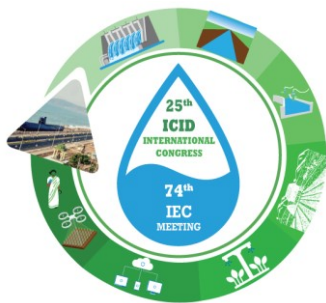
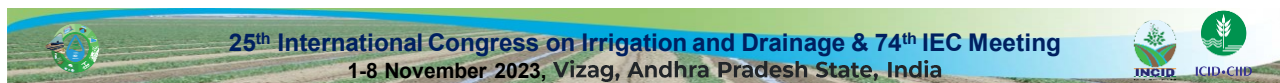


25th International Congress on Irrigation and Drainage & 74th International Executive Council meeting

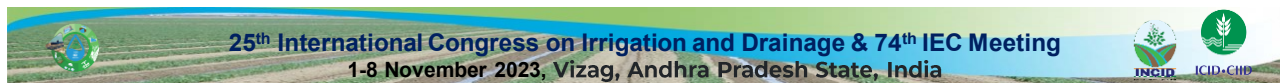


Theme:
**Tackling Water
Scarcity in Agriculture**



THE USE OF SOLAR STILLS IN AGRICULTURE: SUSTAINABLE IRRIGATION AND FOOD PRODUCTION

Souad NASRDINE
Mohammed BENCHRIFA
Jamal MABROUKI
Miloudia SLAOUI
03 November 2023



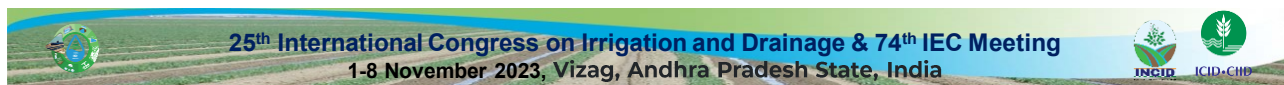
OUTLINE

01
Introduction

02
Methods

03
Results and
discussion

04
Conclusion



INTRODUCTION



Shortage
of Water

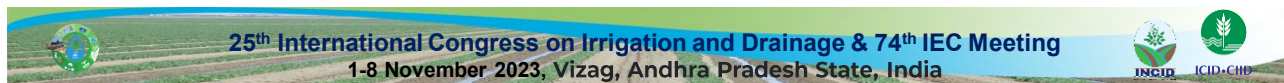
Solar
Distillation



Energy Depletion



Food
Scarcity



METHODS

System description

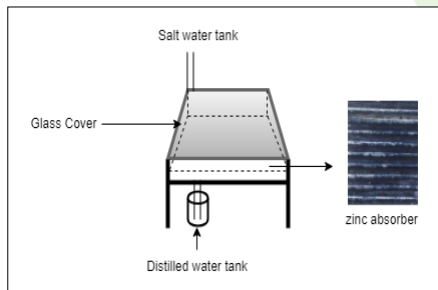
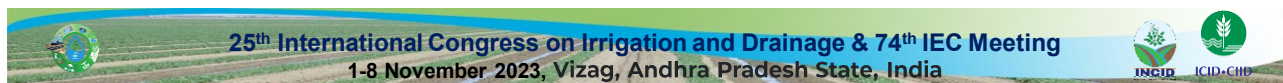


Figure 1. Diagram of operation of the tilted solar still.

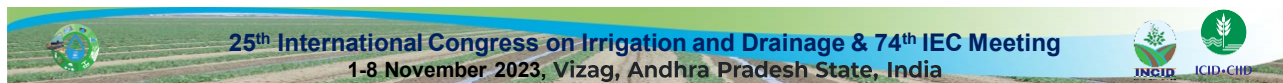
- ➔ Glass cover
- ➔ Absorber
- ➔ Water tank



METHODS

Operating principle

- ➔ Heating water with solar radiation.
- ➔ Steam creation.
- ➔ Condensation of steam on the glass.
- ➔ Collection of condensates.



