

11-12 FEBRUARY 2025

RABAT, MOROCCO

Institut Agronomique et Vétérinaire Hassan II



WEFE NEXUS INTERNATIONAL CONFERENCE

**EXPLORING AND BRIDGING NEXUS FOR
A SUSTAINABLE FUTURE**



These projects are part of the
PRIMA programme supported
by the European Union.

WEFE NEXUS INTERNATIONAL CONFERENCE

Day 2 – 12th February 2025

PILLAR 3: WEFE NEXUS SOLUTIONS

INNOVATIVE SOLUTIONS SHOWCASING DEMONSTRATION CASES FROM BONEX/SURENEXUS



Giulia Berni

Junior Project manager
Planet



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Solar Desalination for Sustainable Agriculture: A WEFE Nexus Approach in the Mediterranean Basin

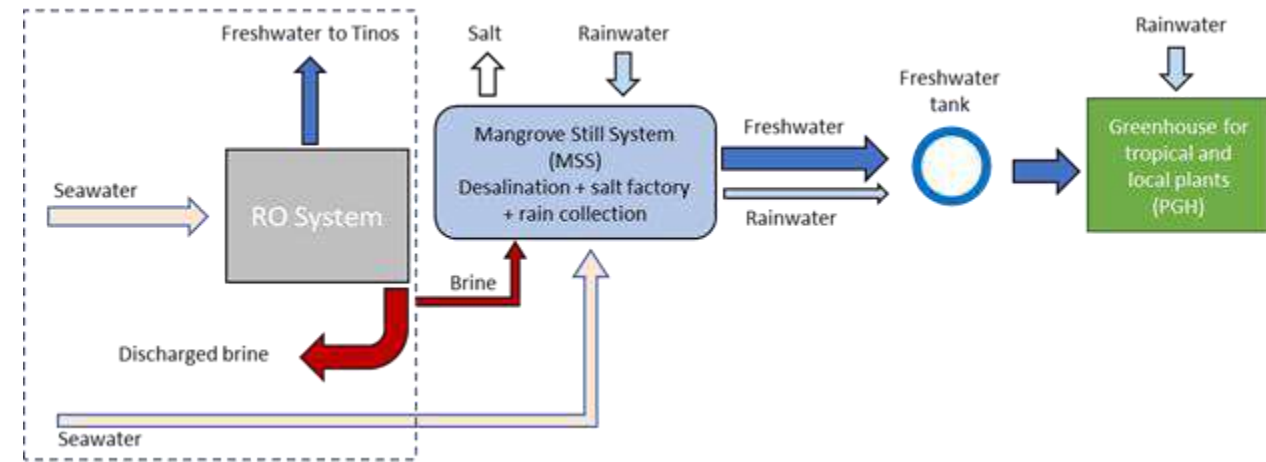
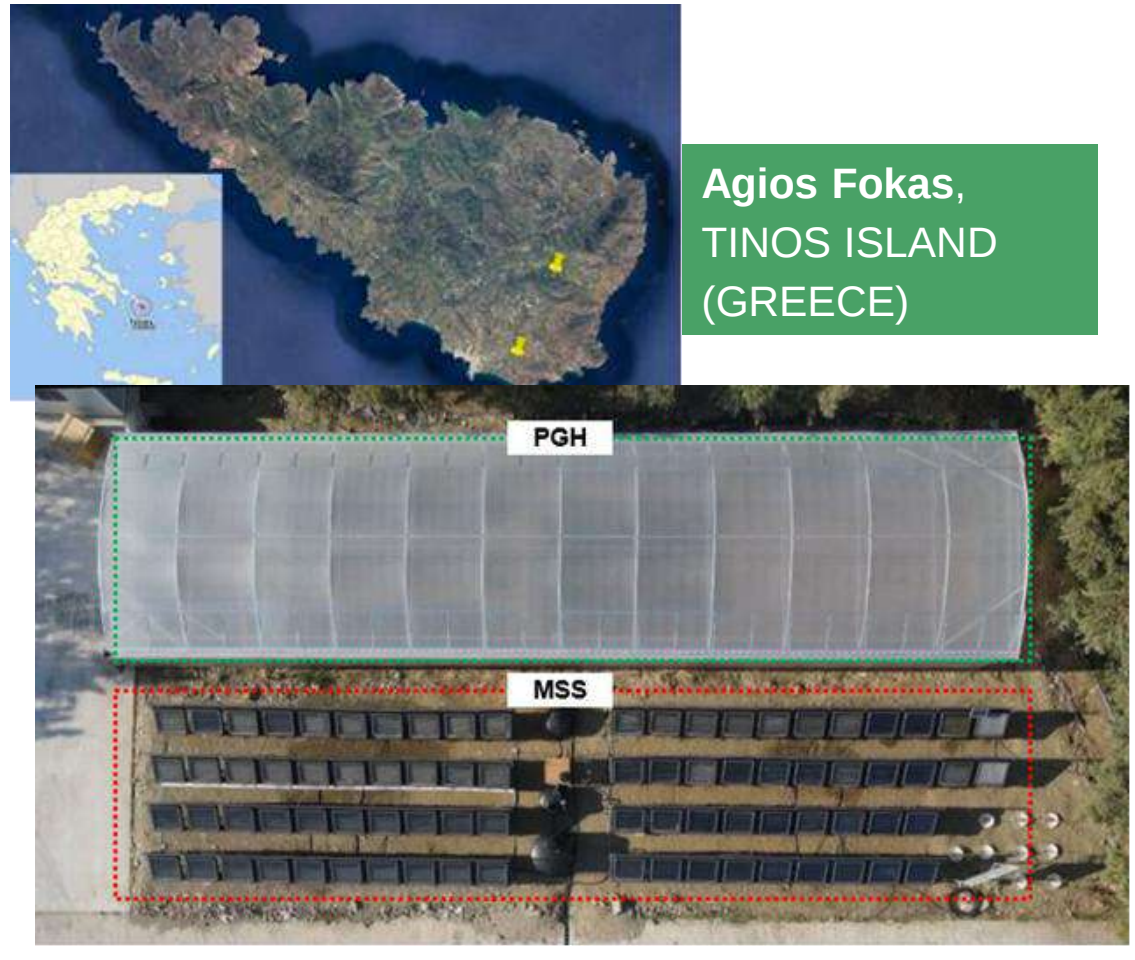
Giulia Berni, Dimitris Michailaris



