Land Restoration and the Cocoon Technology

In collaboration with Land Life Company

MENAQUA Key Facts

Aim: Restoring degraded land with the help of the Cocoon Technology

Focal area: The MENA countries with particular emphasis on Jordan and Lebanon

Degraded and (partly) restored land

Profile: MENAQUA is a social entrepeneurship based in The Hague/The Netherlands

Land degradation and restoration

Land degradation can be defined as the deterioration of the original landscape including vegetation and wildlife

Degradation by overgrazing

Degradation by high soil salinity

Land degradation can be caused by:
- Climatological factors
- Influence of civilizations

Land degradation and restoration

Restoration is giving land back its original status within the boundaries of the current climatological impact

Restoration with fruit trees on terraced land

Succesfull restoration starts with sound landscape engineering including:
- (Re)-forestation programmes
- Innovative agricultural practices
- Improved water management

Land restoration cannot succeed with the support of the local population:
- Raising awareness
- Community participation
- Education and (on the job) training

Community participates in reforestation

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The Cocoon Technology

The Cocoon is a small reservoir ('pot') in which water is stored for plant growth during the dry season thereby eliminating the need for irrigation

Cocoons drastically improve the survival rate of young seedlings

Multiple Cocoons are used to restore forests or enhance agriculture in degraded areas

The Cocoon Technology

Some of the main features of the Cocoon are:

- Water supply to roots by 'wicks'
- Made of bio-degradable material
- Soil improvement by adding bacteria
- Equipped with wind shelter
- Easy installation
- Not expensive
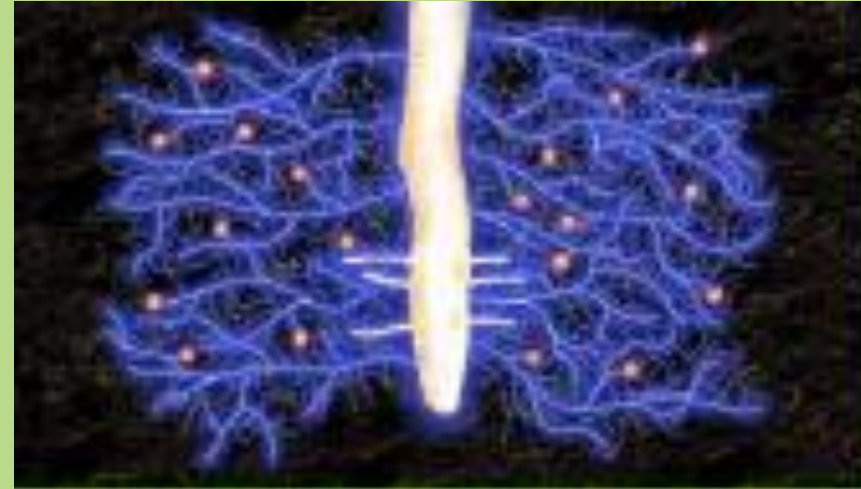
Mycorrhizae and bacteria entering the soil

Two 'wicks' supplying water from reservoir to roots

Wind shelter to protect seedlings

The Cocoon Technology

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The Cocoon planting procedure:
- **Dig a hole (hand or machine)**
- **Plant seedling**
- **Install Coccon**
- **Fill with water and bacteria**
- **Place cover and wind shelter**

The Cocoon project cycle

Three main phases
- **Pre-planting**
- **Planting**
- **Post-planting**

All info stored in the database of Land Life Company

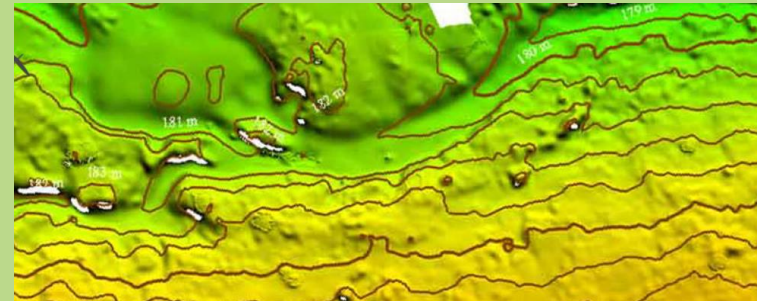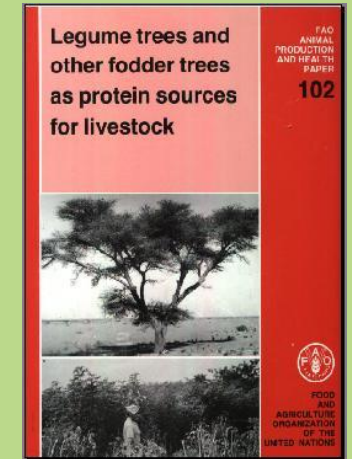# The Cocoon project cycle

