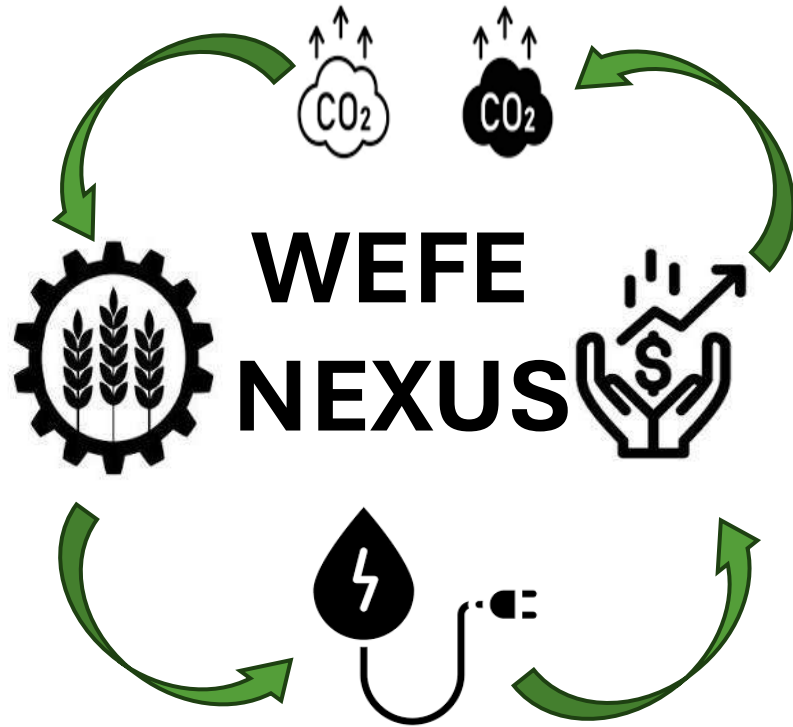




Conclusive Workshop of BONEX

The project **BONEX** in Jordan – Main Results from the Demonstration Project in Wadi Al Wala

Prof. Arwa Abdelhay

02/06/2025

DP in Jordan

The intervention consists of

1. two hydroponic production systems (46.5 m x 9 m, 418.5 m² each) powered by solar PV system
2. and two other traditional-farming greenhouses established (control

The **hydroponic irrigation system** is drip irrigation with soilless growing medium which is tuff (locally available)

The **water** is collected from Al Wala valley stream, filtered, and circulated in a **closed loop** throughout the hydroponic green houses

The **fertilizers** are supplied and dozed based on a self-adjusting system

Four cultivation cycles: 2 Cucumber, Peas, and Red Cabbage

Hydroponic



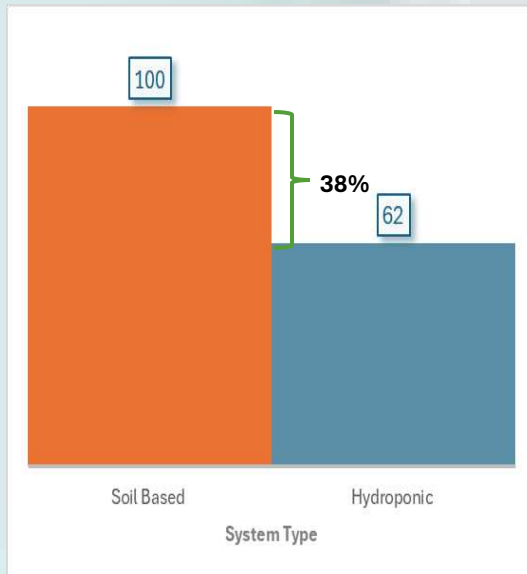
Traditional



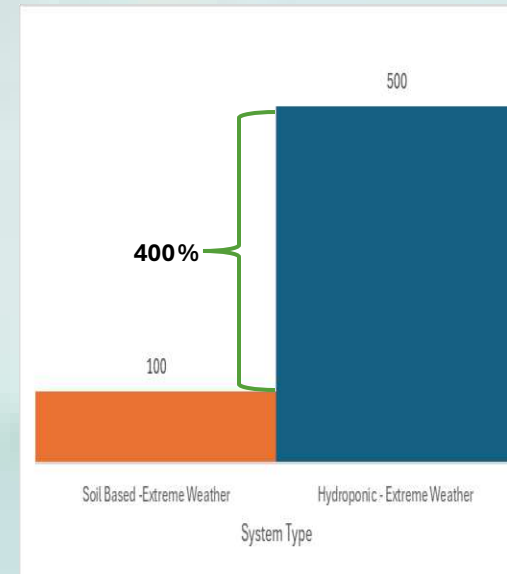
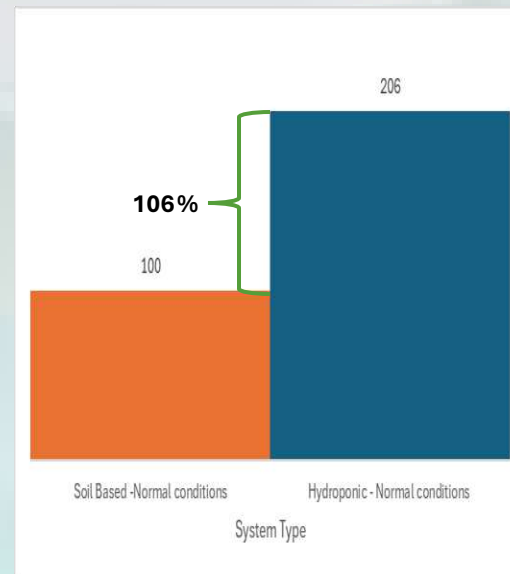
KEY PERFORMANCE INDICATORS

