from WASTE to WORTH

CLEAN WATER FOR ALL

SGDS: 6,7,12,13

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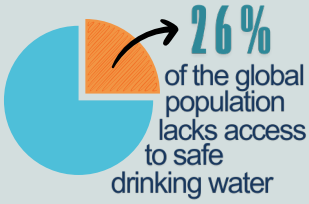
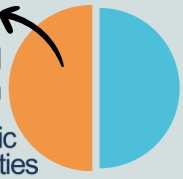
the CHALLENGE

Access to clean, sanitized water remains a critical challenge for many people in rural areas worldwide.

Despite having water sources, these supplies are often contaminated with harmful bacteria and waterborne diseases, leading to significant health crises and preventable deaths



26% of the global population lacks access to safe drinking water



46% of the global population doesn't have basic sanitation facilities

Each year, approximately 3.6 million people die from water-related diseases, with most of these victims being children—about 2.2 million annually.

On average, dirty water claims a life every **10 seconds**, highlighting the urgent need for effective solutions

Overall, around **844 million** people worldwide lack access to safe drinking water, emphasizing the critical nature of this global challenge.

WHY IS CLEAN WATER IMPORTANT?

Health and Well-being: Clean water prevents waterborne diseases such as cholera, dysentery and typhoid. Clean water supports hygiene and sanitation, and reduces the risk of illness and outbreaks.

Basic Human Need: Water is essential for drinking, cooking, and hygiene. Without clean water, people risk dehydration, malnutrition, and health issues. A lot of communities in rural areas do not have access to drinkable, clean water.

Economic Development: Access to clean water is vital for agriculture, manufacturing, and commerce. Farmers need it for irrigation, and industries rely on it for production. Without clean water, productivity is reduced, leading to economic setbacks

Education: In areas without clean water, children, spend hours collecting water, which reduces school attendance. Improved access to clean water allows more time for education and better opportunities.

Human Dignity: Access to clean water is linked to human dignity. Safe drinking water and sanitation facilities are fundamental to the right to a decent quality of life. People living without access to clean water often face indignities and struggles that affect their overall well-being.

HOW THIS RELATES TO THE SDG'S

SDG's that dirty water addresses:

6 CLEAN WATER AND SANITATION

Relates to universal access to safe water and sanitation, directly addressing the need for clean water.

4 QUALITY EDUCATION

With easier access to clean water, children, have more time for education, leading to higher attendance and improved learning outcomes.

3 GOOD HEALTH AND WELL-BEING

Clean water prevents waterborne diseases, leading to better health outcomes and fewer deaths, particularly for children.

SDG's that the solution addresses:

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Composting organic waste reduces waste and supports the circular economy by converting discarded material into value.

13 CLIMATE ACTION

Compost heat reduces emissions, cuts fossil fuel use, and sequesters carbon to combat climate change.

2 ZERO HUNGER

The composting process produces nutrient-rich soil, which can be used for agriculture, promoting food security.

