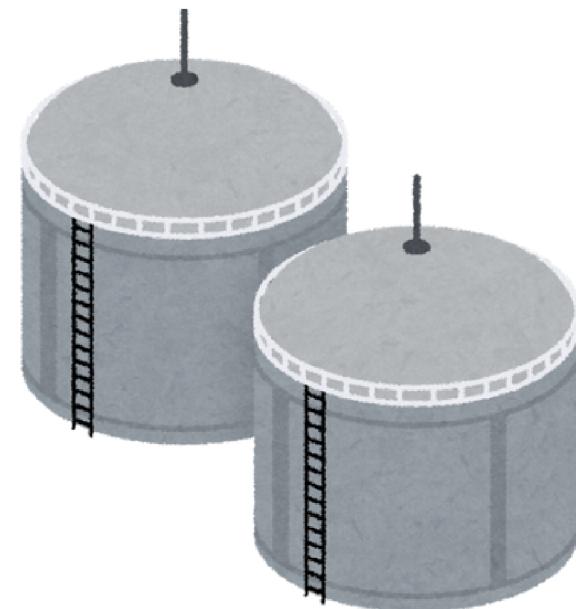
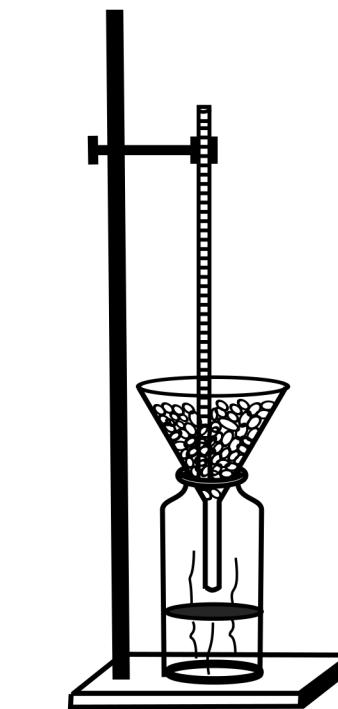
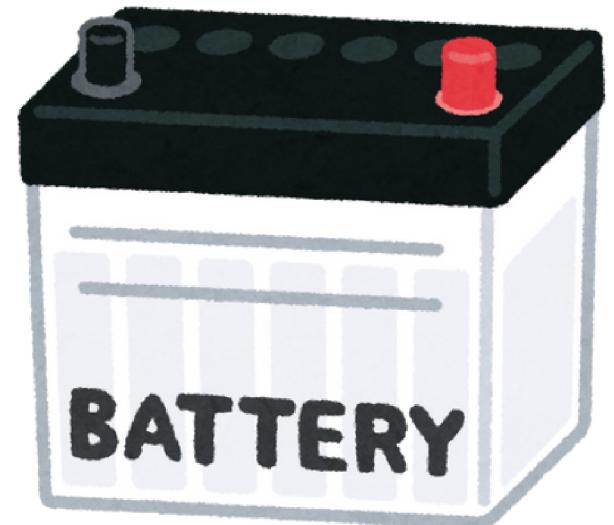


- Main Idea: This system uses solar energy to purify water, making clean water accessible for remote and off-grid communities.

