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Introduction

In a world where access to clean water and proper sanitation is a basic human right, our initiative aims to make a lasting impact. Through such an innovative solution and community involvement, we strive to ensure an effective self irrigating project that will overall, build climate resilience in vulnerable areas and empower communities to adapt to the impacts of climate change. This will ensure sustainable development and improved livelihoods by simultaneously incorporating a water security plan in afforestation and agriculture as well as solid waste management in society

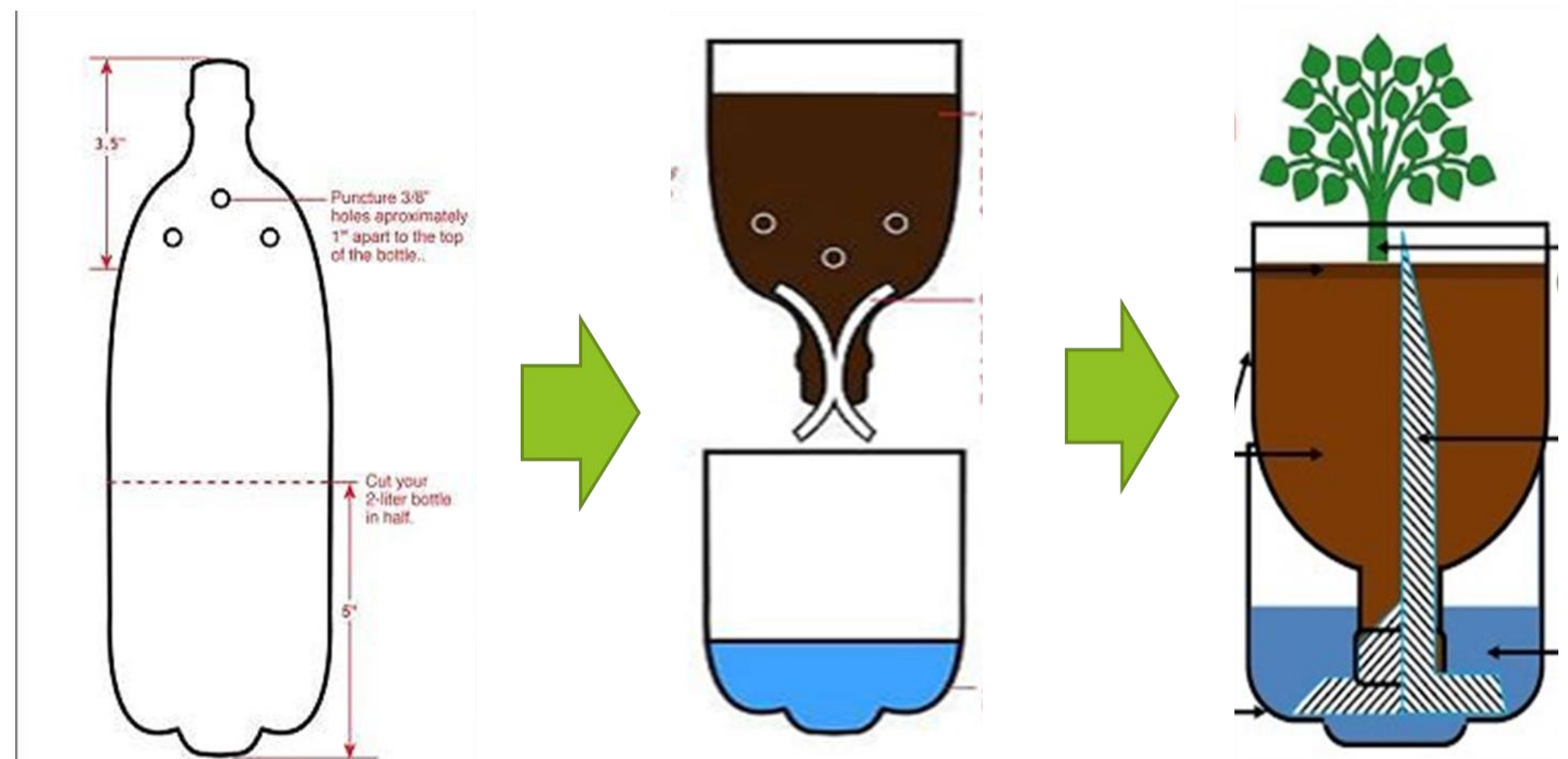
Aim

To;
Achieve water security in the afforestation and agricultural activities and
Ensure efficient solid waste management in the society.
Bring out a cost effective economic idea for the youth, governments and other entrepreneurs worldwide

