Access to Clean Water:

Sustainable, Scalable and Easily Accessible Solutions to Guarantee Equal and Just Consumption in Zones with Non-potable Water Sources

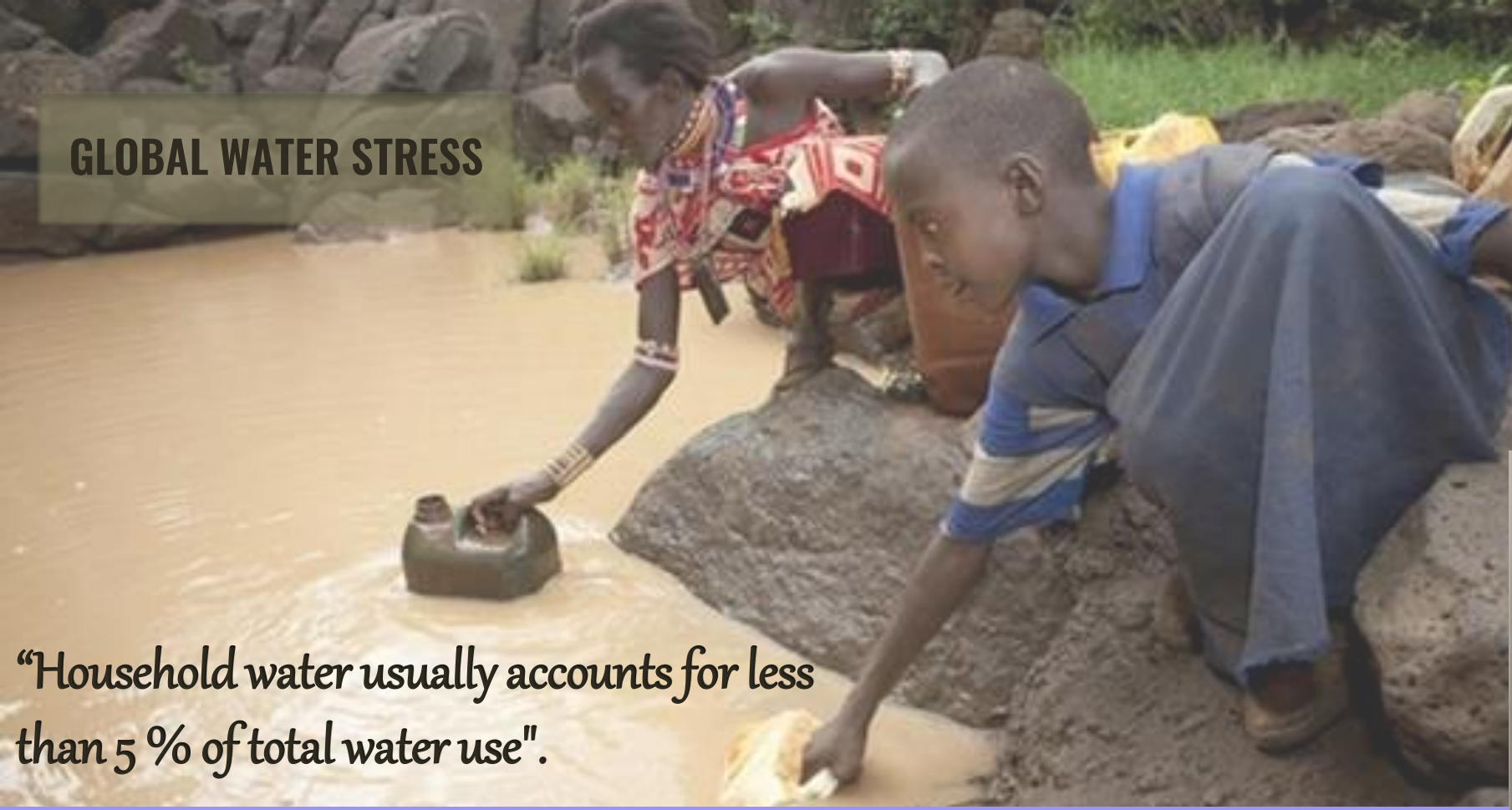
UNIVERSIDAD TECNOLOGICA NACIONAL
Facultad Regional Paraná
Civil Engineering Department
Ingles II, 2022

Civil Engineering Students

- Joaquin Borghello
- Irina Velasquez
- Sol Bustamante

INTRODUCTION

GLOBAL WATER STRESS



"Household water usually accounts for less than 5 % of total water use".

National Academy of Engineering (NAE) "*Grand Challenges for Engineering*".