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Demosite 2A - Agios Fokas, Tinos (GR)

Mangrove Still System (MSS) + Productive Greenhouse (PGH)



Consists of a solar desalination system coupled to GH to produce fruits, vegetables and aloe.

[SureNexus Demo Site 2A teaser:](#)
[Mangrove Technology Desalination Platform](#)

Demosite technologies & WEFE Nexus

TECHNOLOGY/PRACTICE	MAIN FUNCTION	MAIN WEFE NEXUS
Desalination unit	Production of freshwater from seawater through an evaporation-condensation process	W-En
Hydraulic circuit	System of pumps, valves that manage inputs and outputs of saltwater, freshwater and brine	W-En
Electrical circuit	Energy supply for IoT devices, irrigation system, salt factory	En-W
Salt factory	Forced recirculation of brine to yield salt and avoid brine discharge into the sea	Ec-En-W
Smart irrigation system	Efficient water supply for the greenhouse thanks to soil humidity sensors	W-En-F
IoT	System of sensors and actuators, PLC, that automatise the desalination process and allow for close monitoring and predictive maintenance	En-W
Vegetable greenhouse	200 m ² greenhouse for the local production of vegetables (<i>broccoli, onions, cauliflower beetroot, lettuce, cabbage, tomato, cherry tomato, pumpkin, pepper, melon, cucumber, oregano</i>), aloe and papayas	W-F-En-Ec

Demosite 2A - Agios Fokas, Tinos (GR)