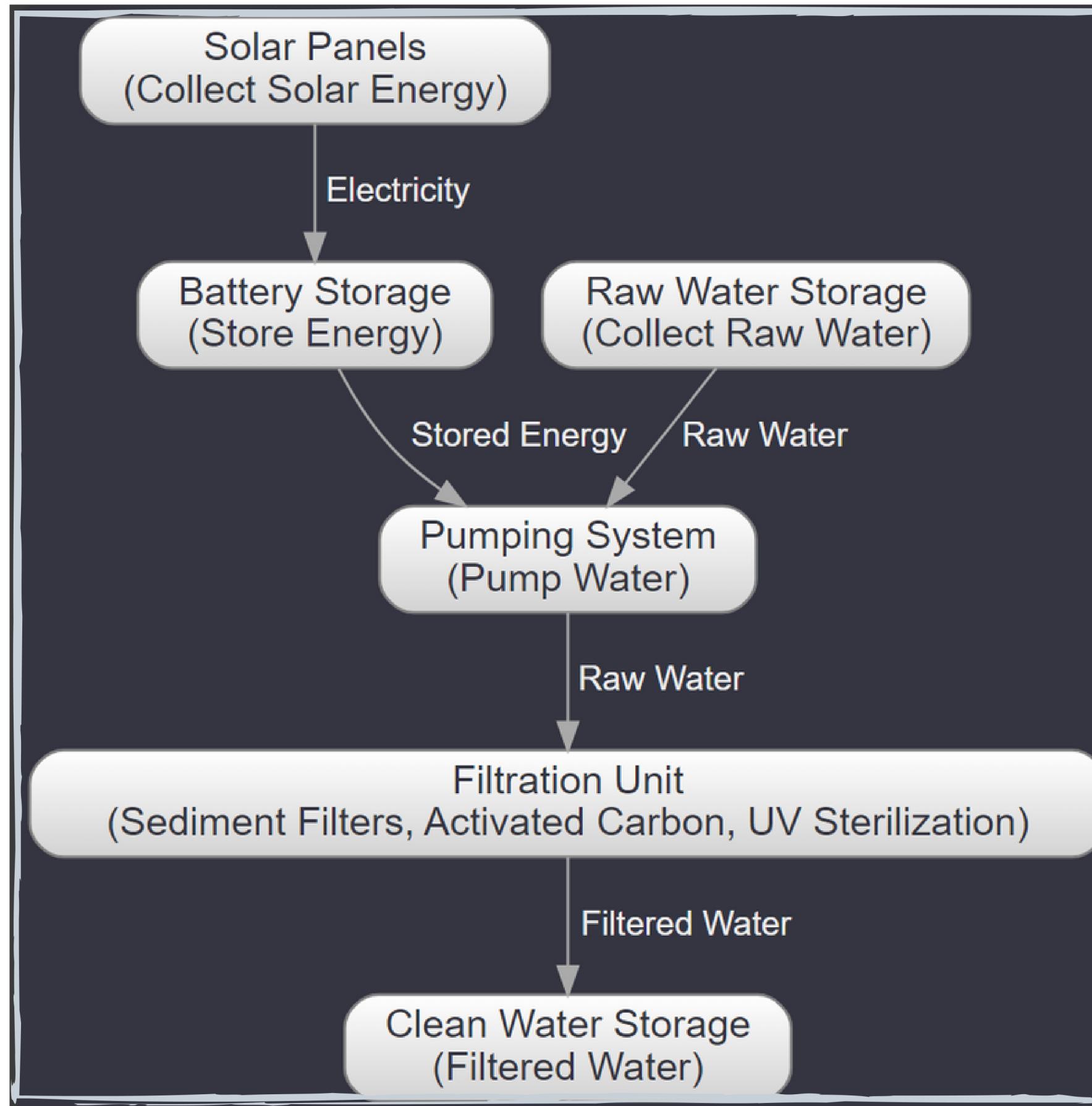


# Components:

- Solar Panels: Capture solar energy.
- Battery Storage: Stores energy for use during non-sunny periods.
- Water Filtration Unit: Purifies the water using various filtration methods.
- Pumping System: Moves water through the system.
- Water Storage Tanks: Store purified water for later use.



# Diagram of the Design Idea 1



# Benefits and Constraints



- Benefits: It's sustainable, economical, scalable, and improves public health by providing clean drinking water.
- Constraints: High initial costs, weather dependency, and maintenance needs.
- Additional Considerations
  - Efficiency of Solar Panels: Invest in high-efficiency panels to maximize energy capture.
  - Water Filtration Technology: Choose advanced and reliable filtration methods to ensure water quality.
  - Energy Storage: Ensure battery systems are robust enough to handle periods without sunlight.
  - Community Training: Provide training for local community members on maintenance and operation to ensure long-term sustainability.





## Design Idea 2 : Rainwater Harvesting and Storage System

Efficient Water Collection,  
Purification, and Storage

# System Overview and Design Specifications

## 1. System Overview:

- Collects, purifies, and stores rainwater for daily use.
- Components: gutters, pipes, first splitters.