7 AFFORDABLE AND CLEAN ENERGY

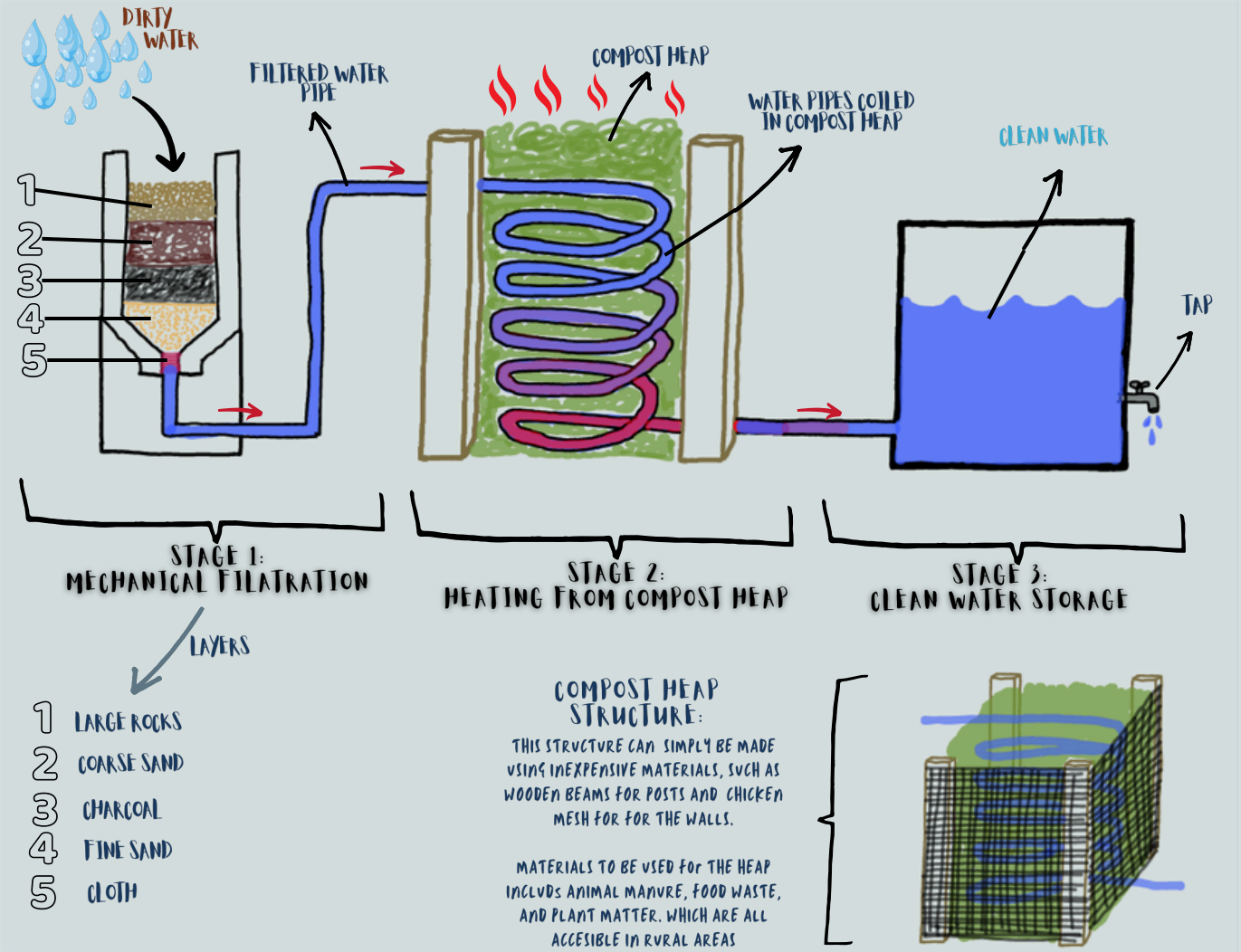
The solution provides renewable, cost-effective energy, reducing fossil fuel dependence

11 SUSTAINABLE CITIES AND COMMUNITIES

Sustainable infrastructure in rural areas, such as clean water and renewable energy, enhances living standards

FUTURE WITH CLEAN WATER = FUTURE WITH HOPE

the PRACTICAL SOLUTION



HOW IT WORKS

BASICS OF THE DESIGN

Studies have shown that water only needs to be heated to 60°C to effectively eliminate harmful bacteria and waterborne diseases. Compost heaps naturally generate heat as a result of microbial decomposition. When organic materials like food scraps, plant matter, and manure decompose, microbes break them down, releasing heat in the process. These heaps can reach temperatures as high as 80°C, making them capable of heating water to a level that is sufficient to kill bacteria and pathogens, making the water safe for human consumption. The mechanical filtration system is included in the design as this is the first stage of the water cleaning process, where the filters can remove any large harmful or unharmful solubles from the dirty water - eliminating the risk of these solubles blocking up the pipe in later processes. After heating of the water, the compost heap can be used as a fertilizer for gardens or farm lands. This process eliminates any need for external energy from non renewable resources, and utilizes green energy, therefore decreasing the carbon footprint. As well as making the design appropriate for people living in rural areas who have no access to energy to heat their water.

STAGE 1: Mechanical filtration

STEP 1:
Gathered dirty water is poured into mechanical filtration by the user

STEP 2:
Dirty water flows through the 5 layers of the filter. This removes any harmful solubles and is the first stage of cleaning the water.

STEP 3:
The filtered water is then gathered in a pipe at the bottom of the mechanical filtration.

STAGE 2: HEATING FROM COMPOST HEAP

STEP 4:
The filtered water is collected in a pipe. This pipe then coils in tight circles through the compost heap.