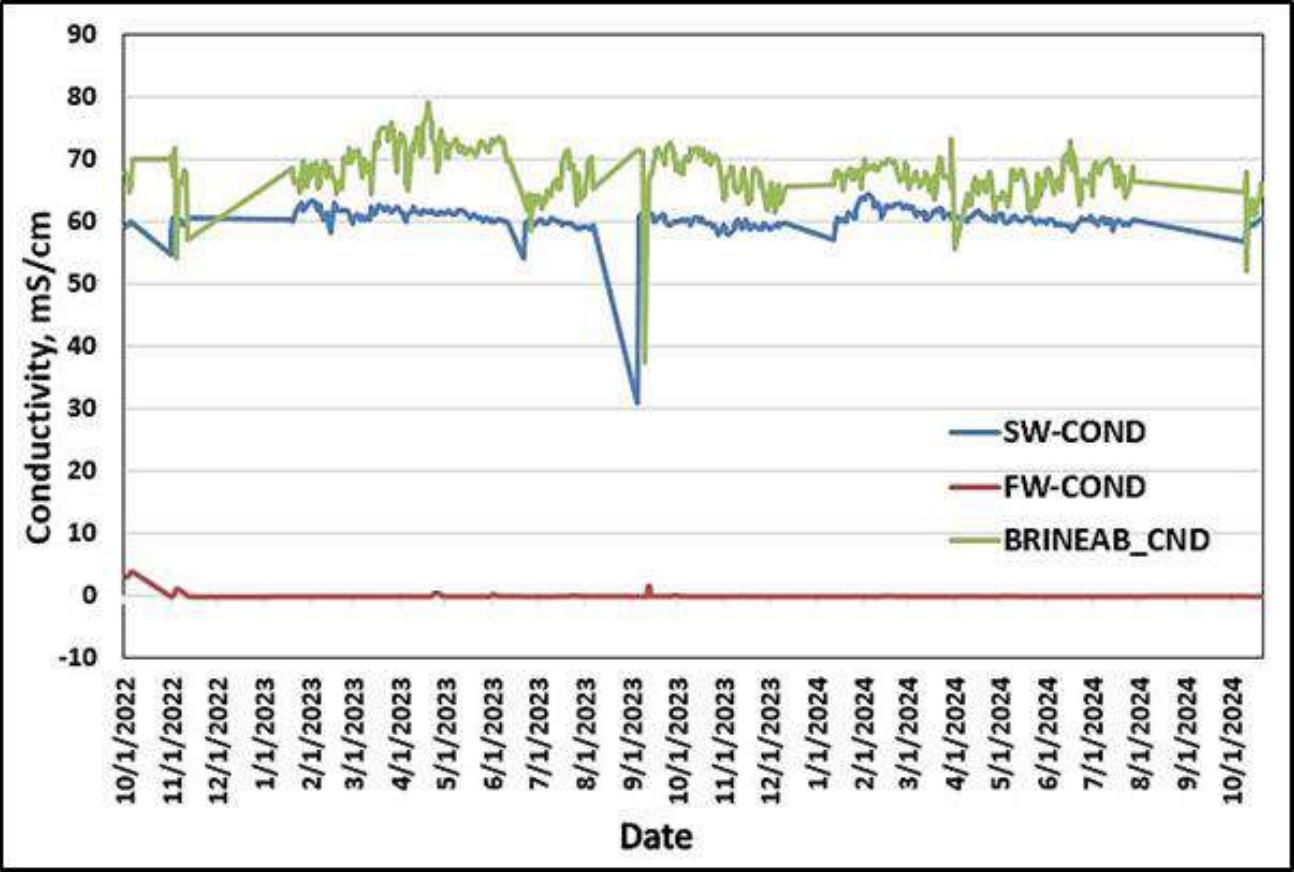
Demosite 2A - Agios Fokas, Tinos (GR)



Demosite 2A - Agios Fokas, Tinos (GR)



