

BONEX III WORKSHOP

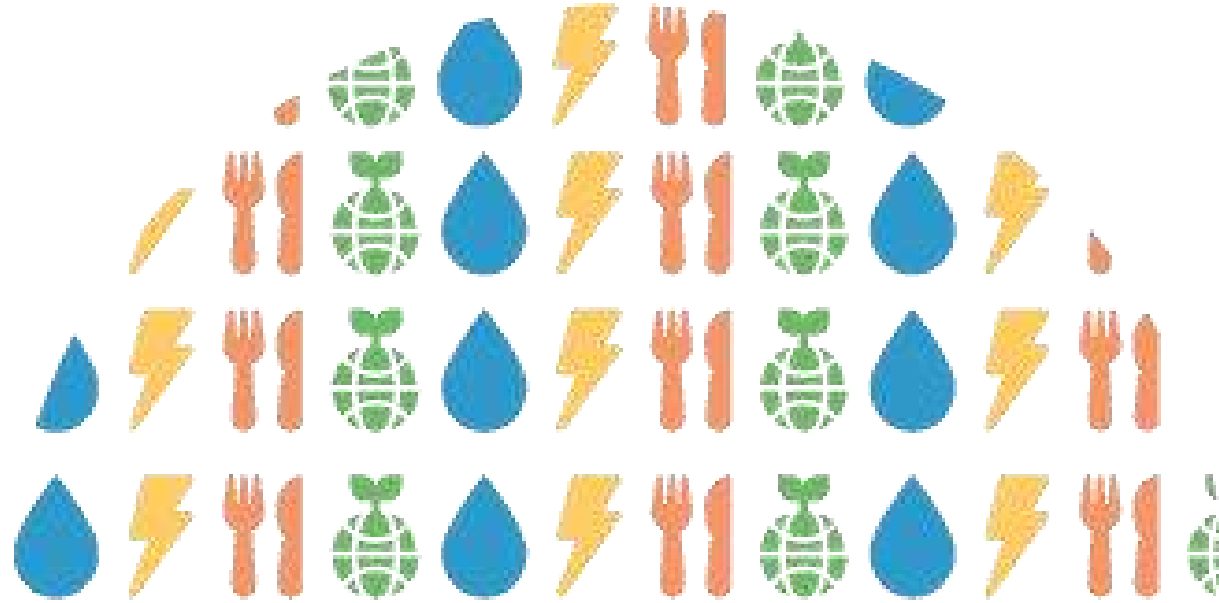
Solar Hydroponics: Identifying Roles & Solutions

January 29, 2025



AGENDA

- 9:00 – 9:15: Opening
- 9:15 – 10:00: DP results discussion
- 10:00 - 10:30: Tour of the Hydroponics Unit
- 10:30 – 10:50: Coffee break
- 10:50 – 11:40: Exercise 1: What is needed to support the implementation of the intervention?
- 11:40 – 12:30: Exercise 2: Who should be in charge of the complementary measures to facilitate the implementation?
- 12:30 – 12:45: Plenary Discussion
- 12:45 - 13:00: Closing



BONEX

**Boosting Nexus Framework
Implementation in the Mediterranean**

Intervention implemented in the DP

- System installed at AUB in September 2024: Greenhouse, Solar Panels, and Hydroponics unit
- System started running in December 2024



PRIMA
PARTNERSHIP FOR RESEARCH AND INNOVATION
IN THE MEDITERRANEAN AREA



This project is part of the
PRIMA programme supported
by the European Union.