ENSURE AVAILABILITY AND SUSTAINABLE MANAGEMENT OF WATER AND SANITATION FOR ALL

Map of the Presentation

01 **THE WATER ISSUE**

02 **HELIO SYSTEM**
- Operation
- System components

03 **SIMILAR**
Water purification
PROJECTS

04 **COMPARISON OF THE DIFFERENT SYSTEMS PROPOSED**

01

THE WATER ISSUE

The Water Crisis is a reality that affects the most marginal areas causing large and diverse problems.

- 771 million people (1 in 10) lack access to safe drinking water.
- The water crisis is the #5 global risks in terms of impact on society.
- Each day nearly 5,000 children worldwide die from diarrhea related diseases.

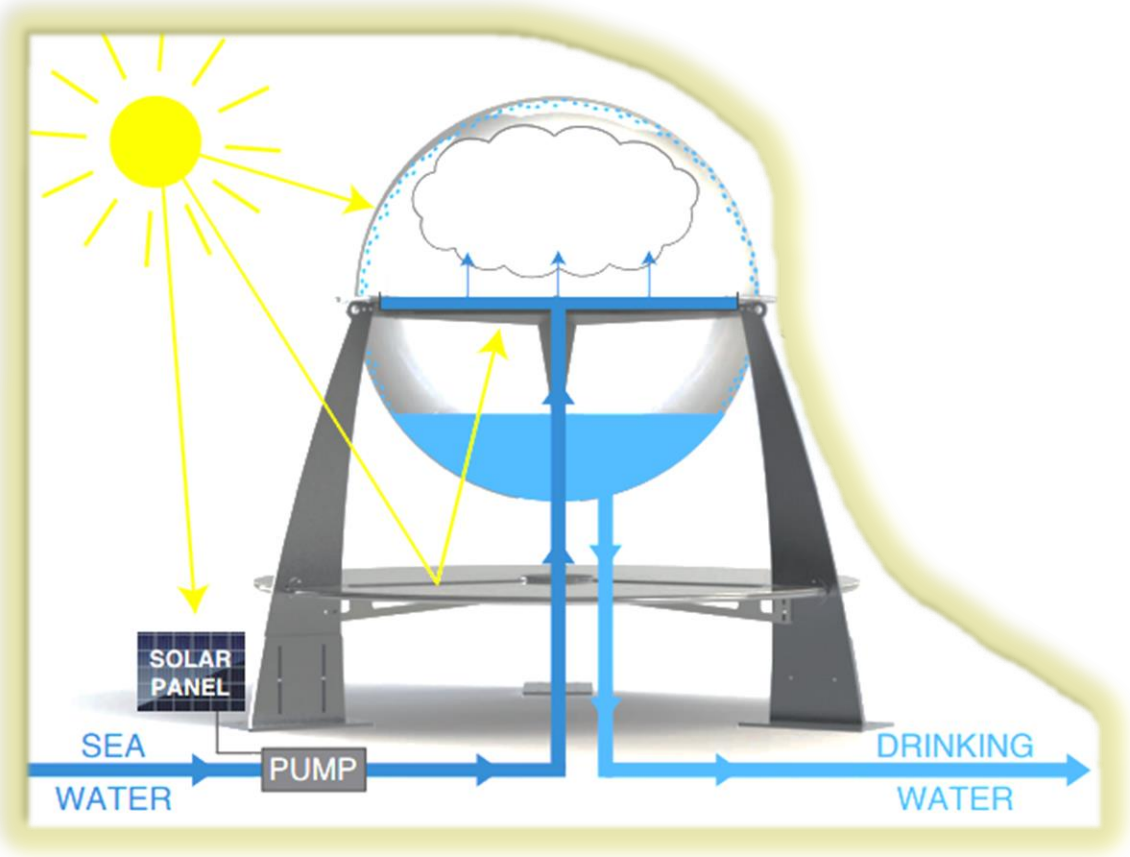
02

HELIO SYSTEM

System with capacity for a family of 5 people

System with a capacity for 25 people