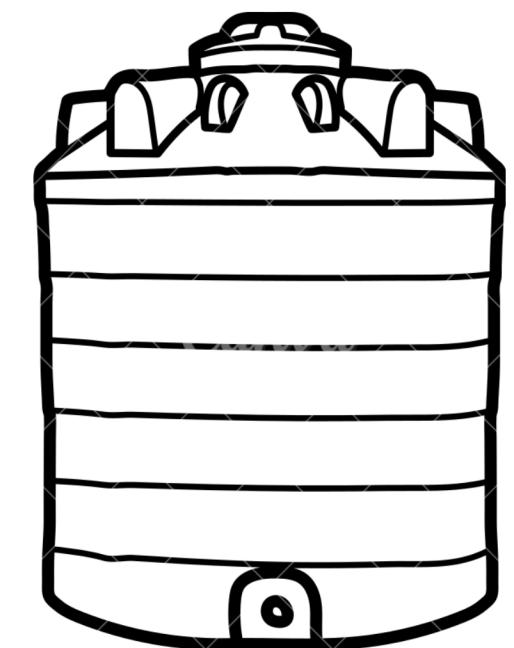
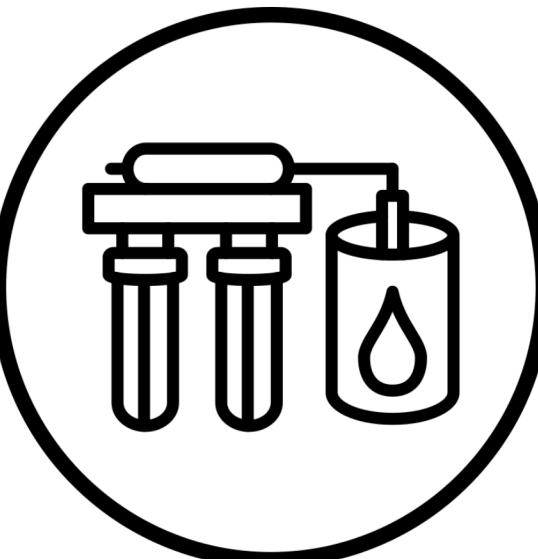
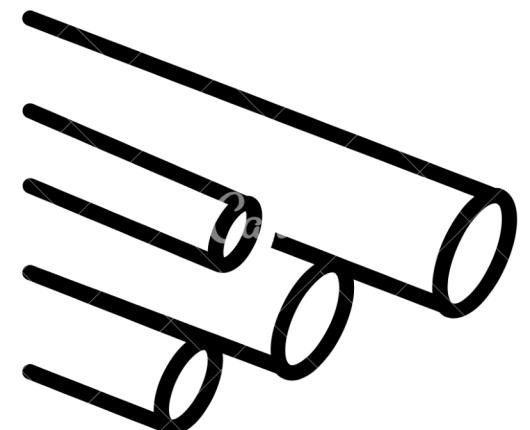
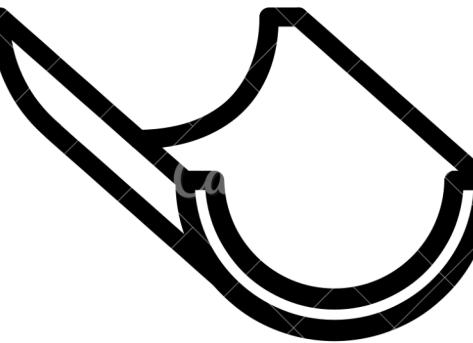
## 2. Design Specifications:

### - Hardware:

- Gutters: strong plastic or stainless steel.
- Pipes: PVC or metal.
- First Splitters: metal or plastic.
- Tanks: large food-grade plastic or metal.
- Filtration: activated carbon filter, UV purification unit.

### - Software:

- Monitoring system for water levels, filter condition, performance indicators, maintenance alerts, and data logging.