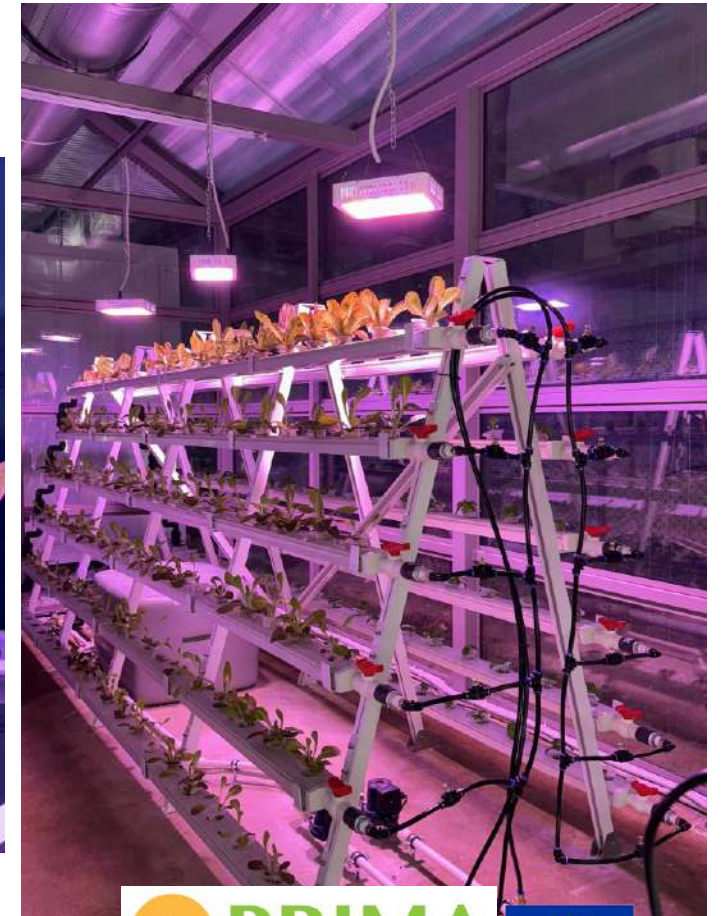
Intervention implemented in the DP

- 24 rotating towers, each has 42 plugs
- 1,008 plants in total



Intervention implemented in the DP

- 2 A-shaped NFT Systems, each has 240 plugs
- 480 plants in total



Intervention implemented in the DP

- 22 solar panels
- Tank room



This project is part of the PRIMA programme supported by the European Union.

Results of the work from BONEX in each DP

- Results of: REWEF



Rapid Evaluation of Water Energy Food ecosystem nexus

powered by FutureWater

INSTRUCTIONS

INPUT

RESULTS

SECTOR DETAILS

Scenarios

Scenario	Description	Show results
Baseline (B)	Current conditions of the nexus unit (Bekaa valley encompassing the Bekaa and Baalbek-Hermel governorates)	
Scenario 1 (S1)	Development of a hydroponic system.	☒
Scenario 2 (S2)	Hydroponic system powered by solar energy.	☒
Scenario 3 (S3)	Upscaled scenario indicating expansion of hydroponic systems across the nexus unit.	☒
Scenario 4 (S4)		☐
Scenario 5 (S5)		☐

Land use

Total	(km2)
Nature	(%)
Other	(%)
Rainfed	(%)
Irrigated	(%)
Irrigated pressurized (% of irrigated)	(%)
Greenhouse area	(%)
Total (check)	(%)

Population

Total	(cap)
Domestic water demand	(m3/p/y)
Return flow urban	(%)
Food demand	(kCal/p/d)
Energy demand urban	(kWh/p/y)

Industry

Units	(-)
Industrial water demand	(m3/u/d)
Return flow industry	(%)
Energy demand industry	(MWh/u/y)

WATER

Precipitation
ETpot
Irrigation requirement
Greenhouse requirement
Runoff fraction
Recharge fraction
Reclaimed fraction
Pumping capacity
Pumping depth
Pump efficiency
Desalination amount
Inflow

ENERGY

Pressurized irrigation (consumption)
Greenhouses (consumption)
Reservoir storage capacity
Hydraulic head
Hydropower capacity factor (efficiency)
Hydropower running fraction
Desalination energy consumption
Thermal plants production
Total solar panel surface area
Photovoltaic energy yield

FOOD

Rainfed agriculture
Irrigated agriculture, potential
Greenhouses, potential
Nutrient loading reclaimed water
Nutrient loading by fertilizer
Nutrient uptake fraction
Caloric value

ECOSYSTEM

Nature valuation
Water outflow (environmental flows)
Overexploitation pumping cost
Nutrient excess, costs
CO2e per fertilized area
CO2e per MWh
CO2e price



PRIMA
PARTNERSHIP FOR RESEARCH AND INNOVATION
IN THE MEDITERRANEAN AREA



This project is part of the
PRIMA programme supported
by the European Union.

Opportunities and Barriers Identified in the 2nd workshop

	Barriers	Opportunities
Financing	• High initial and maintenance costs • Lack of financing (loans) • National financial instability	• High return on investment • Stabilization of cost (annually)
Physical Implementation	• High skilled labor required • Need for imported materials • No sunlight in winter	• Controlled environments • Utilizing spaces • Collaboration with research institutions for technical support
Social, Administrative, and Political	• Social acceptance • Limited administrative expertise • Lack of clear regulations and guidelines	• Policy advocacy for renewable energy • Leveraging public-private relationships
WEFE	• Water scarcity and irrigation challenges • Water treatment fees	• Improved water-efficient farming techniques • Integration of renewable energy sources



Results

- Results of:
 - **Non-Monetary Valuation:**
 - **Importance of Natural Resources:** Vital for survival, economy, and biodiversity in Lebanon.
 - **Challenges:** Pollution, inefficient resource use, and lack of sustainable practices.
 - **Connection to Nature:** Strong cultural and personal ties to the environment.
 - **Economic Benefits & Challenges:** Some gain from natural resources, but face economic pressures and corporate dominance.
 - **Call for Action:** Need for broader implementation of sustainability practices and policies.
 - **Optimism:** Positive experiences in nature and hope for improved environmental management.

