Support to green water financing: landscape, agriculture, domestic

Prepared by: Charbel Rizk.
Team Lead Civic Engagement.
Lebanon Water Project. Funded by USAID

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The Lebanon Water Project

- Funded by USAID: 65 million dollars
- Time frame: 2015 to 2020

The Lebanon Water Project

- **Result A: Improve service delivery and resource management** by the five public water utilities that are mandated by law to provide water, wastewater, and irrigation management services in Lebanon, and by local municipalities where feasible and appropriate.

- **Result B: Improve civic engagement in water management** and advance citizen perception of the water utilities role in providing a necessary and valuable service.

- **Result C: Improve private sector involvement in water management**

History and context of green financing

- Workshops at Central Bank of Lebanon on Green Technologies by an EU project – 2009
- Development of the Green Circular 83 by Central Bank - 2010
- Creation of the Lebanese Centre for Energy Conservation to finance green energy technology and energy conservation - 2011

The Lebanese Center for Energy Conservation (LCEC)

- Partnered with the Central Bank of Lebanon to promote energy conservation at the beginning through NEEREA
- LWP Partnered with BDL and LCEC to promote water conservation through the development of **specific guidelines** to be applied in **LEA**
- Provides very soft loans, supported by BDL, for energy conservation, green energy production and water conservation

Impact of the creation of LCEC

- From 2 companies in green technology to more than 20 at present
- Millions of dollars in projects
- **Extended currently in partnership with LWP to cover water conservation in Domestic, landscape an agriculture**

Rational for water conservation

- We are below the poverty level in water 796 m3/ca.y (the limit is 1000 m3/ca.y)
- Agriculture consumes 70% of the water in Lebanon
- Domestic use is around 20% of the water budget
- **Small savings in water for irrigation will have a high impact on the national water budget**

Rational for green financing in water conservation

- Water conservation is a main objective of the LWP project
- Drip systems increase the efficiency of irrigation and reduce energy needs, labor and input requirements
- Hydroponics recycle up to 90 % of the used water for irrigation and reduce pollution from agriculture
- Sanitary fixtures are becoming highly efficient with potential water use reductions between 15 to 50%

Rational for green financing in water conservation

- **Cost and financing constitute barriers to the adoption of drip systems and hydroponics**

- Soft financing through LEA could be the solution to a wider adoption of drip irrigation, hydroponics and efficient household fixtures

Approach in LWP

- LWP provided financial incentives for water conservation
- LWP Partnered with the private sector to promote water conservation
- LWP partnered with BDL and LCEC under LEA to develop guidelines for water conservation using soft loans
  - Domestic guidelines
  - Landscaping guidelines
  - Agriculture guidelines
- The guidelines provided LCEC with a clear and transparent way to assess eligibility for financing

The Guidelines – Structure and Content

- Technical section that describes the methods of calculating water savings, pipe and pump requirements
- An administrative section that describes the requirements of BDL and LCEC to be able to process the file
- Two files are presented for each project: A financial file for the bank and a technical file to be reviewed and approved or not by LCEC

Required savings

- The savings are a comparison between water consumption using surface or sprinkler irrigation with drip irrigation
- For landscaping the comparison is between hose irrigation and a modern irrigation system including drip and sprinklers. Savings should be at least 30%
- For agriculture, the comparison is between sprinklers and drip in most cases. Savings should be at least 10%

Loan file requirements

- The technical file should contain:
  - A description of the project
  - Types of plants
  - Calculation of water needs
  - Sizing of the emitters and pipes
  - Costing of the project based on actual proforma invoices

- LCEC will finance the pipe network and emitters but not the pump

Yes we can calculate plant water needs

Two types of calculators:

- CropWat for agriculture
- Excel based - developed specifically for the guidelines under landscaping
- LEED V.4 for households

Landscaping and agriculture

1. Drip irrigation
2. Hydroponics

Drip Irrigation

- Delivering water and nutrients to the plant root only
- Efficiency in water delivery 90% compared to 40% for flood irrigation and 75% for sprinklers
- Reduced pressure need at the pump from 4-8 bars down to 2 bars
- Improved yield quality and quantity

Drip irrigation

- No need to move pipes and sprinklers around
- Reduces the need for fertilizers and herbicides
- Can be fully automated and remotely controlled
- All the plastic is recyclable

Field experiments

In collaboration with UNIFERT a field experiment was organized in 2018 on two crops in the Bekaa

- The two crops are potato and corn.
- Most planted crops in the Bekaa and Lebanon
- Used to be irrigated with sprinklers (Most common Irrigation Practice is Sprinklers)

Field Experiment Results - Potato

RESULTS - POTATOES					
DRIP AND MICROSPRINKLER IRRIGATION SYSTEMS Vs SPRINKLER IRRIGATION SYSTEM (CONVENTIONAL)					
IRRIGATION SYSTEM	SPRINKLER (CONVENTIONAL)	DRIP	MICROSPRINKLER	% RESULTS DRIP Vs SPRINKLER	% RESULTS MICROSPRINKLER Vs SPRINKLER
WATER SUPPLY (m3/IRRIGATION/Dunum)	805.90	685.60	740.00	-15%	-8%
YIELD (Ton/Dunum)	1.8	2.4	2.5	33%	39%
WATER PRODUCTIVITY (m3/Ton)	448	286	296	-36%	-34%

Field Experiment Results - Corn Fodder

RESULTS - CORN FODDER			
DRIP IRRIGATION SYSTEM Vs SPRINKLER IRRIGATION SYSTEM (CONVENTIONAL) CORN FODDER 120 DAYS SPECIES, SINGLE ROW 70cm, 9100 SEEDLING / Dunum			
			% RESULTS DRIP Vs SPRINKLER
IRRIGATION SYSTEM	SPRINKLER (CONVENTIONAL)	DRIP	
DAYS TO HARVEST (DAY)	113	105	-7%
WATER SUPPLY (m3/IRRIGATION/Dunum)	1,136.50	805.40	-29%
YIELD (Ton/Dunum)	5.8	7.5	29%
WATER PRODUCTIVITY (m3/Ton)	196	107	-45%

Hydroponics

- Plants are grown outside the soil in almost inert media under greenhouses
- Water and nutrients are delivered to the medium or in water and can be recycled up to 90%
- Production per m2 can be tripled and even more
- Quality A products up to 80%

Additional demonstrations

- Tensiometers (soil water content sensors)
- Solar pumping
- In greenhouses and grapes

Impact in greenhouses

- Reduction of 50% in irrigation needs
- Reduction in insecticide application 35 sprays
- Increase in yield and improvement in quality

Impact on grapes

- Reduction in irrigation water needs; 53%
- Reduction in agriculture inputs

Domestic

Household fixtures

- Simple devices can save between 20 to 50% water
- Devices include sinks, lavatories, showers and WCs
- Cost is minimal compared to water saving
- Becomes advantageous with water meters

CONCLUSION

- Reduction in water and energy consumption, inputs and labor
- Improved yield quantity and quality
- Improved income for farmers

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