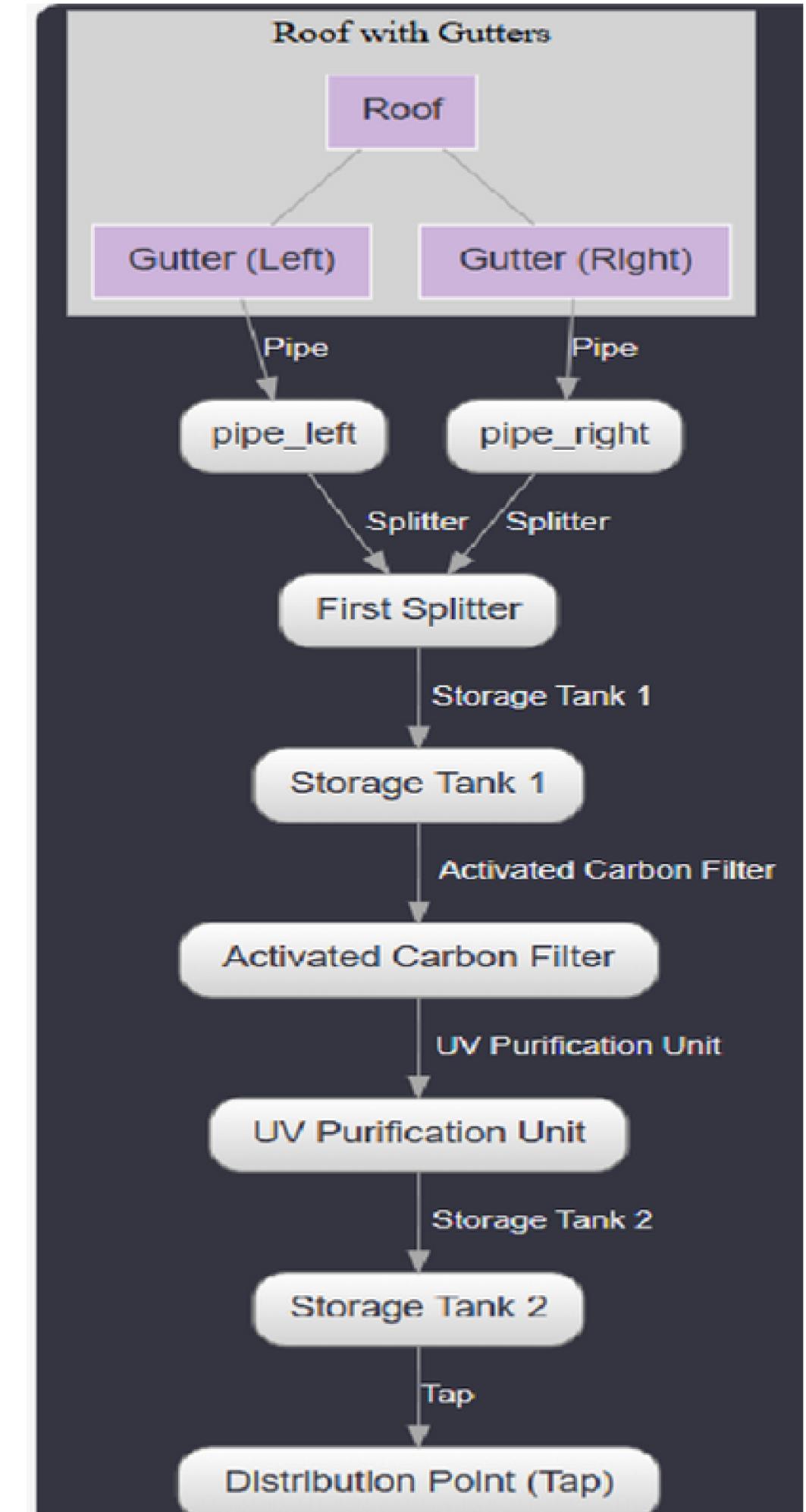


# Functionality



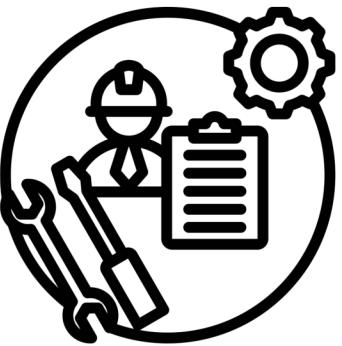
## How It Works:

- Rainwater collected from the roof via gutters.
- Channeled into the system through pipes.
- First splitter removes initial impurities.
- Water filtered through activated carbon and UV purification.
- Stored in a tank for distribution.



# Benefits ✓

- **Ease of Use:** Simple to operate and maintain.
- **Cultural Respect:** Honors local norms and customs.
- **Sustainability:** Uses locally sourced materials.
- **Community Involvement:** Involves community in setup and upkeep.
- **Cultural Sensitivity:** Well-received and beneficial within the community.



# Constraints ✗

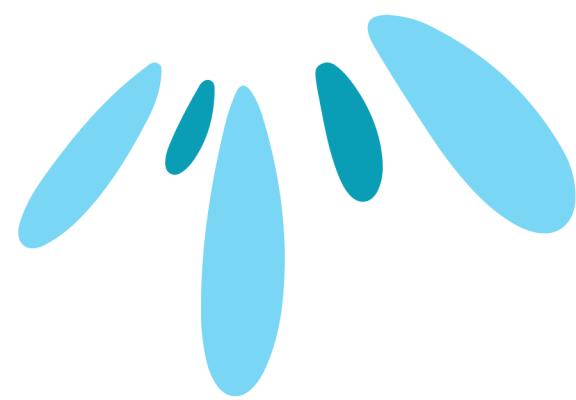
- **High Initial Costs:** The installation cost may be prohibitive for some communities.
- **Maintenance Requirements:** Regular maintenance of gutters, tanks, and filtration systems is needed.
- **Technical Expertise:** Maintenance may require technical skills that are not readily available.