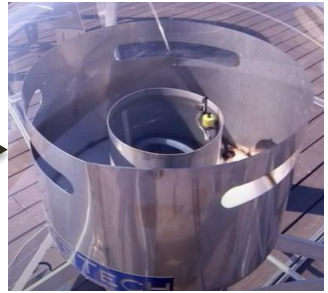
SYSTEM CAPACITY



SYSTEM OPERATION

HELIO SYSTEM COMPONENTS

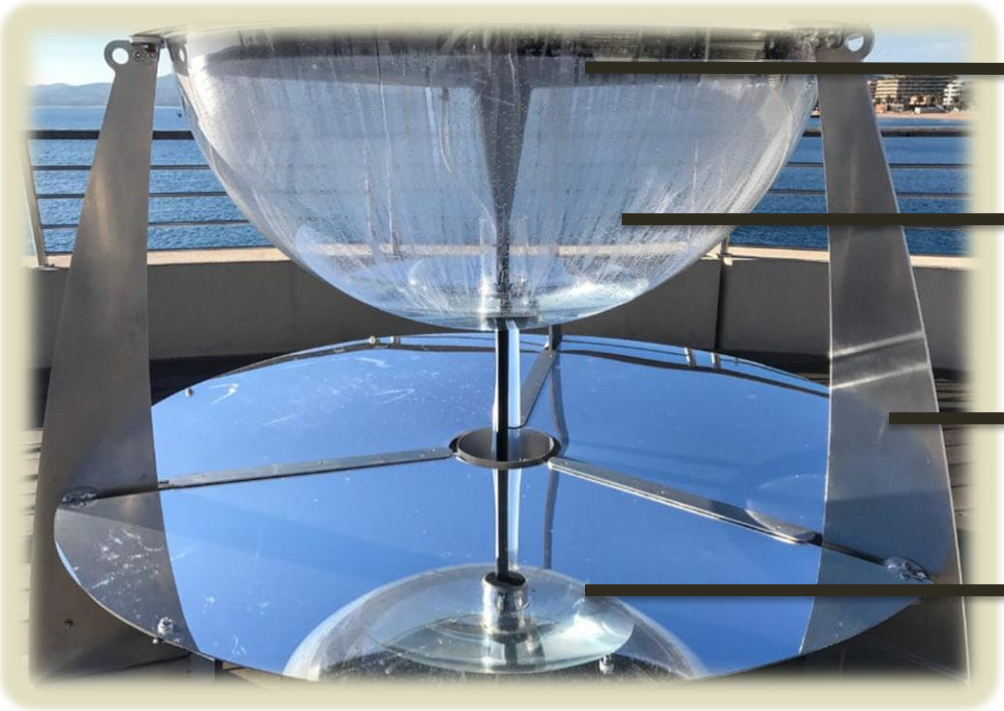
Containers inside the sphere



Aluminium structure

Solar panel

HELIO's Regulation module



Aluminium tray

Plastic sphere

Aluminium structure

Polished stainless steel plate

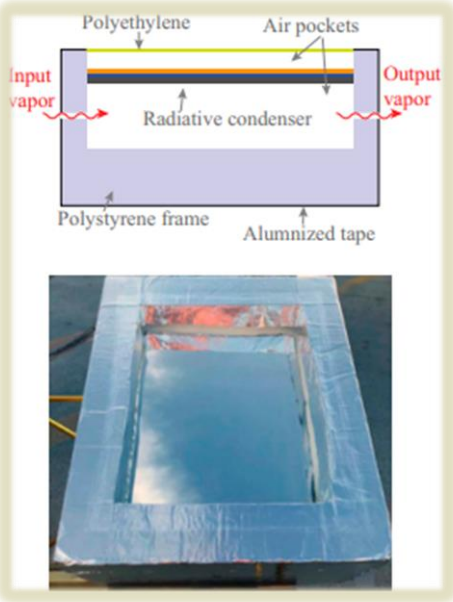
HELIO's Distillation module

03

SIMILAR PROJECTS

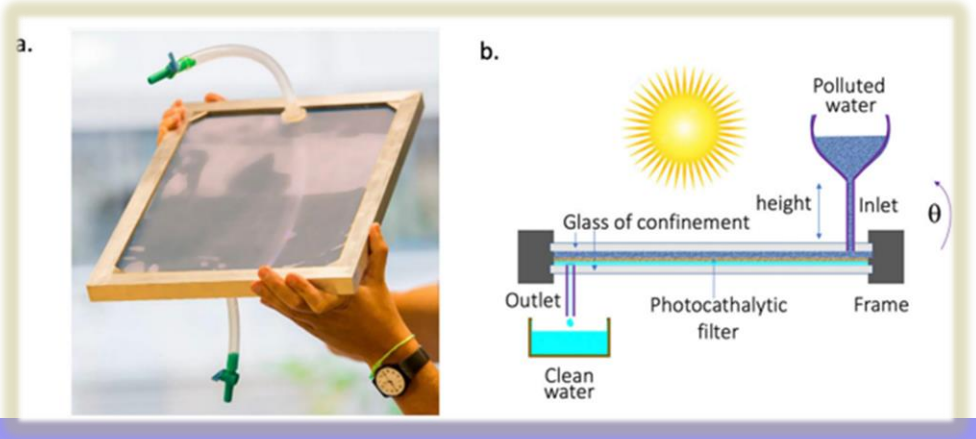
VAPOUR CONDENSATION WITH DAYTIME RADIOACTIVE COOLING

- Contaminated Water Collection Method: no collection of contaminated water
- System operation: Evaporation and condensation by solar radiation
- Components´ material: Silver film and polydimethylsiloxane (PDMS)
- Capacity: Small scales
- Assembly: Experts



