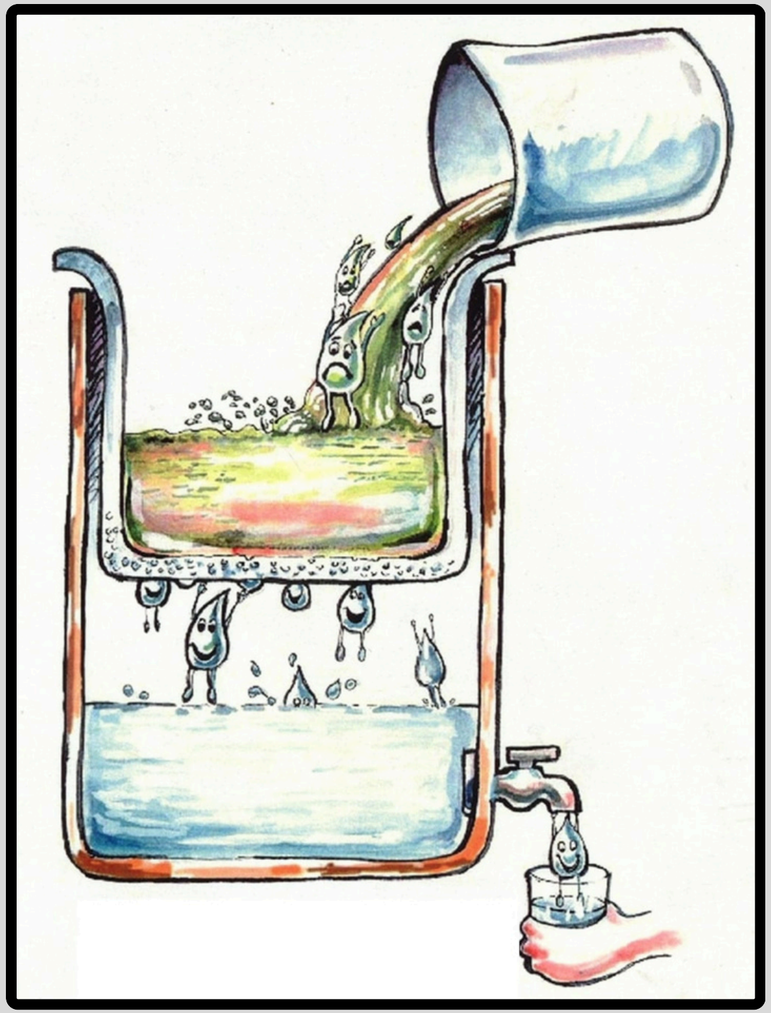
BIO WATER PURIFIER



ROSHMI MICHAEL
AMEESHA ANTHONY
AMALENDU N HARIDAS
NINIYA K.J

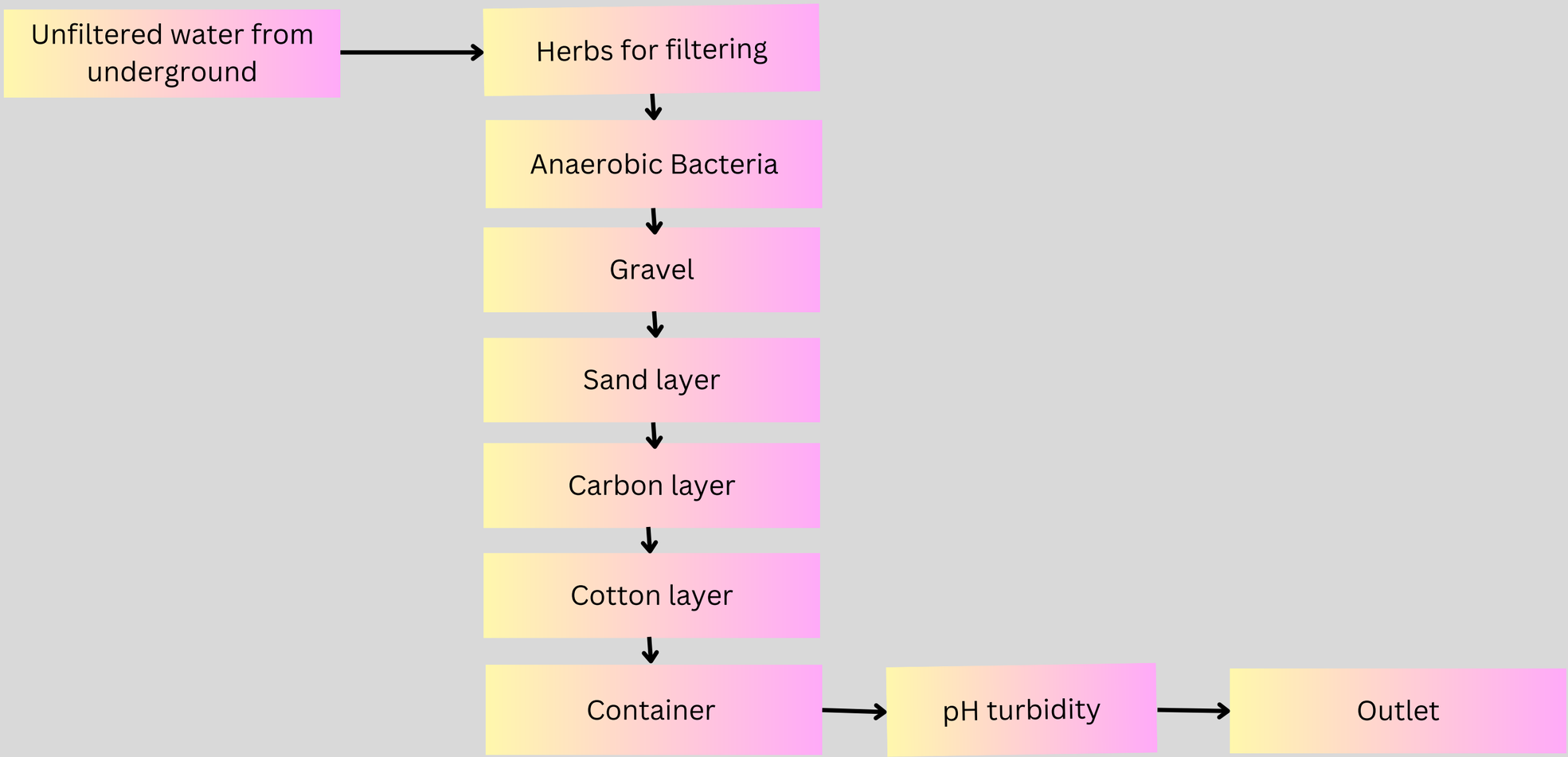
PROBLEM STATEMENT

1. Unfiltered underground water contains contaminants like sediments, microorganisms, chemicals, and dissolved impurities.
2. These contaminants pose health risks and reduce water quality.
3. A proper filtration system is needed to make the water safe for consumption and use.

SOLUTION

- Natural Filtration Layers: Use herbs (like Moringa seeds and Neem leaves), gravel, sand, and cotton to remove bacteria, impurities, and particles.
- Biological Treatment: Employ anaerobic bacteria to break down organic matter and pathogens.
- Chemical and pH Balance: Utilize activated carbon to remove chemicals and odors, and adjust pH and turbidity with minerals and natural coagulants.

BLOCK DIAGRAM



First Block: Filtration Using Herbs and Plants

- Herb and Plant Layer: Utilize herbs and plants known for their natural antimicrobial and purification properties, such as Moringa oleifera seeds (crushed to release coagulant proteins), Neem leaves, or Vetiver roots.

- This layer helps in reducing microbial contamination and binds to certain impurities, acting as an initial purifier to reduce turbidity and biological contaminants.

Second Bock: Anaerobic Bacteria

- Anaerobic Bioreactor: Construct a chamber where anaerobic bacteria can thrive. These bacteria break down organic matter and reduce biological oxygen demand (BOD) by digesting organic pollutants, pathogens, and other contaminants.
- The anaerobic environment will support bacteria that do not require oxygen, which can help in reducing the number of harmful bacteria and viruses.

Third Block: Gravel Layer:

- Gravel Layer: Use a layer of gravel (2-5 cm size) to trap larger particles and provide initial filtration for sediment and debris.