Activities carried out - data collection

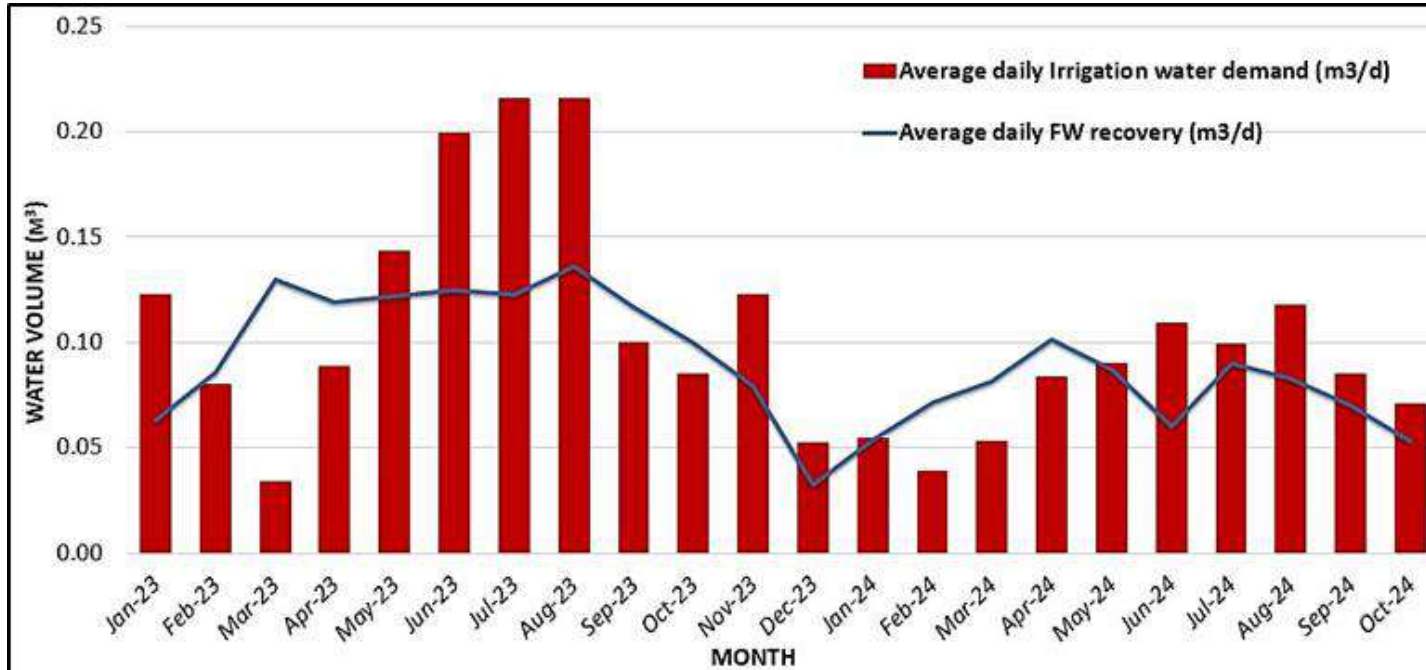


Collection of demosite data:

- Water production
- Water consumption
- **Water quality**
- Energy consumption
- Greenhouse practices
- Vegetable production

	SW-COND	FW-COND	BRINEAB_CND	SW-ph	FW-ph	BRINEAB_PH
21/10/2024	60,23321528	0,0461262	69,91929589	7,626169	5,946067	8,136051781
20/10/2024	60,15265313	0,046932	65,4343375	7,637191	5,945099	8,099044792
19/10/2024	60,26935104	0,052407	64,74568021	7,725458	5,960881	8,140273021
18/10/2024	60,09767917	0,055413	66,52332292	7,842665	5,958338	8,155164479
17/10/2024	59,72004271	0,058522	66,90140521	7,638137	5,913096	8,117070208
16/10/2024	59,32024167	0,065161	67,83969792	7,706731	5,906433	8,133656354
15/10/2024	59,59973542	0,069787	68,03473021	7,7906	5,895497	8,143573438

Activities carried out - data collection



Collection of demosite data:

- **Water production**
- **Water consumption**
- Water quality
- Energy consumption
- Greenhouse practices
- Vegetable production

- Irrigation water shortage → Tap water supply requirement
- Considering that 10 MSS units (out of the total 80) are out of order due to damage
- FW Productivity depends on weather conditions (Solar Irradiation level)

Activities carried out - data collection

Sept 2023 - Oct 2024

Plant Species	Units	kg/unit (mean value)	Harvest per plant (kg)
Broccoli	7	0.25	2.51
Fresh onions	48	0.05	2.4
Papayas	52	0.32	15.96
Aloe Vera (Leaves)	180.00	0.22	39.6
	(22Plants)		
Aloe <u>Arborescens</u> (Leaves)	25.00	0.07	1.75
	(- Plants)		
Cauliflower	5	0.66	3.3
Beetroot	8	0.1	0.8
Lettuce	12	0.21	7.52
Cabbage	3	2.5	6.7
Tomato	17	0.2	3.4
Cherry tomato	256	0.02	4.12
Curly Salad	10	1.00	10
Pumpkin	29	0.22	6.38
Pepper	189	0.14	26.46
Melon	14	1.7	42.5
Cucumber	12	0.5	6.0
Oregano			
Bananas (Bunches)	2	8.1	16.2
Total harvest			195.6