Materials and methods

- Clean and Prepare the waste plastic bottles (like a beverage or water bottle with a screw-on cap).
- Using a drill or a sharp tool, make a hole and thereafter insert a Cotton thread in the cap of the smaller part of the bottle
- Thereafter, insert the upside-down small bottle into the larger one, making sure the open end of the smaller bottle is submerged in the potting soil.
- Before you screw the cap with the small bottle into the larger bottle, fill the large bottle with water.
- plant your chosen water-loving plant in the potting soil in the container where you've inserted the small bottle.
- Leave the plant to grow for a period of 30 to 60 days without watering.
- Measure the level of water loss in cm/day in each setup whilst recording the relative humidity of that area

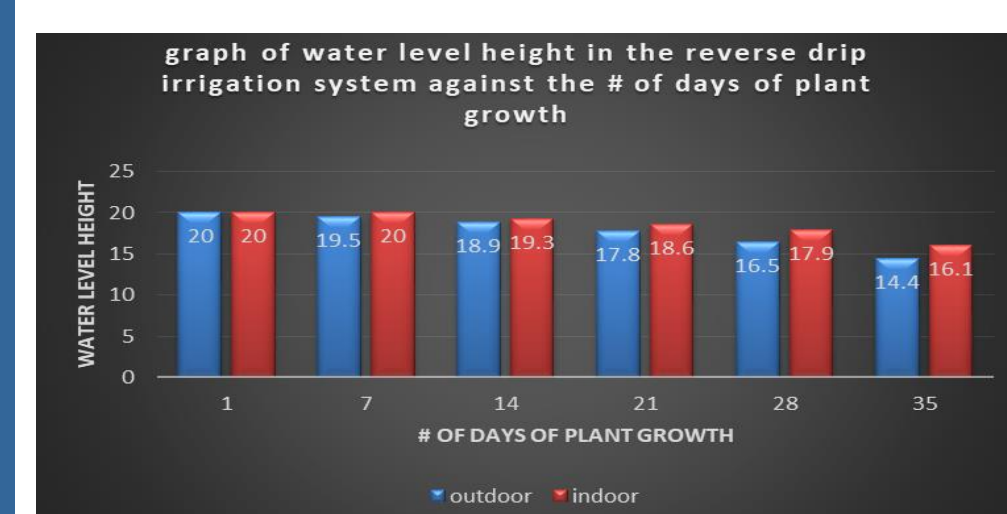
Method



images courtesy of garden gate magazines and k4 craft

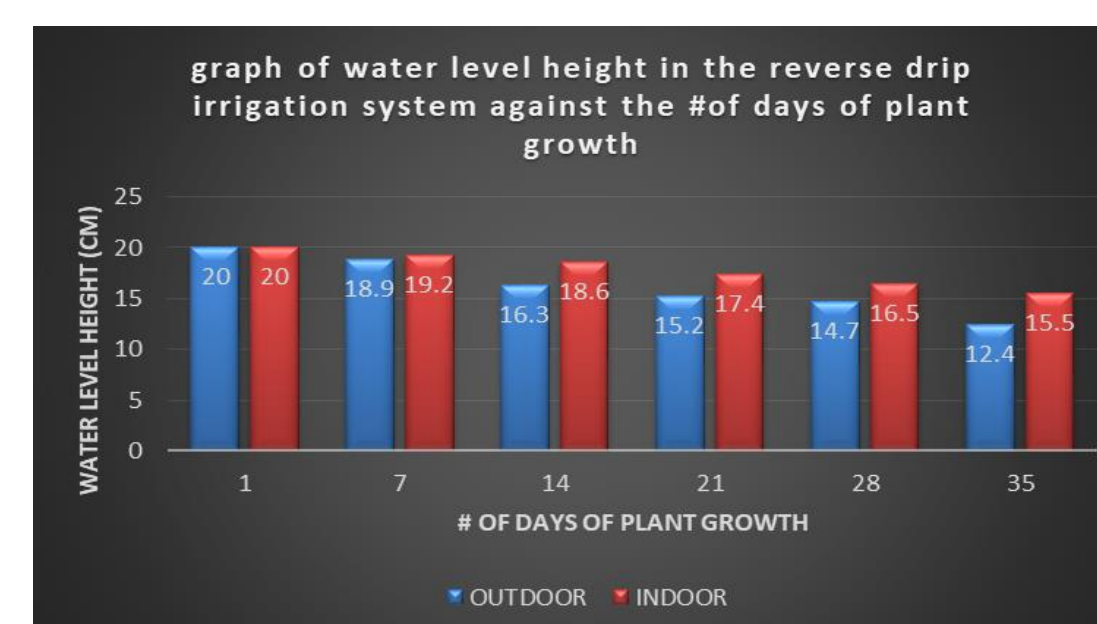
Results

Bar graphs showing Comparative Analysis of changes in Water levels in the Climate resilient reverse drip irrigation system at average relative humidity's of 52% and 36%



water loss in CRRDIS observed at an Average Relative humidity amount of 52% (may-june)

water loss in CRRDIS with an average Relative humidity amount of 36% (aug-September)