KPI

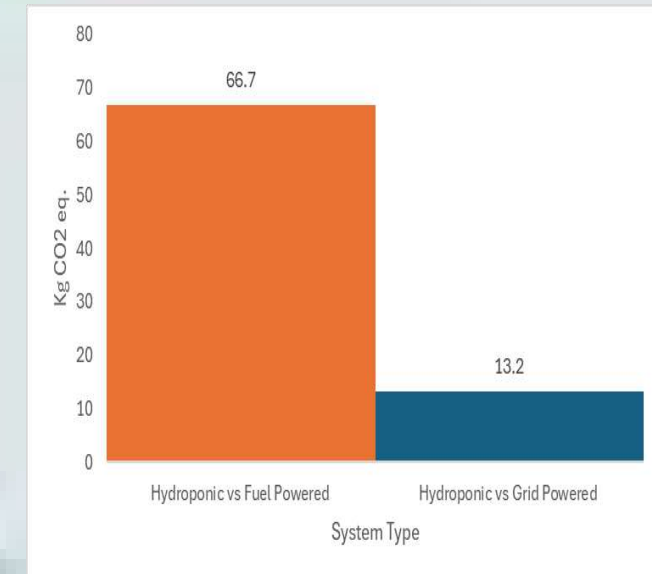
Water Saving



Crop Productivity

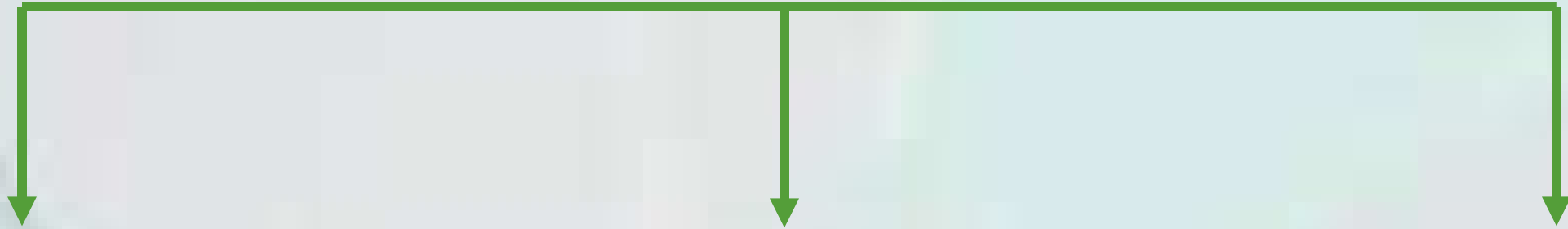


CO₂ Emissions



KEY PERFORMANCE INDICATORS

KPI



Hydroponic Resilience



Fertilizer use optimization

Closed loop system and a fertigation units to minimize the quantities of fertilizers to be applied

Socio-Economic

Early Engagement of local community:
The project is operated and managed by **Dhiban Youth Cooperative** (almost half are women)

Income Generating Example

Assessment of Hydroponic upscaling scenarios using REWEFe tool

Four scenarios:

- Small hydroponic system (S1)
- Expanded hydroponic system (S2)
- Small hydroponic powered by solar energy (S3)
- Expanded hydroponic system powered by solar energy (S4)
- Traditional farming is used as the baseline scenario



Results of REWEFe tool

- (S1) significantly reduces energy consumption, requiring less irrigation and exhibiting greater energy efficiency compared to traditional greenhouse agriculture.
- (S2), the expansion of hydroponic operations leads to increased energy demand, which poses a potential limitation in energy-scarce contexts such as Jordan.
- The transition to solar-powered hydroponics (S3) offers substantial ecosystem benefits. These include reduced water usage, resulting in increased outflows from the nexus unit, and lower CO₂ emissions due to the adoption of renewable energy sources.
- Water consumption is reduced by 5–7% as a result of decreased reliance on conventional irrigation. Across all scenarios, the deployment of hydroponic systems contributes to increased food production, with improvements ranging from 1% to 34%. Water recirculation within the system minimizes the need for fertilizers.
- Overall, the implementation and scaling of hydroponic systems within the nexus unit enhance water efficiency and food productivity. However, the increased energy demand observed in the large-scale scenario (S4) underscores the importance of expanding renewable

**THANK YOU FOR YOU
ATTENTION**