Table 5: Fertilizers and phytosanitary products used in PGH

Name	Package Quantity	Units used	Frequency	Comments
Copp.ion or ICC	1 lt	6	Monthly (spraying)	Plant protection – Fungus elimination (Proactively)
Copper Oxychloride	5 Kg	2	Monthly (spraying)	Plant protection – Fungus elimination (Proactively)
Serenade Aso	1 lt	1	When needed (spraying)	Bio-treatment for Fungus elimination
Brotaverd	1 lt	3	When needed – per 2 months (spraying)	Cu, Mn, Zn – Plants strength boost & vascular disinfection
Pyrethro	1 lt	4	–Proactively per 2-3 weeks	Plant protection – Harmful insects elimination
Paraffin oil	1 lt	3	When needed (spraying) – Proactively per 2-3 weeks	Plant protection – Harmful insects elimination
Potassium salts of fatty acids	1 lt	2	When needed (spraying) – Proactively per 2-3 weeks	Plant protection – Harmful insects elimination
Diatoms Earth	200 gr	4	When needed (soil application)	Ants elimination
Insect traps	Package of 10 units	2	When needed	Adhesive traps
Humi-Plus	1 lt	1	End of Winter (soil application)	Organic fertilizer with P and Humic acids – Roots enchantment - plant boost - SOM & nutrients availability increase
Algaliv or Maxxis	1 lt	2	Early Winter (spraying)	Algae based Bio-activators with free Amino acids and K & SOM, Cu (maxxis) – Strength boost & Protection of Stress conditions

Collection of demosite data:

- Water production
- Water quality
- Water consumption
- Energy consumption
- **Greenhouse practices**
- **Vegetable production**

Activities carried out - WEFE Analysis

	FOOD		ECOSYSTEM		
	Process	Technology/Indicator	Process	Technology/Indicator	
WATER for WATER for	Water production	Solar desalination	Water Saved /	Solar desalination	
	Water Demand	Water Consumption in the GH	Brine not discharged into the sea	Salt factories	
ENERGY for	Saltwater Supply	Pumping	Energy Saved / Efficiency	CO ₂ reduction from food import	
ENERGY for	Freshwater supply	Crop Yield			
ENERGY for	Pumping and controlling system	Irrigation			
	Salt production	Salt factory			
FOOD for			Avoided contamination	Organic Fertilizers Organic Pesticides	
ECOSYSTEM for					
ECOSYSTEM for	Soil Quality /Fertility	Soil organic matter			