## Design Idea 3 : Community Greywater Recycling System

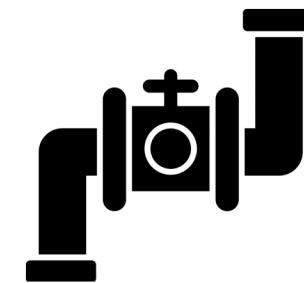
Main idea: system recycles greywater from households for non-drinking/ non-potable uses.



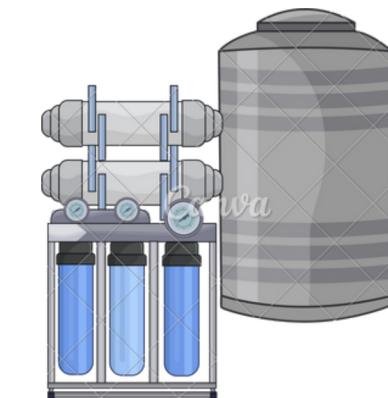
# Components:

## Hardware:

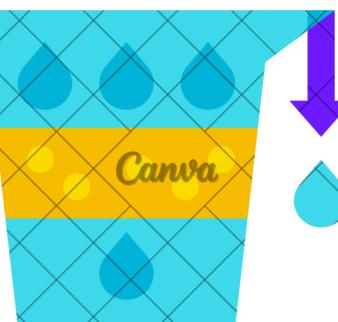
- Diversion valves



- Heavy filter

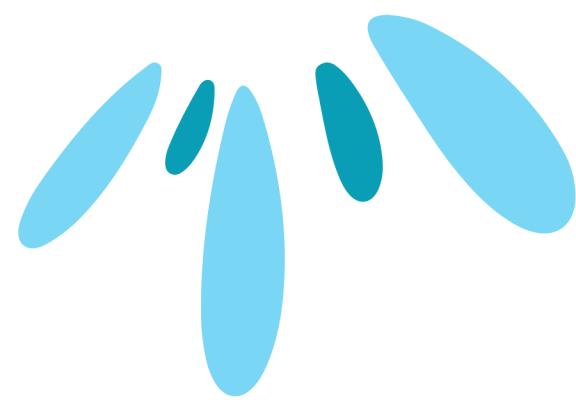


- Sand filter
- Optional secondary treatment  
(biological, UV)



