Successful stories in adapting to climate change

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Challenges Facing Water Resources

- Increasing Distress Facing Water Resources
  - Population Growth
  - Water Pollution
  - Climate Change
Water Consumption

- Difficult to determine actual breakdown of water consumption due to:

  - System leakage >50%
  - Losses & contamination
  - Unlicensed wells
  - Syrian Refugees
Water Consumption

- Water withdrawal $1,473-1530 \text{ Mm}^3/\text{year}$ (MoEW (2010)-WB (2009):)

Agriculture 61%
Industry 11%
Domestic 18%
Water Consumption by Sector

<table>
<thead>
<tr>
<th>Sector</th>
<th>Mm³/Yr</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>915</td>
<td>61</td>
</tr>
<tr>
<td>Domestic</td>
<td>270</td>
<td>18</td>
</tr>
<tr>
<td>Industry</td>
<td>165</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>1500</td>
<td>90</td>
</tr>
</tbody>
</table>

Mm³/Yr: Million cubic meters per year
%: Percentage
Irrigation Techniques

- Irrigated areas according to the irrigation technique used are as follow:
  - 50% Surface
  - 25% Drip
  - 25% Sprinkler
Water Source for Irrigation

- Different sources of irrigation

Groundwater (49%)  Surface water/rivers (39%)

Hillakes and reservoirs
Agricultural challenges

- Agriculture’s contribution to Lebanon’s GDP is small and has been dropping over the years from about 7% in 1994 to about 5.5% in 2013.

- Climate change decrease in water availability

- Reduction in agricultural productivity especially for the crops that depend on irrigation.
Agricultural challenges

- Estimation: 20 days decrease in the time dense snow cover persistence (Shaaban 2009).

- Quality and in salinity

Less Water
Agricultural challenges

Demographic pressure and climate change are expected to cause a decrease in the production of exportable crops

- citrus crops
- Banana,
- Apple
- Potato
MoE (2001) by the year 2015, only 60% of water resources will be left to agricultural use (as compared to 74% in 1994). Water withdrawal figures for 2005 show that the share of agriculture had already dropped below 60% (FAO, 2010).
Challenges

- Surface irrigation still widely used mainly in small plots areas:
  - High investment cost irrigation systems
  - Lack of knowledge

- Waste Water is widely used in uncontrolled manner in irrigation.

- High running cost in irrigation due to fuel consumption especially that most agricultural areas are not connected to the grid
Within the increasing challenges, MoA has undertaken several actions to improve irrigation sector and reduce pressure on fresh water.
MoA actions

- **Renewable energy projects**
  
  3 solar systems were installed by MoA to pump water and use it for irrigation:

  - Deir el Ahmar nursery (15 du, pumping depth 250 m)
  - Hammana Nursery (8 du, centrifugal pump from reservoir)
  - Kfardebian fruit trees plot (15 du, pumping depth 80 m)

  Moreover, a study within (GRE.NE.CO) project was undertaken describing use of RE in agriculture sector in Lebanon.
MoA actions

**Treated Waste Water Projects**

To reduce pressure on fresh water, 3 projects using treated wastewater are or have been implemented within MoA:

1. TCP with FAO
   - At the end of this project, Guidelines for the use of Treated Waste Water in Lebanon were issued.

2. Coping with water scarcity (MoA/LARI/MoEW and FAO)
   - Transmitting treated water from Iaat treatment plant
   - Running capacity 600-700 m³/day and full capacity 12 000 m³/day
   - Irrigating at 1st phase 220 du in Iaat (forage maize, Wheat, barley, forest trees (Populus), using drip irrigation on 30 du)
3. ACCBAT project (EU/MoA)

- Transmitting treated water from Ablah treatment plant
- Running capacity 800 m$^3$/day and full capacity 2 000 m$^3$/day
- Irrigating at 1$^{st}$ phase 15 dun of vineyards in Ablah
- A collection reservoir of a capacity of 15,000 m$^3$ is being constructed to collect water from the treatment plant.
MoA actions

- **Extension and trainings**
  Within its program, MoA is regularly conducting trainings to:

  - **Farmers on:**
    - New pressurized irrigation techniques
    - Irrigation schedule
    - Safe use of Waste Water in Agriculture

  - **Technicians and professionals (in collaboration with EU organizations):**
    - Regulated deficit irrigation
    - non-conventional source of irrigation (treated waste water)
MoA actions

- **Subsidies to the farmers**
  Within its objective to reduce the costs on farmers and encourage them to shift to water savings irrigation techniques:

  ✓ In 2013 MoA distributed irrigation equipment's for free to a number of fruit trees growers.

  ✓ As a first result at least 30% of the beneficiaries shifted from surface to pressurized irrigation networks.
Within the framework of MoA Strategy 2015-2019 different strategic axes were determined to promote the irrigation sector in Lebanon.
Shift the irrigation scheme of 1 000 ha/year:

From surface irrigation to pressurized irrigation, by subsidizing the irrigation materials by 50% of their initial cost.
Establish committee for Treated Waste Water use in Irrigation:

Includes all stakeholders to promote and legalize the use of TTWW in irrigation

Renewable Energy in Agriculture

✓ Economic study on the use of RE in Agriculture is undertaken
✓ 8 demopolts using RE in agriculture in (Bekaa, Nabatieh and Mount Lebanon) are under preparation
Recommendations

- Promote the management of small scheme network through the establishment of WUA.
- Protect ground and surface water from pollution
- Choose planting varieties resistant to drought and high temperature
- Adjust planting dates
- Shift planting location
Thank you