Hydroponic Unit Visit

COFFEE BREAK

Exercise 1:

- **The barriers to the implementation of the intervention**

Barriers identified in the 2nd Workshop

Financing	• High initial and maintenance costs • Lack of financing (loans) • National financial instability
Physical Implementation	• High skilled labor required • Need for imported materials • No sunlight in winter
Social, Administrative, and Political	• Social acceptance • Limited administrative expertise • Lack of clear regulations and guidelines
WEFE	• Water scarcity and irrigation challenges • Water treatment fees

What is needed to overcome the barriers in order to implement the intervention?

Financial Resources	
Technology	
Institutional Arrangements	

Exercise 2:

- Who should be in charge of the complementary measures to facilitate the implementation?

Planning Phase
(short term)



Implementation Phase
(medium term)

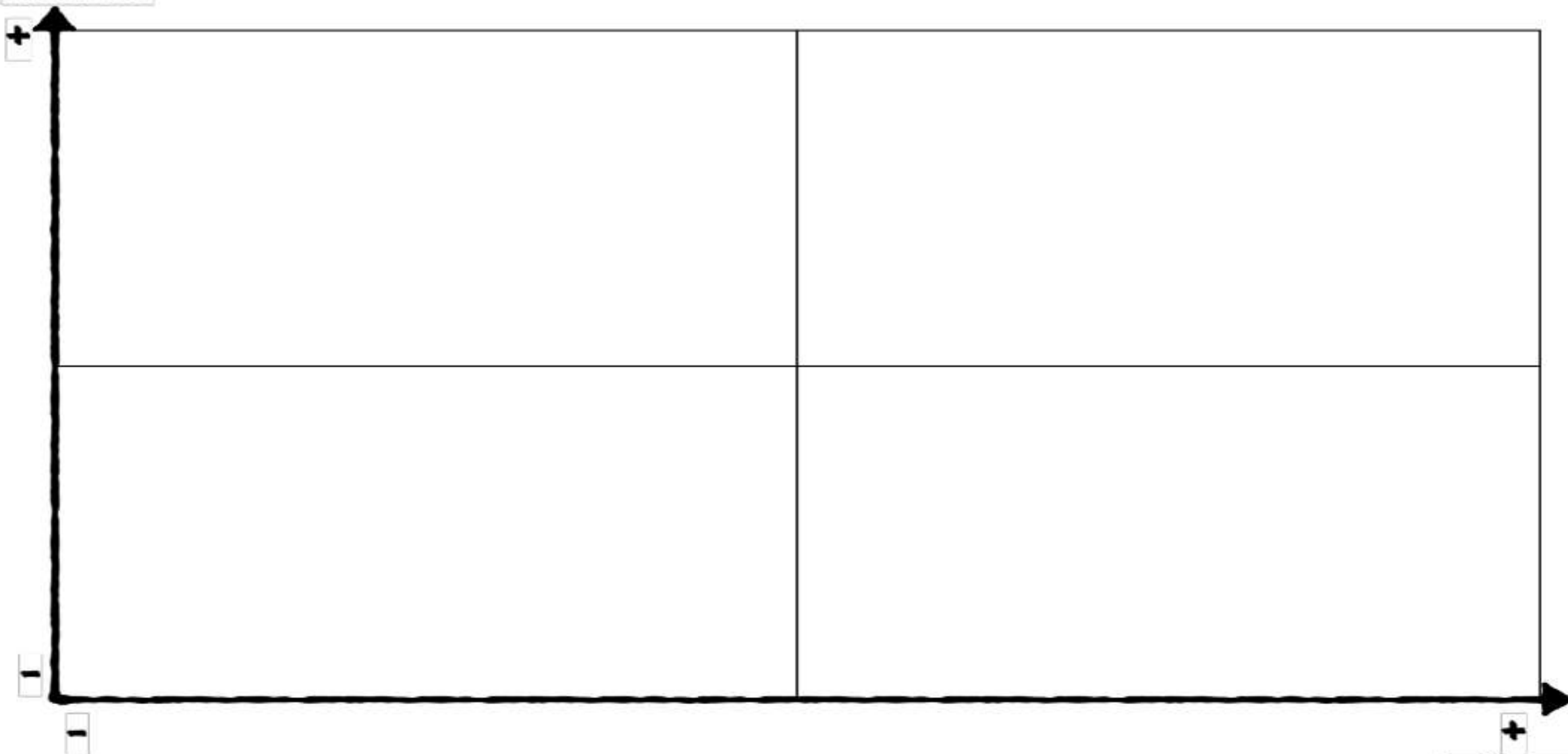


Action Phase
(long term)



Who should be in charge of the complementary measures to facilitate the implementation?

Interest



Influence

Plenary Discussion

- **How and where do you think these measures could impact the social, economic, and environmental dynamics of the region? Which dynamics would change, and how?**
- **Which of these changes in the measures do you consider most important? Who would be responsible for these changes?**

Participation Evaluation Survey