Waste Water Reuse for Afforestation in Egypt

Forest restoration in Algeria, Egypt, Morocco and Tunisia using treated wastewater to sustain smallholders' and farmers' livelihoods’

(GCP/RAB/013/ITA)

Activates in Egypt

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Why plantations in Egypt?

A suitable climate for many valuable timber trees.

Large areas of desert land can be used for this Purpose

Several organizations and institutions at national and international level can exchange knowledge in the field of forest management.

Large quantity of Treated Waste Water 2.4 billion cubic meters per year

24 plantations has been already established.
Egypt currently has about 11 thousand feddans of forest.

Egypt has 70,000 ha of natural forest cover.

There are 24 plantation has been cultivated on the sewage water.

Egypt currently has about 11 thousand feddans of forest.
Location:
Located at 16 km south Ismailia near the Suez Canal
Date of establishment:
1998 by (MALR) and (EEAA)
Cultivated with:
10 tree species
4 non-tree species
<table>
<thead>
<tr>
<th>Area</th>
<th>ha</th>
<th>Feddan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest Area</td>
<td>128.5</td>
<td>305.8</td>
</tr>
<tr>
<td>Non-Forest Area</td>
<td>28.4</td>
<td>67.5</td>
</tr>
<tr>
<td>Plantation Area</td>
<td>156.8</td>
<td>373.3</td>
</tr>
<tr>
<td>TWW Facilities</td>
<td>84.3</td>
<td>200.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>241.1</strong></td>
<td><strong>573.9</strong></td>
</tr>
</tbody>
</table>
The training

Undersecretariat for Afforestation and Environment

Horticulture Research Institute

University of Alexandria

Desert Research Center

Scrapium

Horticulture Research Institute Giza, Cairo
Improve skills of the foresters

Improve Exchange knowledge

Forest inventory

Improve Silvicultural knowledge

Forest Management Practices in sustainable system

Improve Silvicultural Management planning
Methodology of the training

(Compass, GPS, Clinometer, Diameter measurement tape, Distance measuring tape and Digital camera).

(DBH, Commercial height, Vitality, Tree quality, Social class, Stem form, Damage degree, Damage type and Total Height).

1. Area of sample plot.
2. Basal area.
3. Mean DBH.
4. Mean height.
5. Volume.
Measurements
Serapinium major problems

- Water problem
- Browsing problem
- Pests
Fix the pumping system (breakdown of five pumps from seven).

Estimate the actual amount of water provided to the plants.

Cultivated drought resistant species at the edges of a parcel.
Silvicultural management

<table>
<thead>
<tr>
<th></th>
<th>ha</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protective forest</td>
<td>29.8</td>
<td>19%</td>
</tr>
<tr>
<td>Productive forest</td>
<td>118.9</td>
<td>76%</td>
</tr>
<tr>
<td>Demonstration forest</td>
<td>1.5</td>
<td>1%</td>
</tr>
<tr>
<td>Experimental area</td>
<td>6.6</td>
<td>4%</td>
</tr>
<tr>
<td>Plantation area</td>
<td>156.8</td>
<td>100%</td>
</tr>
</tbody>
</table>

1- Planting and replanting
2- Tending and pruning operations
3- First thinning and second pruning
4- Second thinning
5- Harvesting
The most promising tree species in volume

Eucalyptus ssp.  Khaya senegalensis

Graphic 4: MAI (m3/ha/year) of different species and ages at Serapium forest plantation.
### Tree species

<table>
<thead>
<tr>
<th>Tree species</th>
<th>mean annual volume increment (MAI)</th>
<th>mean basal area</th>
<th>total growing stock</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casuarina, Cupressus, Dalbergia</td>
<td>6 m3/ha/year</td>
<td>8.7 m2/ha</td>
<td>4393 m3 (54 m3/ha)</td>
</tr>
<tr>
<td>Eucalyptus ssp., Khaya senegalensis</td>
<td>11 m3/ha/year</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Annual Harvestable Commercial Wood Volume
- **Eucalyptus sp.**
  - annual harvestable area: 9 ha
  - sum volume: 765 m3/year
  - annual harvestable area: 85 m3/ha
  - annual income: £E153,000 ($24,480)

### Current Situation
- Annual income: £E153,000 ($24,480)
Future activities for Serapium

- Establish a forest training center in Serapium
- Improve the waste water treatment technology
- Improve sustainable management system
- Use of sludge for soil fertilization
- Define production targets and improve silvicultural practices
- Capitalize on carbon credits produced by the increase in CO2 stocked
- Define production targets and improve silvicultural practices
GCP/AB/013/ITA (FAO) should support UAE in the implementation of the recommendations of the forest management plan in Serapium.

Improving irrigation and filtering system in forest plantations using TWW.

A partnership between University of Alexandria as well as Headquarter of Afforestation and Environment University of Basilicata.
Thank You