Technical issues:
- Site selection
- Remote sensing
- Ground observations
- Local knowledge
- Scientific research
- Landscape engineering plan

Digital elevation map obtained from remote sensing

Soil sampling

Rearch including literature studies are essential

Socio-economic considerations:
- Interviewing local population
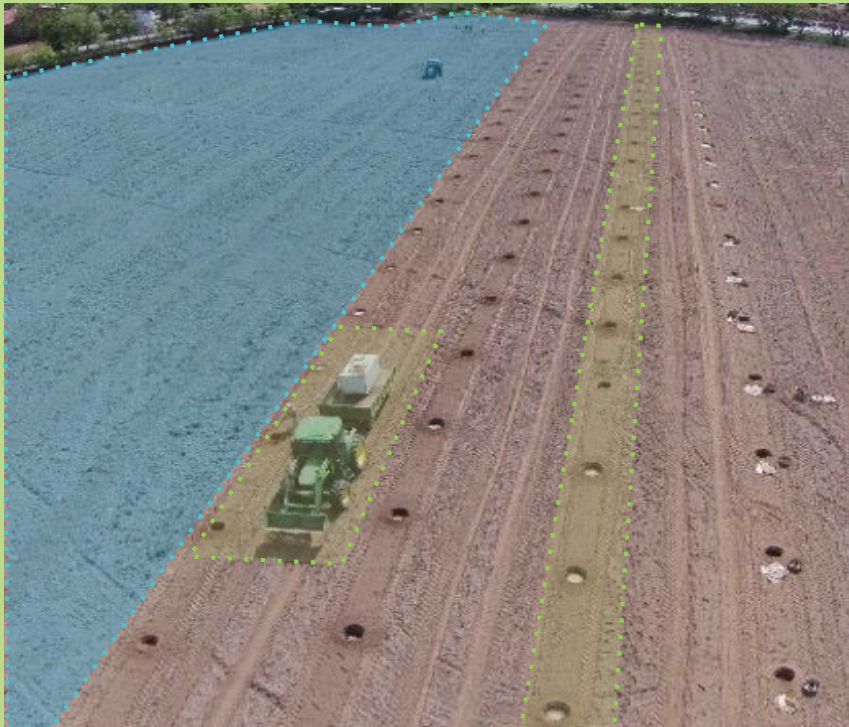- Implementing community participation
- Drafting education and training plan

Involving the local community

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The Cocoon project cycle

Planting and post-planting

Site activities during planting:

- Land preparation and plot design

- Planting by hand or machine

- Completion (e.g. protective measures)