Results in both graphs shows the mean waterloss $\pm$ SD, n= 3
key
CRRDIS = Climate resilient reverse drip irrigation system

a) Outdoor plant growth after 28 days of planting (relative humidity 36%)



- Plants have a pure green color on their leaves.
- Water level in the bottle was above the halfway mark.
- Soil was observed to be moist throughout the experiment.

b) indoor plant growth after 28 days of planting (relative humidity 36%)

- Due to the lack of sufficient sunlight, These plants gradually underwent degradation, giving the leaves of the plant a pale yellow color. Despite this, the Water level in the bottle was above the halfway mark and higher compared to the outdoor kept irrigation system.
- Soil was observed to be moist throughout the experiment



Discussion and applications

Using Graphpad prism version 9 software, The % of water loss was calculated to be 0.128cm/day for indoor plants and 0.217cm/day for outdoor plants at 36% relative humidity. In addition, The % of water loss was calculated to be 0.120 cm/day for indoor plants and 0.110 cm/day for outdoor plants at 56% relative humidity.

Actual evaporation rates from moist soil can indeed vary widely based on several factors, including soil type, temperature, humidity, wind speed, and solar radiation. The specific range being 0.47inches(1.2cm) for sandy soils and 0.4 inches (1.0 cm) for silt loam soils per day [1]. This information therefore proves that this reverse drip irrigation conserves water to at least 7-10 times as much for the plants. Most importantly, it can automatically provide enough water required for plant growth for more than 35 days without the need for watering.

therefore recycling plastic bottles this way will help in promoting plant growth as it is clearly an efficient and water-saving method of delivering water directly to the roots of plants in a controlled and precise manner.

thus improving water security and sanitation in several ways including:

- Energy Savings**(also reduce the energy required for pumping and transporting water, leading to energy savings and reduced carbon emissions.)
- Reduced Water and land Pollution**(drip irrigation reduces the potential for surface runoff, which can carry pollutants and agrochemicals into water bodies. This helps protect water quality and aquatic ecosystems. By utilizing waste plastic bottles in this project, will be getting rid of plastic waste quickly with much efficiency.

APPLICATIONS

AFFORESTATION INITIATIVE; Generally, trees require the most water during two key stages: Early Growth Stage where Young trees are set up for their establishment phase (6-12 months)and during the Hot and Dry Seasons

Additionally, Trees will provide ;

- 1.)Flamboyance/beauty (jacaranda, miombo, planes, elms and neetle trees) as well as air conditioning especially In the summer times in Cities and town areas.
- 2)Economical benefits(timber) in forests (mahogany, oak, pine and eucalyptus)

➤ AGRICULTURE INITIATIVE;

farmers and floriculturists will be provided with a steady water supply for their gardens, flowering and herbal plants

➤ ECONOMIC AND SANITATION PERSPECTIVE;

Economic Benefits:, in addition to having a positive economic impacts on farmers and communities especially for those in water deprived areas this idea will also lead to the creation of more job opportunities to entrepreneurs that will recycle as many plastic waste bottles this way.

Overall, this system will play a crucial role in enhancing water security by using water more efficiently, reducing wastage, recycling plastic waste and improving agricultural and afforestation productivity. It will prove a valuable tool in sustainable water resource management, especially in regions where water availability is a critical concern.

Conclusion

By implementing this Climate Resilient irrigation system in both Rural and urban Communities" , we will strengthen the adaptive capacity of vulnerable communities facing water insecurity risks in agricultural and afforestation activities, and foster sustainable development that promotes environmental protection and social inclusivity for all. Even more so, this system will contribute significantly to achieving Sustainable Development Goal 6 (SDG 6), which is focused on ensuring the availability and sustainable management of water and sanitation for all

Acknowledgements

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references

- 1) Bond, J. J., & Willis, W. O. (1969). Soil water evaporation: surface residue rate and placement effects. Soil Science Society of America Journal, 33(3), 445-448
- 2) . Ayeleru, O. O., Dlova, S., Akinribide, O. J., Ntuli, F., Kupolati, W. K., Marina, P. F., ... & Olubambi, P. A. (2020). Challenges of plastic waste generation and management in sub-Saharan Africa: A review. Waste Management, 110, 24-42.