RESULTS AND DISCUSSION

Solar radiation

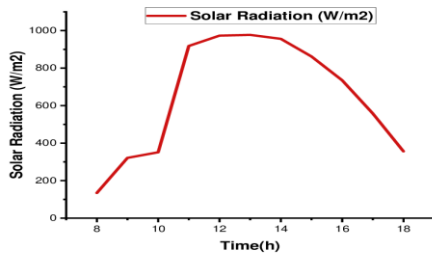


Figure 1. Variation of solar radiation as a function of time on May 15, 2022 in Rabat.

Solar radiation varies from 134.1 W/m² at 08:00 to a maximum value of 977 W/m² at 13:00, after which it begins to fall to a value of 356 W/m² at 18:00 at the end of the experiment.



RESULTS AND DISCUSSION

The principle of irrigation

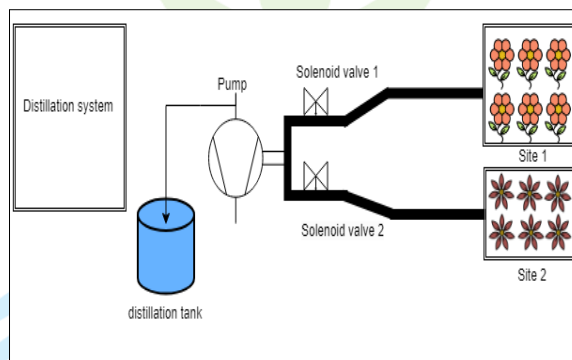


Figure3. Schematic diagram of irrigation using distilled water.



RESULTS AND DISCUSSION

The irrigation systems are mainly composed of a surface pump controlled by a program and connected directly to the tank of the solar still. The water is pumped into two fields to be watered using a pump equipped with two solenoid valves. Both fields have soil moisture and light sensors.



RESULTS AND DISCUSSION

Description of the block diagram

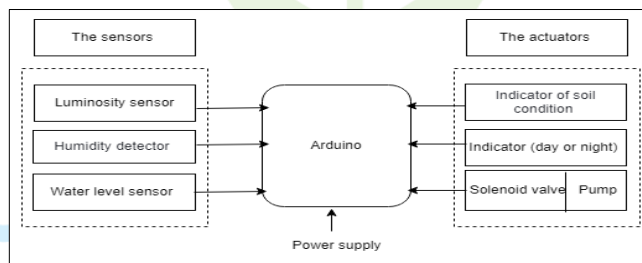


Figure 4. Block diagram of the system.



RESULTS AND DISCUSSION

The block diagram of the irrigation system basically consists of three parts. In addition to the power supply, these components include: a board containing a measurement unit using sensors, a processing and control board, a system containing the actuators equipped with indicators.



RESULTS AND DISCUSSION

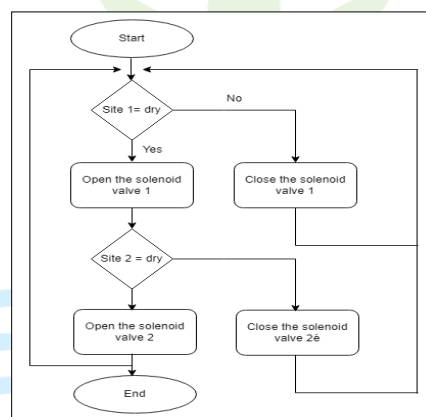
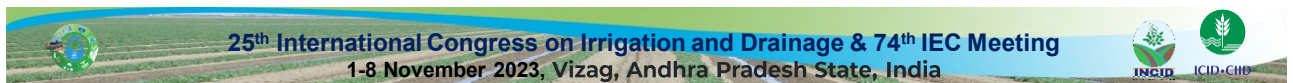
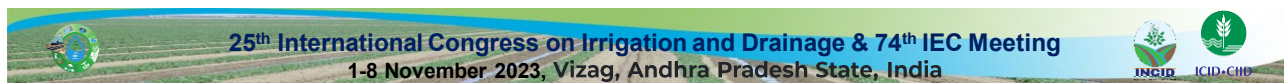


Figure 4. Automatic watering diagram.



RESULTS AND DISCUSSION

The number of fields to be irrigated may be more than two. In this case, for n given fields, n solenoid valves can be added.



CONCLUSION

- ➔ The importance of finding ways to provide water and food for the Earth's inhabitants
- ➔ Exploring new applications for our natural resources, such as solar energy.
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