DEVELOPMENT OF A RAINWATER HARVESTING SYSTEM AS AN APPROPRIATE TECHNOLOGY WITHIN THE FRAMEWORK OF A HUMANITARIAN ENGINEERING PROJECT

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This project used the appropriate technology development process to build a **Rainwater Harvesting System** at **Wormser Erlebnisgarten**, an environmental education center located in Worms, Germany. By showcasing sustainable water management, the project supports the center's mission of fostering environmental awareness and hands-on learning for all ages.

1. Problem Statement

The area faces significant challenges due to limited access to water and inadequate maintenance of existing water infrastructure. These issues result in unreliable water availability and frequent system failures, which severely impact the daily lives and activities of the local population. Addressing these problems is critical to ensuring a consistent and sustainable water supply for the community of the garden.

2. Main Question

How to increase access to water using easier mainte-nance appropriate technology?

3. Objectives

To increase access to water by implementing easier-maintenance appropriate technology that can collect and store up to 100 liters of rainwater per installation, with a focus on cost-effective and eco-friendly design tailored to local environmental conditions.

- 3.1 Install a wooden gutter system to collect at least 30 liters with a Rain Water Harvesting System.
- 3.2 Use locally available materials and basic tools for construction.
- 3.3 Complete the project in 4 days with daily miles-tones.

4. Theory

Humanitarian Engineering Process
Service-Learning approach (Engineers Without Border Australia).

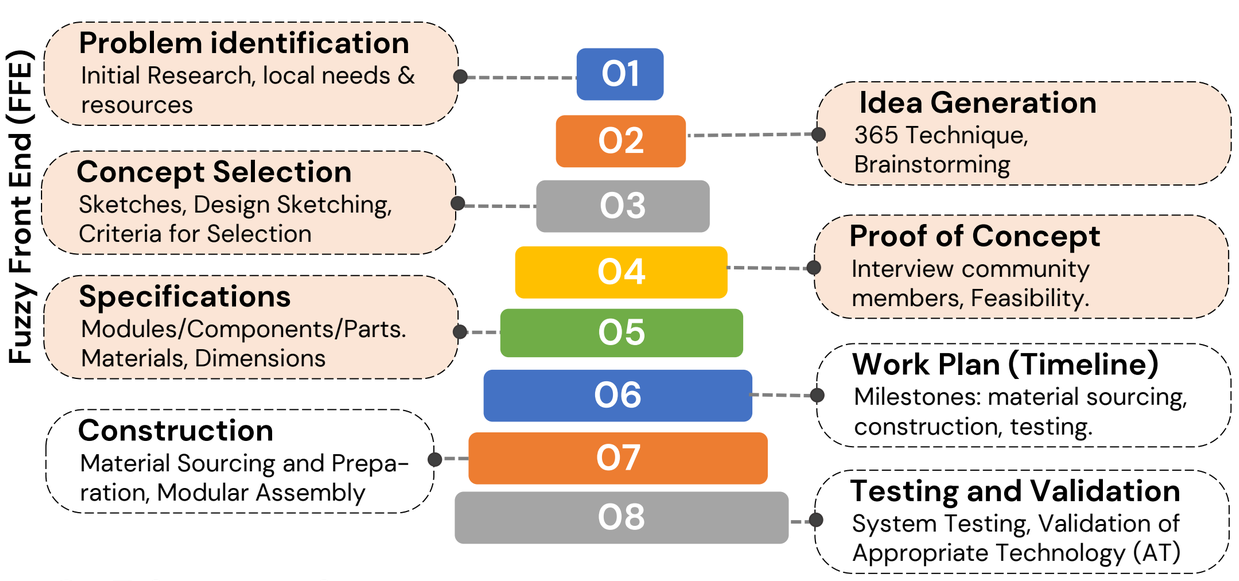
Appropriate Tech. Development
According Product Development Process (Steven D. Eppinger, Karl Ulrich)

Appropriate Technology Criteria
Criteria for Identifying Appropriate technology (Haba Prieto, 2014).

FRUGAL Innovation
Do more, with less, for more (Navi Radjou & Jaideep Prabhu)

Impact Evaluation
Social & Environmental Impact Gertler, P. J., Martinez, S., Premand, P., Rawlings, L. B., & Vermeersch, C. M. J. (2016).

5. Method



6. Discussion

This initiative exemplifies appropriate technology, showing that effective solutions can be developed with limited resources. It highlights the power of community efforts and proves that similar systems can be replicated in resource-constrained areas to address water scarcity. This rainwater harvesting system showcases environmentally sustainable design using local materials. V-shaped gutters and recycled plastic bottles ensure efficient, low-cost water collection. Testing confirmed minimal leakage and reliable performance, offering a scalable solution for water-scarce communities

	Criteria for identifying appropriate technologies (Haba Prieto, S. 2014).	Yes	No
1	It solves a specific need of a specific social group.	X	
2	Adapt the original design to the local condition.	X	
3	Flexible design to respond to environmental changes.	X	
4	Low costs for execution, operation and maintenance	X	
5	According to the management capabilities of the locality	X	
6	Environmentally sustainable	X	
7	Promotes training by involving beneficiaries	X	
8	Facilitates social and cultural appropriation	X	
9	Promotes the participation of men and women equally	X	

7. Conclusions

*The rainwater harvesting system demonstrates that integrating humanitarian engineering principles with advanced water technology can produce sustainable, scalable solutions that effectively meet the water needs of underserved communities.
*This project enhanced community resilience by establishing a sustainable water source and empowering local residents through educational initiatives.
*This interdisciplinary approach enhances the design's effectiveness by ensuring that diverse perspectives are taken into account when addressing community needs.

8. References

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