Activities carried out - system improvements



**New
design**

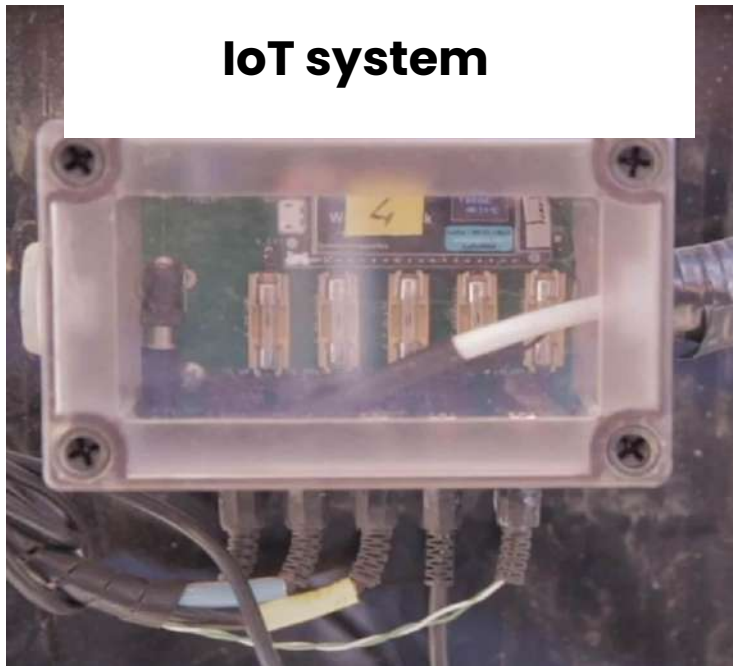


Mangrove Technology Platform

**Desalination +
Salt production**



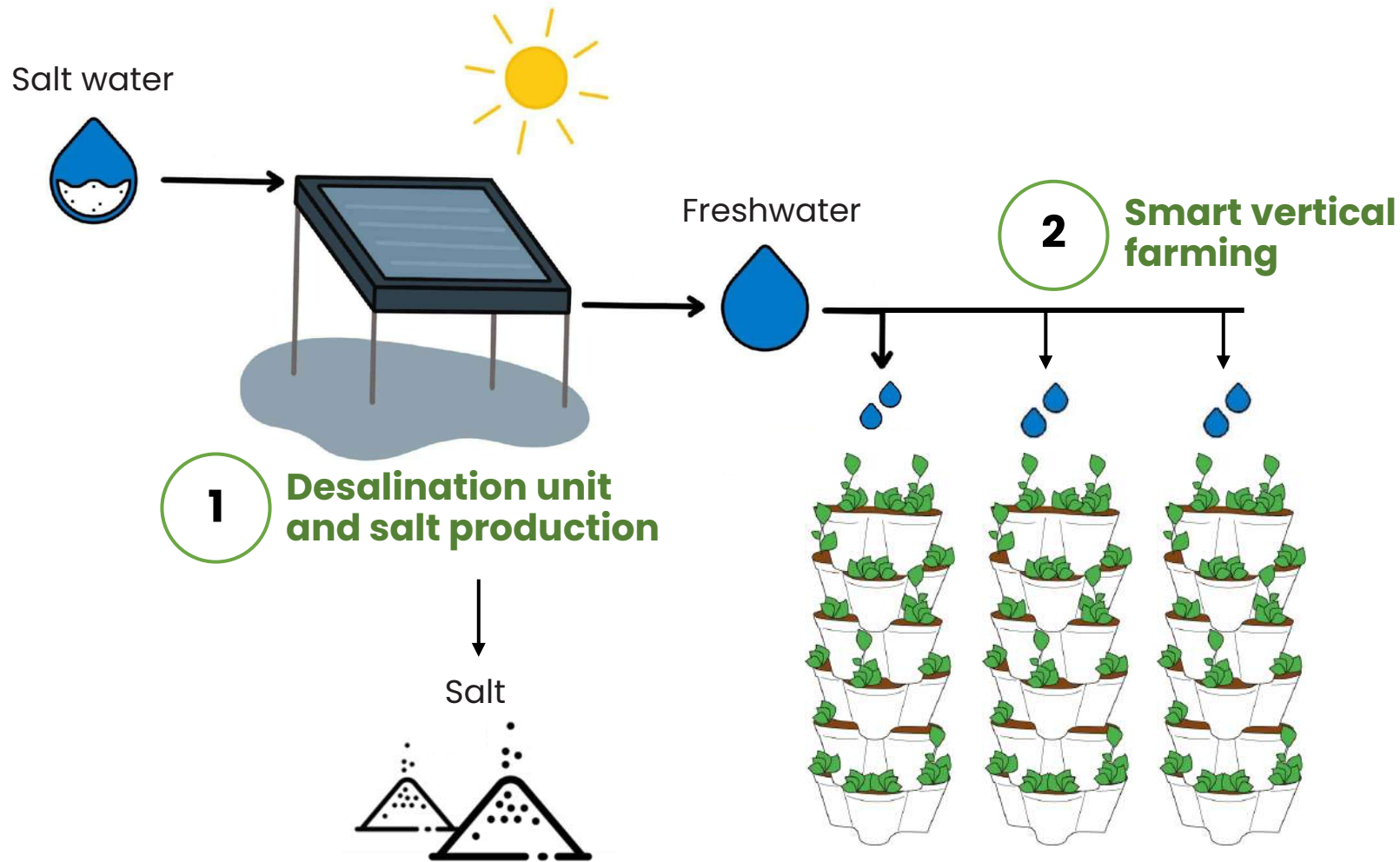
IoT system



Vertical plant nursery



Mangrove Technology Platform



Leveraging salt water and sun irradiation to produce **water** and grow **small fruit, crops**, and **tree seedlings**.



**SURE
NEXUS**



PRIMA
PARTNERSHIP FOR RESEARCH AND INNOVATION
IN THE MEDITERRANEAN AREA



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