4F CROPS
Future Crops for Food, Feed, Fiber and Fuel

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Biomass Department of CRES

1/7/08
4F CROPS

- The project is being funded by the 7th Framework Programme for Agriculture and the theme 2 (Food, Agriculture and Fisheries and Biotechnology)
- The proposal was submitted in May 2007 in the call FP7-KBBE-2007-1
- The Grant Agreement number is 212811
- Fixed starting date is 1/6/08 and the project will last 24 months.
- The total budget is 998,520 euros
- The consortium is consisted by 13 partners (six are Universities and the rest research organization and/or institutes)
## List of Beneficiaries

<table>
<thead>
<tr>
<th>Beneficiary number</th>
<th>Beneficiary name</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Coordinator)</td>
<td>Center for Renewable Energy Sources - CRES</td>
<td>Greece</td>
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<tr>
<td>2</td>
<td>University of Catania - UNI.CT</td>
<td>Italy</td>
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<tr>
<td>3</td>
<td>Agricultural University if Athens - AUA.eco</td>
<td>Greece</td>
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<tr>
<td>4</td>
<td>Institute for Energy and Environmental Research - IFEU</td>
<td>Germany</td>
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<tr>
<td>5</td>
<td>Agro technology &amp; Food - A&amp;F</td>
<td>Netherlands</td>
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<tr>
<td>6</td>
<td>University of Bologna - UNIBO</td>
<td>Italy</td>
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<tr>
<td>7</td>
<td>National Institute for Agricultural Research - INIA</td>
<td>Spain</td>
</tr>
<tr>
<td>8</td>
<td>University of Lisbon - UniNOVA</td>
<td>Lisbon</td>
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<tr>
<td>9</td>
<td>Institute of Natural Fibres - INF</td>
<td>Poland</td>
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<tr>
<td>10</td>
<td>University of Agricultural Science in Bucharest - UASB</td>
<td>Romania</td>
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<td>11</td>
<td>Agricultural University of Athens - AUA.bio</td>
<td>Greece</td>
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<tr>
<td>13</td>
<td>National Agricultural Research Foundation - NAGREF</td>
<td>Greece</td>
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<tr>
<td>14</td>
<td>Baltic Renewable Energy Centre - EC BREC</td>
<td>Poland</td>
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</tbody>
</table>

**FOOD**

![Vegetable Image]

**FEED**

![Livestock Image]

**FIBER**

![Crop Image]

**FUEL**

![Alternative Energy Image]
• The **main aim** of the 4F CROPS project is to survey and analyze all the parameters that will play an important role in successful non-food cropping systems in the agriculture of EU27 alongside the existing food crop systems.
Specific objectives

- Review of the agricultural land uses in EU27 and the prediction in short (2020) and longer terms (2030), so as to identify possibilities of non-food cropping systems for each time frame.

- Mapping of cropping possibilities like choice of crops, rotation cycles, yielding potential, raw material characteristics for each end-use based on regional potential levels, ecology and climate.

- Comparative cost analysis of the food and non-food crops in short and long term consideration and evaluation of the most critical socio-economic parameters, like farmer’s income, rural development, public acceptance and safety measures.

- Evaluation of the most important environmental criterial (soil water, air, climate change, biodiversity, landscape) by means of an Environmental Impact Assessment (EIA) and a Life Cycle Analysis (LCA).
Specific objectives

- Record of the existing policies and the driving forces in the future crops
- Development of scenarios for promising non-food cropping alongside food cropping systems, be defining systems’ boundaries and evaluating the priorities and trends, in short and long time frameworks.
- To develop a whole dissemination plan that its main elements will be the web-site development, the projects workshops and other dissemination activities (articles, presentations, fact sheets, leaflets, links with previous and on-going activities, etc.)
Why there is a need for the cultivation of the non-food crops (fiber and fuel crops)?