STEP 5:
As the compost heap heats up due to the microbial decomposition of the waste materials, which then heats up the filtered water in the pipes

STEP 6:
The water is then heated to a temperature above 60 degrees celsius, thus killing any harmful bacteria in the water. The water is now completely clean and safe for consumption

STAGE 3: CLEAN WATER STORGAE

STEP 7:
Once the clean water exists the compost heap, it is gathered in a storage tank.

STEP 8:
The clean water can be accessed as needed by the user for consumption through the tap.

STEP 9:
The old compost heap matter can be used as a fertilizer for the soil.

IMPLEMENTATION

WHY THE SOLUTION WILL WORK

Resource Accessibility and Sustainability: The system uses locally available compost in rural areas, where organic waste is abundant and access to electricity or fuel is limited. It generates heat for water purification and promotes sustainable waste management, creating a closed-loop system that supports water sanitation and environmental sustainability

Low-Cost and Easy Setup: The system is affordable and easy to set up, using local materials like compost, eliminating the need for costly infrastructure. It requires minimal maintenance and provides long-term clean water, making it ideal for rural areas with limited resources.

Health and Environmental Benefits: The system purifies water through the mechanical filtration and heating via composting, thus reducing waterborne diseases and mortality rates. While the composting also reduces waste and pollution. The resulting compost can be used to enhance soil quality, supporting sustainable farming.

Scalability and Adaptability: The system is scalable for both households and community projects, with expansion options like larger compost heaps or more filtration units. It can be replicated in rural areas worldwide with similar resources, offering a sustainable, low-cost solution that grows with the community.

MONITORING PROGRESS

The system can be monitored by sending out teams each month to the rural areas, that check up on the Water cleaning system, as well as do any necessary maintenance on the system. This will ensure that all components of the system are functioning correctly, to ensure clean water as the outcome.

CONCLUSION

The proposed water sanitation system is likely to be successful because it leverages local resources (compost), requires no external energy or fossil fuels, and is both affordable and easy to maintain. It addresses the pressing needs of rural communities for clean water, waste management, and sustainability. Furthermore, it can be a long-term, self-sustaining solution, which is crucial for areas with limited infrastructure. The system's simplicity, cost-effectiveness, and environmental benefits make it a highly practical and scalable solution for improving water sanitation in rural areas.

REFRENCES

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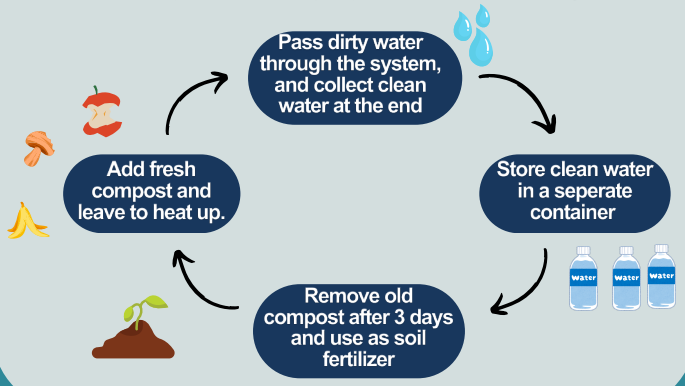
SETUP TIME

Once paired up with local partners in rural communities, the system can be put into place in less than a day. The compost heaps take a few days to fully heat up, reaching the necessary temperatures for water purification. At the end of the cycle, the heated water is collected and stored in containers for use. After 3 days the compost heap stops generating heat and can be repurposed as fertilizer, and fresh compost can be prepared for the next cycle.



PARTNERSHIP

Collaborations could provide support in areas such as funding, research, technology development, implementation, and outreach. A few potential partners are: Water.org , Global green , The Composting Council , WHO and private sector companies.

OBSTACLES to OVERCOME

Lack of Education: People in rural communities may not fully understand how the composting and system as a whole will work, However this can be overcome through training in how to use the compost heap after implementation.

Resource Ability: There may not be enough organic waste in some rural communities to efficiently heat the water, thus the compost heap may be too small, and only heat small amounts of water.

Technical Challenges: If the system is not maintained properly by the user, this could lead to failures within the system.

Initial Financial Barriers: Although the system is designed to be affordable, the cost of the initial setup of the system needs to be considered.

SPECIALIST

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