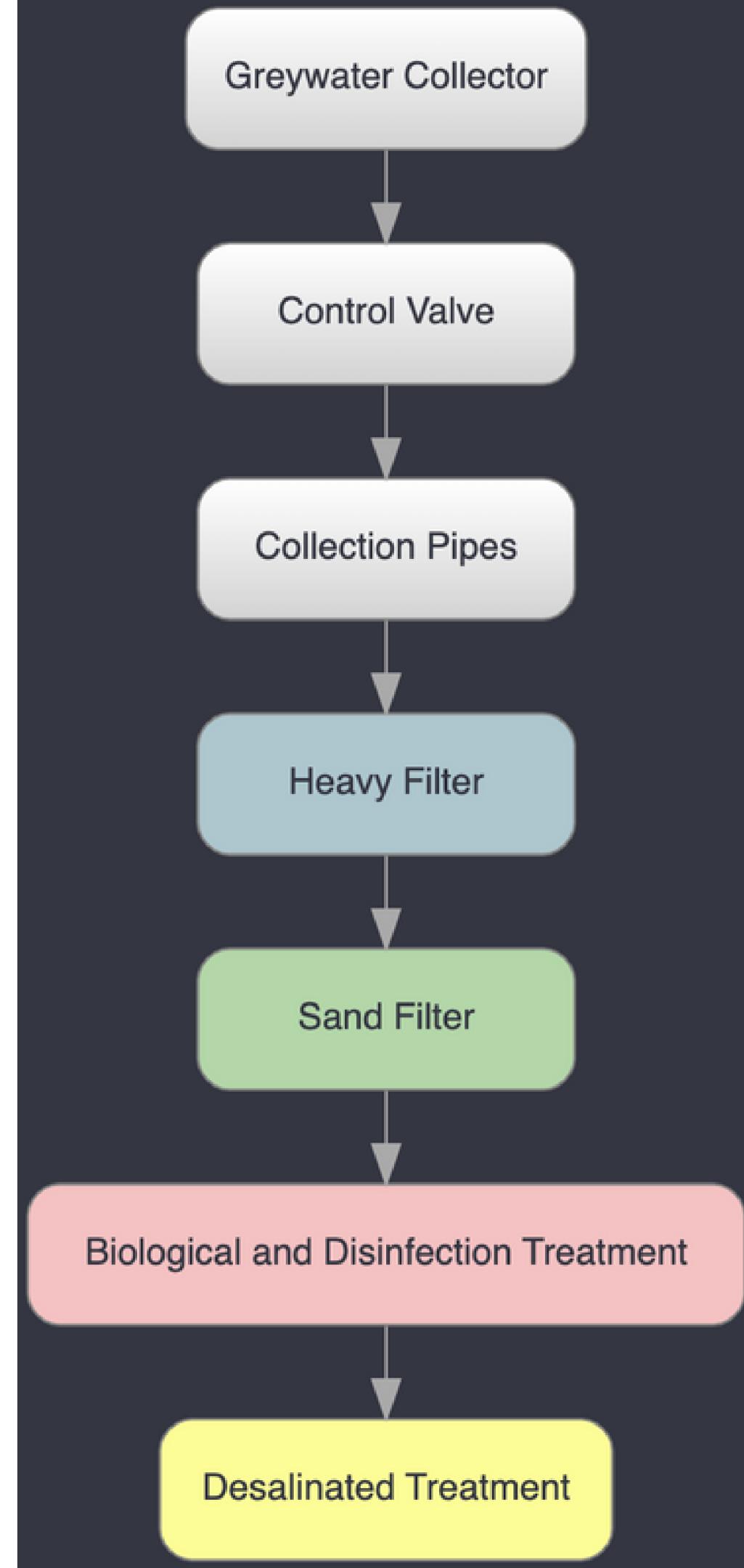
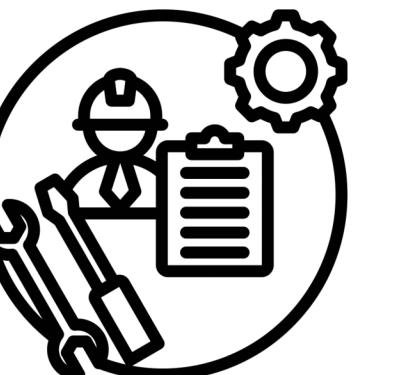
## Software:

- Optimizing system operation by: water flow management, valves controlling.
- Water leak detection (optional)



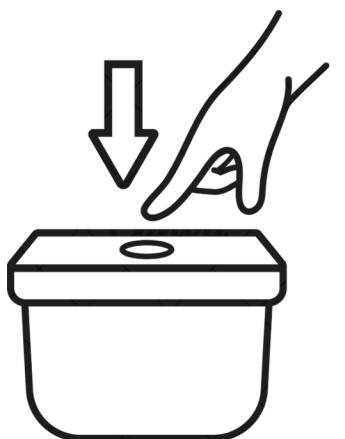
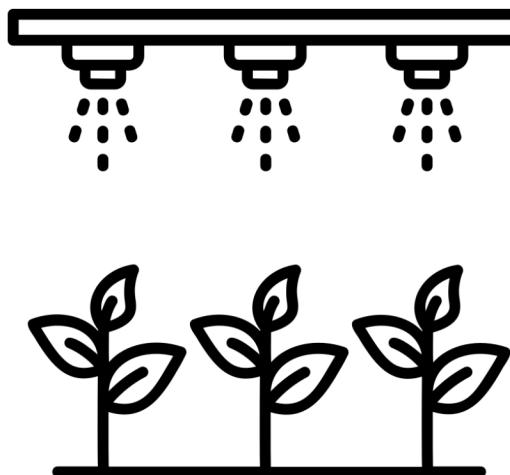
# Diagram - functionality

- Household source of greywater: showers, bathing, washing machine stored in storey tank.
- Flown through system including control valves, pipes.
- Two layer of filters (heavy and sand filters) are responsible for removing suspended large solids.
- Additional treatment: biological and disinfection, UV lights etc. depending on intended use.