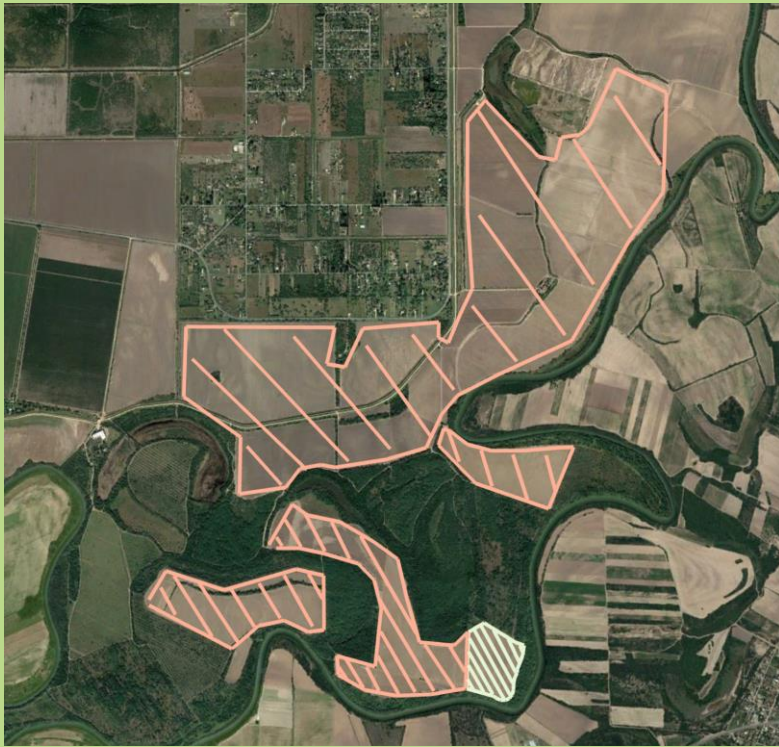**Site activities after planting:**

- Ground observations

- Ground-based sensors

- Data base and analyses

Land restoration and the Cocoon

Example Texas

Degradation by wildfire and forest restoration

Restoration design: hatching: area for Cocoon - double hatching: control area without Cocoon

Mechanised planting of the trees using Cocoon technology

Land restoration and the Cocoon

Example Kenia

Upgrading agricultural land with the Cocoon

Planting of a mango tree in 2014

The mango tree in 2018

Prospects in the MENA countries

Jordan

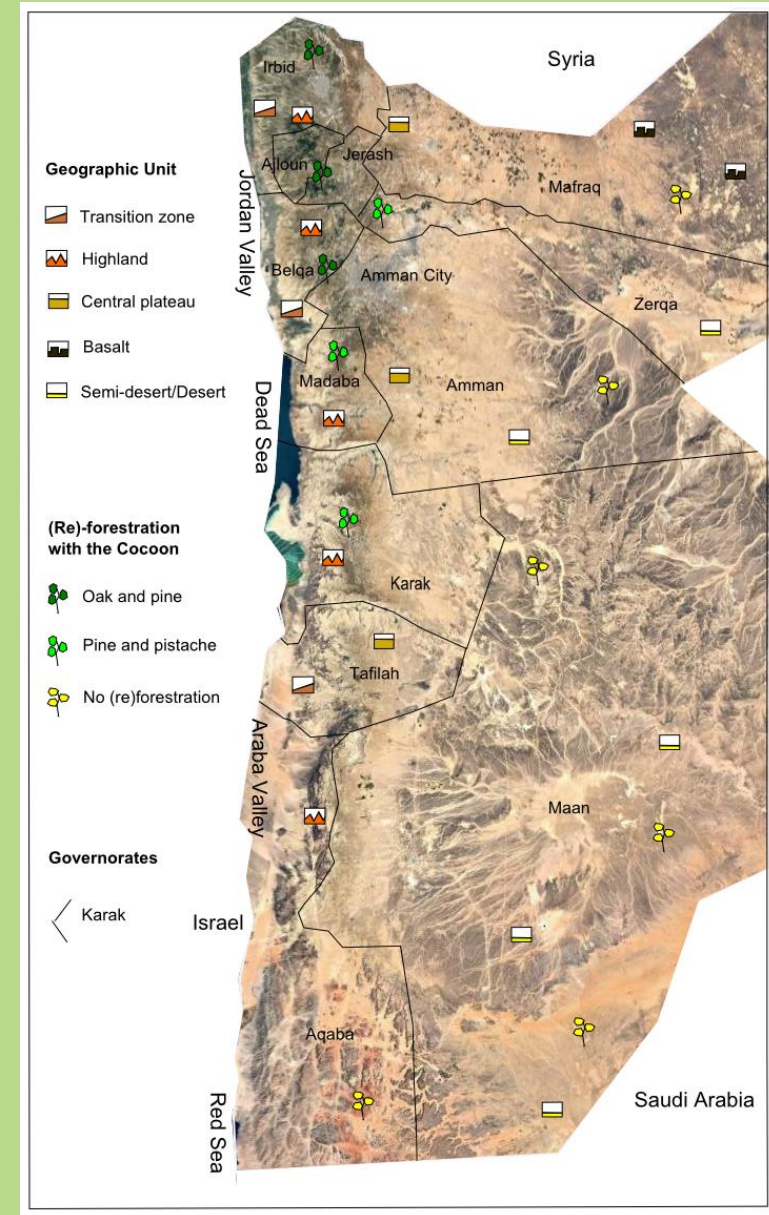**Cocoon technology can be engaged in reforestation and innovative agriculture in the western highlands**

Deciduous oaks in Jordan

Map of Jordan with prospects for reforestation

Trees for reforestation:
- **Pines**
- **Decideous oaks**
- **Pistachio**

Map legend:

