Sustainable Action for Bioenergy Production in Koura (SABioP)

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ENEPLAN

Integrated Energy and Education in Mediterranean Universities

Beirut, 13th-14th September 2018
The Institute of the Environment

A Brief History

- An autonomous multidisciplinary Institute at the heart of the UOB.
- Facilitate and promote **interdisciplinarity** that aims to address societal and environmental problems related to sustainable **development**.
- Relies mainly on grants

**Goal of the IOE**

Providing **solutions to the sustainability of natural resources** within a complex human environment by promoting science as the basis for decision making.
The Institute of the Environment

For whom?

Academic understanding ↔ Community work

Responds to the needs of:
Community development
Capacity building
Institutional strengthening
Economic and social prosperity
Preservation of a healthy natural environment.

We address pressing environmental concerns through **scientific research** and **public action**.
The Institute of the Environment

With whom?

• Collaboration with all **Faculties** at the University.
• Strong links with **laboratories** and departments at the University, allowing implementation of a wide range of multidisciplinary projects.
• **Partnerships**.
• **Opportunities for students** at UOB and beyond to carry-out research, graduate theses, gain professional experience and become involved in community service and development.
• IOE Faculty members **teach courses** according to their fields of expertise in addition to submitting and managing externally funded projects.
The Institute of the Environment

How we do it?

1. The Marine and Coastal Resources (MCR) Program that focuses on understanding and managing issues concerned with the coastal zone and its associated resources.

2. The Land and Natural Resources (LNR) Program that focuses on understanding and managing various topics in the terrestrial natural environment.

2. The Environmental and Energy Economics (EEE) Program that focuses on valuating natural assets and studying the interaction between economics and the natural environment.
Sustainable Action for Bioenergy Production in Koura

Quick Facts

Location: Cities/Villages in Koura District, North Lebanon-Lebanon

Theme: Energy
Sector: Energy generation and supply - Biomass

Duration: 45 months
Start Date: April 1, 2015
End Date: December 31, 2018
Budget: EUR 749,954
EU Contribution: EUR 599,963

Lead Partner:
Institute of the Environment
University of Balamand - Lebanon
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Partners:
Koura Municipalities Union - Lebanon
El Koura Development Council - Lebanon

- Project funded by the European Union (EU) as part of the EU Regional SUDEP Program
- Implemented by the Environmental and Energy Economics Program – Institute of the Environment, University of Balamand
Around 5,000 tonnes of olive pruning residues are burnt yearly in Koura.
Sustainable Action for Bioenergy Production in Koua
General objective
Implementation of a sustainable action for bioenergy production in Koura

How?
Through the production of biomass briquettes from pruning residues of olive groves and forests, a renewable energy source used for heating purposes in stoves/chimneys
### Partnership

#### Institute of the Environment
- **Lead partner**
- **SABioP Project Manager**

- **Management**
- **Scientific studies**
- Raising awareness
- Dissemination
- Trainings to target groups and to KMU employees to ensure project sustainability

#### Koura Municipalities Union (KMU)
- **Final beneficiary**
- Owner of briquetting plant after SABioP completion
  - Link with 34 municipalities

- Endorsement of project outcomes
- Provision of land
- Acquiring required permits
- Support in field activities (surveys, field visits)
- Establishing links with target groups (landowners, farmers, municipalities)/local community
- Participation in meetings/events organization
- Ensure project sustainability

#### Koura Development Council (KDC)
- Trainings to landowners and farmers on pruning techniques
- Support in field activities (surveys, field visits)
- Establishing links with target groups
- Participation in meetings/events organization
- Ensure project sustainability
Multidisciplinarity aspect of the project

• **Design** of the briquetting plant (EEE)
• Implementation of works
• Purchase, installation and operation of equipment

**Key outputs:**

1. An operational biomass briquetting plant with a capacity of 700 tons/year.
2. Creation of a local economy based on **local raw material** (renewable energy and less dependency on fossil fuels)
3. Creation of at least 5 **permanent job opportunities** (per shift) for Koura residents
<table>
<thead>
<tr>
<th>Study/Activity</th>
<th>Department/Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimation of pruning residues from forest, other woodland, shrubland and olive trees in the Caza of Koura</td>
<td>LNR</td>
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<tr>
<td>Assessment of olive pruning techniques in Koura</td>
<td>KDC</td>
</tr>
<tr>
<td>Life cycle assessment of the final product</td>
<td>EEE/Chemical Engineering</td>
</tr>
<tr>
<td>Evaluation of potential reduction of agricultural waste and GHG emissions and removals</td>
<td>LNR</td>
</tr>
<tr>
<td>Design of a solar dryer for the briquetting plant</td>
<td>EEE/Mines ParisTech</td>
</tr>
<tr>
<td>Determination of physical and chemical properties of olive and oak trees residues for the production of briquettes</td>
<td>Chemical Engineering/EEE</td>
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<tr>
<td>Master project that won first prize in the Chemical and Petrochemical field during the 8th annual project exhibition organized by the order of Engineers in North Lebanon, July 2016</td>
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<tr>
<td>Management plan of raw material</td>
<td>LNR</td>
</tr>
</tbody>
</table>
Main studies and activities / Social and Economic aspects

<table>
<thead>
<tr>
<th>Study/Activity</th>
<th>EEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost-benefit analysis, business plan</td>
<td></td>
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<tr>
<td>Logistics for transportation of pruning residues from olive groves</td>
<td></td>
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<tr>
<td>Surveys on households’ socio-economic status and energy consumption for heating purposes (400 households covered)</td>
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</tbody>
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For surveying purposes, Identification of settlements in Koura using satellite images (LNR)
## Main studies and activities / Social and Economic aspects

<table>
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<tr>
<th>Training</th>
<th>Provider</th>
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<td>Training of around 100 landowners on pruning techniques.</td>
<td>KDC</td>
</tr>
<tr>
<td>Trainings of KMU employees on procurement, project planning, design, implementation and management.</td>
<td>EEE</td>
</tr>
<tr>
<td>Trainings for recruited plant employees on technical, managerial, health and safety issues.</td>
<td>EEE/Equipment provider</td>
</tr>
</tbody>
</table>
Education/Research

- Some of the project activities (feasibility studies, logistics, etc.) introduced into courses

- New master projects currently being developed based on project outcomes
- Publications/Conferences
- Dissemination of project outcomes and awareness raising through participation to several university conferences (minimum of 700 attendees)
- Awareness raising through media (TV appearances, radio talks, newspapers, etc.)
Other Key outputs/facts

- Introduction of a new product i.e. the biomass briquettes, a renewable energy source at a competitive price with other fuel types.
- Implementation of a first solution to an old environmental issue in Koura, i.e. burning on field pruning residues of olive groves and forests.
- Improving environmental quality through the reduction of the overall burning activities in Koura. Residues are collected instead of being burnt and are expected to be used as a replacement for other fuel types.
- Potential reduction of greenhouse gas emissions through the control of fire risks (potential reduction of CO2 equivalent emissions by 6.82 Gg/year)
- Increase of ecosystem quality, reduction of negative effect on human health, climate change and fossil fuel energy consumption, in comparison to use of diesel (taking into account the life cycle of the two products).
- Acceptance of the project among Koura residents reflected by a high level of collaboration from the municipalities and the farmers.