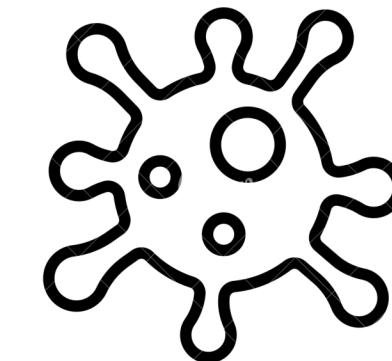
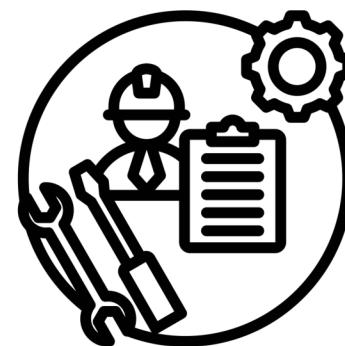
# Benefits ✓

- Offering a reliable source of water for non-potable uses such as irrigation, vehicle washing, and toilet flushing.
- Minimize the risk of landslides due to exposure to underground water.
- Local community can reduce the burden of collecting rainwater for non-potable uses, specially low-income household.



# Constraints ✗

- Requiring significant literacy for local people.
- For example, greywater reuse is never potable, risk of contamination if using for vegetables and herbs that are to be eaten raw.
- Possibly large initial investment and maintenance fee



# Design idea 4: Water Storage and Groundwater Recharge Management System



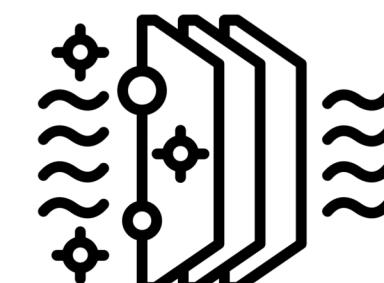
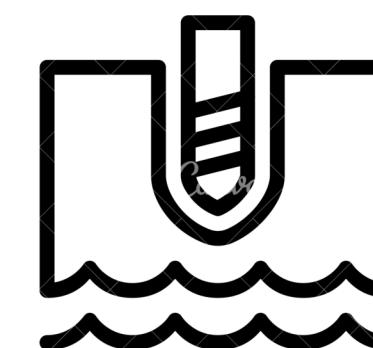
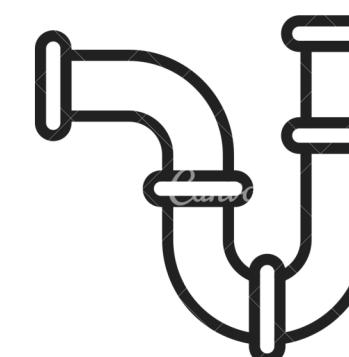
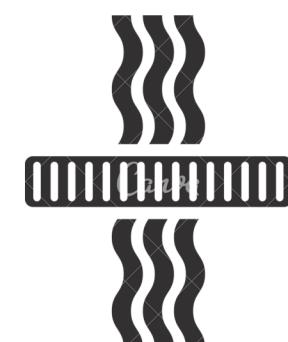
- Main Idea: This system replenishes groundwater reserves with rainwater and excess water, mitigating environmental impacts and optimizing groundwater resources.