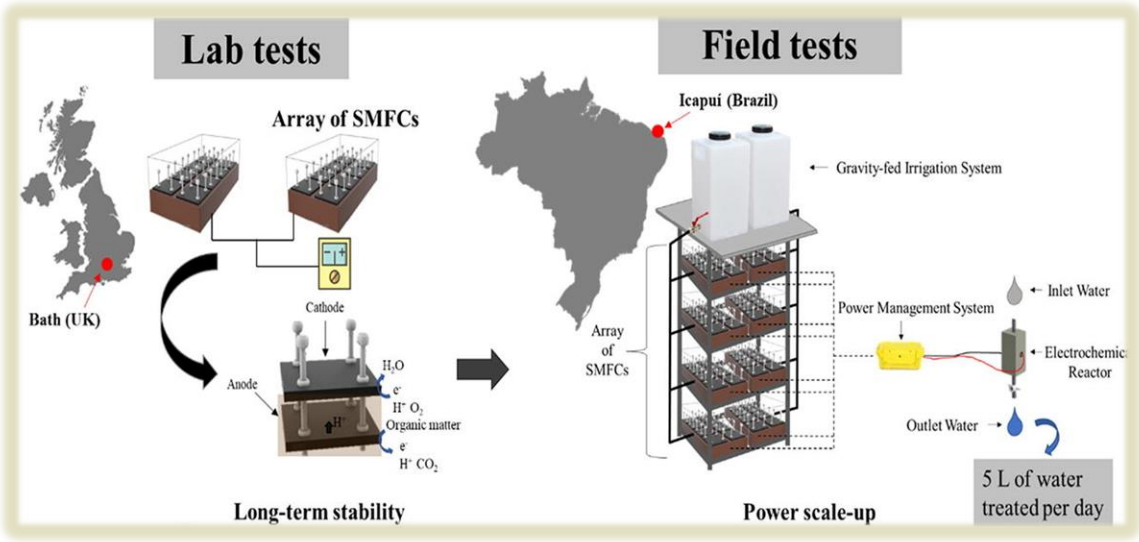
SOLAR WATER PURIFICATION WITH PHOTOCATALYTIC NANOCOMPOSITE FILTER BASED ON TIO2 NANOWIRES AND CARBON NANOTUBES

- Contaminated Water Collection Method: Uses a water tank to contaminated water
- System operation: Solar radiation pasteurization
- Components´ material: Titanium dioxide nanowires filters and carbon nanotubes
- Capacity: Small scales
- Assembly: Non-experts



SOIL-MICROBIAL FUEL CELL

- Contaminated Water Collection Method: Does not collect contaminated water
- System operation: Indirect purification
- Components´ material: Soil microbial fuel cells
- Capacity: Small scales
- Assembly: Experts



04

COMPARISON OF THE DIFFERENT SYSTEMS PROPOSED

A. VAPOUR CONDENSATION WITH DAYTIME RADIOACTIVE COOLING

B. SOLAR WATER PURIFICATION WITH PHOTOCATALYTIC NANOCOMPOSITE FILTER BASED ON TIO2 NANOWIRES AND CARBON NANOTUBES

C. SOIL-MICROBIAL FUEL CELL

VS HELIO

SYSTEMS PROPOSED vs HELIO

Factors	HELIO System	Projects		
		A	B	C
Contaminated Water Collection Method	Uses a solar water pump to collect contaminated water	Does not collect contaminated water	Uses a water tank to store contaminated water	Does not collect contaminated water
System Operation	Evaporation and condensation by solar radiation	Evaporation and condensation by solar radiation	Solar radiation pasteurization	Indirect purification
Components' Material	Plastic spheres with aluminium structure	Silver film and polydimethylsiloxane (PDMS)	Titanium dioxide nanowires filters and carbon nanotubes	Soil microbial fuel cells
Capacity	Medium and large scales	Small scales	Small scales	Small scales
Assembly	Non-experts	Experts	Non-experts	Experts

SYSTEMS PROPOSED vs HELIO

CONCLUSION

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