SUSTAINABLE CAPSTONE PROJECTS (SCAP)
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Sustainable tiny house design and construction (clean water)

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INTRODUCTION

Our sustainable tiny house features two key water systems: rainwater harvesting and solar desalination. Motivated by the need for eco-friendly living, this project aims to enhance self-sufficiency and reduce environmental impact. The rainwater system captures and stores rainwater, while the solar desalination system converts seawater into drinking water using solar energy. These systems ensure a continuous supply of clean water, minimize reliance on municipal resources, and showcase sustainable water management in compact housing. Our objectives are to promote environmental awareness and inspire future green living solutions.

MATERIALS USED IN CONSTRUCTION

Our tiny house project utilized a combination of materials, some of which are recyclable. We used wood, which is a renewable resource, and plastic for the tank and tube, both of which can be recycled. The pump and tap, essential for water management, are not typically made from recyclable materials but were chosen for their durability and efficiency. Integrating these materials demonstrates a balance between sustainability and functionality in our design.

FINAL PRODUCT

In our tiny house, we integrated a rainwater harvesting system and a solar water desalination system. Channels were installed along the edges of the roof to collect rainwater, which then flows into a filtered tube. The filtered water is stored in a tank equipped with a pump. When the sink is turned on, water is pumped from the tank through tubes directly to the sink, providing clean water. Additionally, the solar desalination system is mounted on the roof's edge, utilizing solar energy to convert seawater into potable water, ensuring a sustainable and reliable water supply.

* figure 01. Clean water system

* figure 02. Tiny House.

RESULTS AND DISCUSSION

Our sustainable tiny house project successfully demonstrated the practicality of integrating rainwater harvesting and solar desalination systems. The rainwater collection system efficiently captured and filtered rainwater, ensuring a reliable supply of clean water. The solar desalination system provided an alternative source of potable water, especially valuable in areas with limited freshwater resources.
For future improvements, we plan to enhance the efficiency of the solar desalination system by incorporating advanced solar panels and more efficient desalination techniques. Further research into eco-friendly materials and energy-efficient components will also contribute to the overall sustainability and effectiveness of the project

CONCLUSIONS

Our project successfully integrated rainwater harvesting and solar desalination systems in a tiny house. The rainwater system reliably provided clean water, while the solar desalination system converted seawater into potable water. These innovations promote sustainable living by reducing reliance on municipal water supplies. Challenges included optimizing system efficiency and integrating components in a small space. Through the SCAP program, we gained insights into sustainable design and interdisciplinary collaboration. Future improvements will focus on enhancing system efficiency and expanding sustainable features.

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