# Component:

## Hardware:

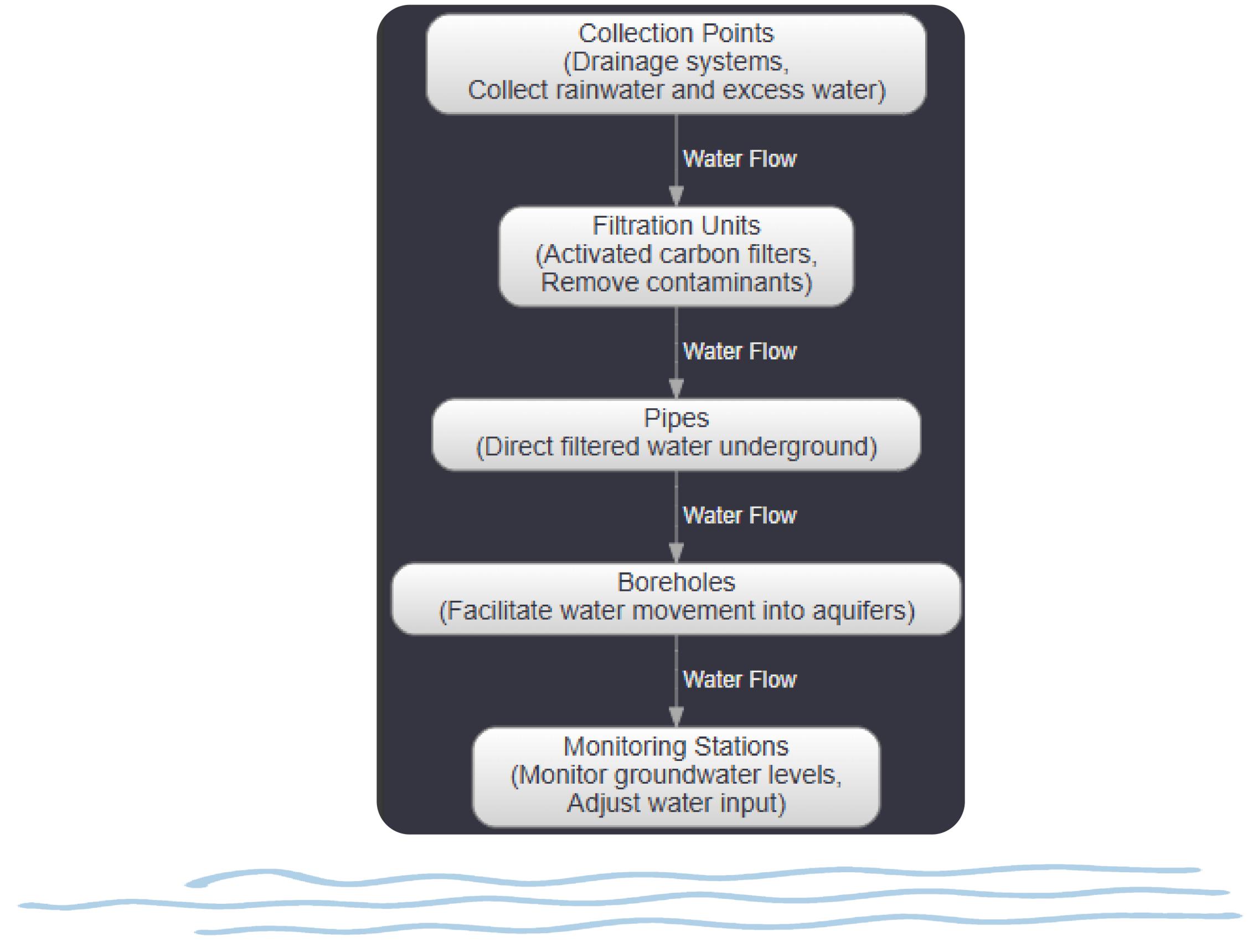
- Drainage Systems: Collect rainwater and excess water.
- Wells and Pipes: Direct water underground.
- Boreholes: Move water into underground systems.
- Filtration Systems: Remove contaminants with carbon filters.



## Software:

- Water Management Software: Monitors water levels and recharge rates.
- Control Systems: Adjust water input to maintain aquifer levels.

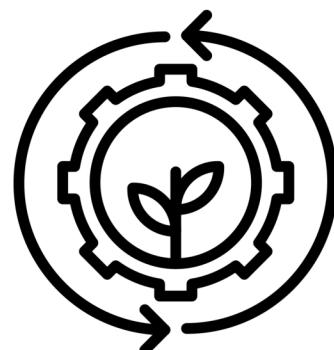
# Diagram of the Design Idea 4



# Benefits

## Environmental Benefits:

- Reduces groundwater overuse and prevents land subsidence.
- Maintains ecological balance by preserving groundwater levels.
- Supports biodiversity and mitigates climate change impacts.
- Community Benefits:
- Ensures a reliable and sustainable water supply.
- Enhances water security for residents, promoting health and economic growth.
- Empowers communities to adapt to environmental challenges.



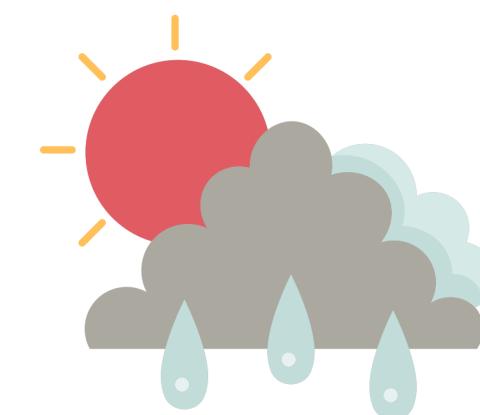
# Constraints and Challenges

## Constraints:

- High Initial Investment: Requires financial support from government and NGOs.
- Technical Expertise: Needs skilled professionals for design, installation, and maintenance.
- Training Needs: Community education and capacity-building initiatives are necessary.

## Challenges:

- Geographic and Geological Variations: Require customized solutions for different areas.
- Climate Change: Irregular rainfall patterns necessitate adaptive design and management strategies.



**Thank you for listening**