- This layer also supports the growth of beneficial microbes that further help in the decomposition of organic materials.

Fourth Block: Sand Layer:

- Sand Layer: Follow the gravel with a fine sand layer that traps smaller particles, further reducing turbidity and providing additional filtration.
- Sand filters are effective in removing fine particles and improving the overall clarity of the water.

Fifth Block: Activated Carbon Layer

- Activated Carbon Layer: Use an activated carbon layer to adsorb chemicals, pesticides, herbicides, organic compounds, and odors from the water.
- This layer also helps in improving the taste of water and reducing any residual chlorine or chemicals.

Sixth Block: Cotton Layer

- Cotton Layer: Use cotton as a fine filter to capture very small particles, acting as a final filtration barrier.
- This layer can also aid in additional microbial filtration due to the dense structure of cotton fibers.

Seventh Block: pH and Turbidity Adjustment

- pH Adjustment: Introduce crushed limestone or other minerals to balance the pH level of the filtered water.
- Turbidity Adjustment: Conduct a final check for turbidity. If necessary, use coagulants (like natural alum or Moringa seed powder) to further reduce turbidity by causing particles to settle.

CONCLUSION

- Comprehensive Filtration System: A multi-layered filtration system using herbs, anaerobic bacteria, gravel, sand, activated carbon, cotton, and pH adjustment effectively purifies underground water.
- Efficient Removal of Impurities: This natural approach eliminates sediments, pathogens, chemicals, and other impurities, ensuring the water is safe for consumption.
- Eco-friendly and Sustainable: The system provides a sustainable solution to water filtration, avoiding synthetic chemicals or complex machinery.