Geographic Unit
- Transition zone
- Highland
- Central plateau
- Basalt
- Semi-desert/Desert

(Re)-forestation with the Cocoon
- Oak and pine
- Pine and pistache
- No (re)forestation

Governorates
- Karak

Prospects in the MENA countries

Lebanon

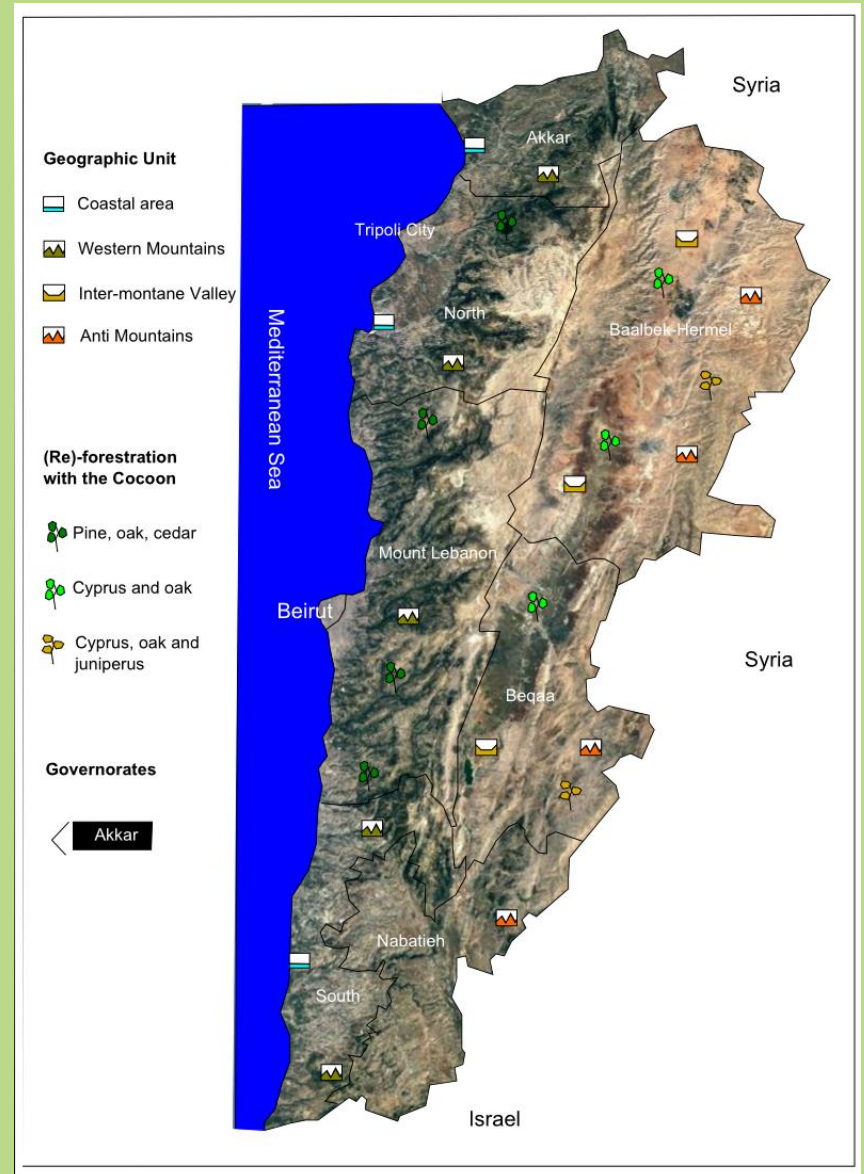**Cocoon technology can be implemented for reforestation and in innovative agriculture in most parts of the country**

Famous cedar tree of Lebanon

Map of Lebanon with prospects for reforestation

Trees for reforestation
- **Pines**
- **Decideous oaks**
- **Cedars**
- **Cypresses**

Geographic Unit
- Coastal area
- Western Mountains
- Inter-montane Valley
- Anti Mountains

(Re)-forestation with the Cocoon
- Pine, oak, cedar
- Cyprus and oak
- Cyprus, oak and juniperus

Governorates
- Akkar

Mediterranean Sea

Syria

Akkar

Tripoli City

North

Baalbek-Hermel

Mount Lebanon

Beirut

Syria

Beqaa

Nabatieh

South

Israel

Thank you for your attention