Coach:
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Double Reverse Osmosis with Adsorption for Enhanced Water Purification

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Problem statement

Current water filtration methods struggle with pollutants like pharmaceuticals, heavy metals, and microplastics. To address this, a novel Double Reverse Osmosis (DRO) system, augmented with selective adsorption technology, is proposed. This system aims to enhance pollutant removal efficiency, reduce energy consumption, and evaluate economic viability for widespread application in water purification.

Constraints

Cost
Environmental Impact
Maintenance

Target Specification

Water quality:

TDS less than 200 | pH around 7

Lead: 10 ug/L | Mercury: 1ug/L

Capacity:

Purification rate around 400000 m^3/day

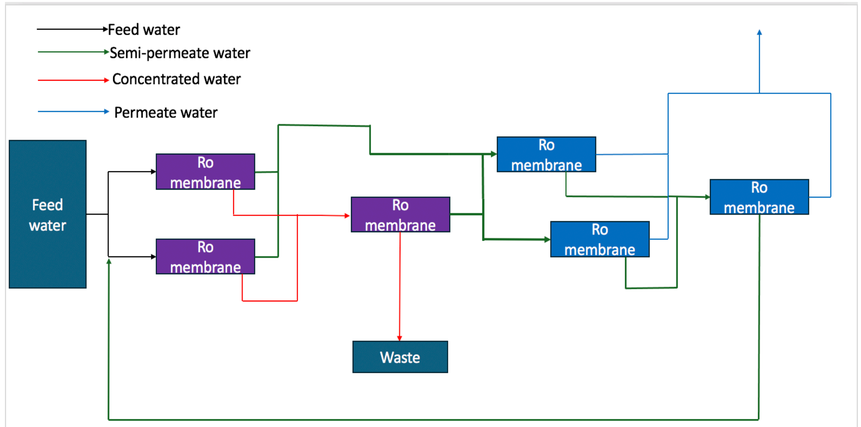
Efficiency:

85%

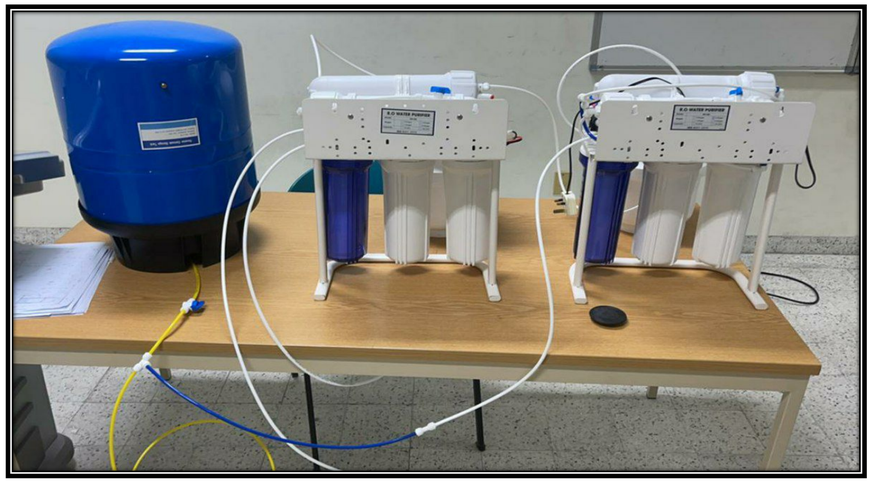
Environmental Impact:

Water recovery 65%

Process Diagram



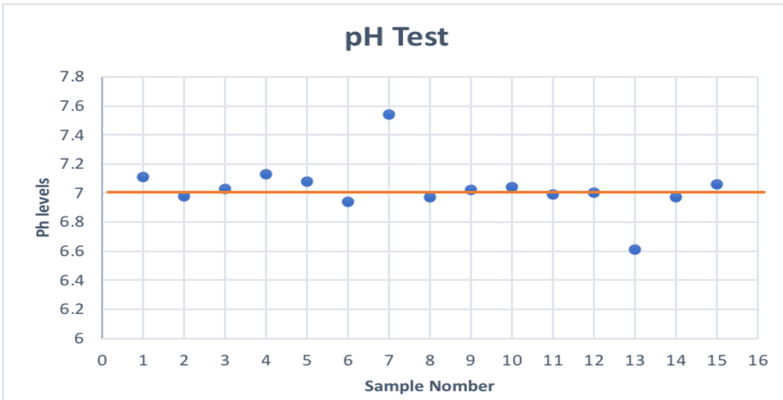
Prototype



Project impact

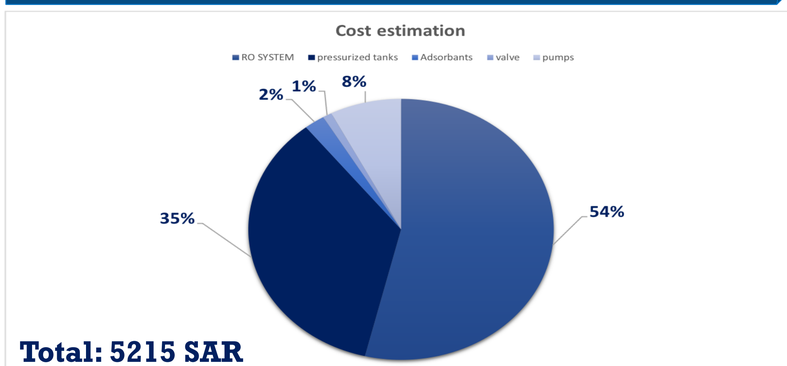
Health: Improved removal of contaminants like heavy metals ensures safer drinking water.
Environment: Cleaner water discharge protects natural ecosystems.
Economy: Enhanced efficiency reduces treatment costs and energy usage.

Testing / Validation



TDS levels achieved an average of 170
Lead: 10.12ug/L | **Mercury:** 1.01ug/L
Efficiency: 86.67% | **Water recovery:** 68%

Cost estimation



Total: 5215 SAR

Conclusion

The design of DRO with adsorption has succeeded in purifying the water to meet specifications, ensuring a positive impact on the environment while achieving efficiency beyond the specified requirements.