The concept of using plants as non-food crops feedstock is not new, but, despite considerable investment in research and development little progress has been made in the commercial marketplace.

The IENICA consortium carried out an estimation of the potential of plants to produce non-food crops and according to them, the potential was enormous, but the markets disorganized and frequently uninformed (Schenkey, 2006).
Why there is a need for the cultivation of the non-food crops (fiber and fuel crops)?

The need for the cultivation of the non-food crops is supported by the following facts:

- The reform of CAP is going to lead to the release of agricultural arable land
- There is an increasing need for fibers crops (to describe the needs for biobased products)
- There is a great need for biofuels that will be produced from dedicated crops
- The climate change is going to force especially the south Europe to shift to other cultivations that will need less water, nitrogen that will have salt tolerance, in other words crops that will not need intensive cultivation
The concept

Need for the cultivation of non-food crops (fibre and fuel crops)

4F CROPS

Survey and analyze all the parameters that will play an important role in a successful non-food cropping systems alongside the existing food crop systems

This mainly will be done though the formation of successful scenarios that will take under consideration the several parameters such as technical (which crops, in which rotation systems, logistics, the role of biotechnology, etc.), socio-economics (cost analysis, public acceptance, rural development, farmers income (etc), environmental (sustainability), regulatory (co-existence and safety measures when crops using for both food and non-food uses).

1st Workshop (Month 6, Spain)
“Market need of non-food crops and available land use in EU27”

2nd Workshop (Month 12, Italy)
“Future non-food crops (fibre and fuel) in EU27”

3rd Workshop (Month 18, Romania)
“How can we produce non-food crops that can be environmental friendly and economic viable”

4th Workshop (Month 24, Greece)
“How to establish successful scenarios for the establishment of non-food crops”
The project will be carried by eight work packages:

WP1 Land use in EU27
(months 1-15, leaded by EC BREC - Poland)

- The work will start with a review of the current land use in EU27 that will be used as a base for the prediction of the future land use in short term (2020) and long term (2030).
- For the prediction a number of parameters will be considered like the existing intensive agricultural systems, climate change, regional differences and market demands for food, feed, fiber and fuel.
WP2 Cropping possibilities  
(months 1-18, leaded by UNI.CT - Italy)

- The main objective of this WP is the mapping of the cropping possibilities that will be based on regional potential levels, ecology and climate.
- The future crops will be categorized in four major categories, namely crops for food, animal feed, fiber and fuel).
- Several parameters will be critically addressed, like crop domestication and genetics, physiology, input requirements (water, fertilizers, chemicals) and crop management possibilities (double cropping/parallel cropping).
WP3 Economic analysis and socio-economics impacts
(months 1-21, leaded by AUA.eco - Greece)

- For the economic appraisal of the crops, monitoring of economic parameters, such as commodity prices, interdependency of crops and the new CAP amendments will be included.
- Economic analysis of new and conventional crops will include details of production, and distribution of agricultural products from the point of view of the producer. Estimates of future land use changes will be made.
- Socio economic impacts, like farmers’ income, rural development, public development, public acceptance, safety measures will be analysed.
WP4 Environmental analysis
(months 1-21, leaded by IFEU - Germany)

- For the selected non-food crops and the bio-products (bioenergy, bio-based material) the environmental implications will be assessed to their respective conventional products (fossil energy, conventional materials).
- Several environmental impacts will be assessed like soil quality and soil erosion, air quality and climate change, water issues, biodiversity and landscape by using Life Cycle Analysis assessment and environmental Impact assessment methods.
WP5  Regulatory framework
(*months 1-18, leaded by CRES - Greece*)

- The **existing policies** will be evaluated.
- Emerging **best practices and key factors** that led to the success stories will be pointed out.
- **Barriers** prevented the development of non-food cropping systems will be analysed and reviewed.
- **Co-existence** and **safety measures** when crops are used for both food and non-food uses will be addressed and recommendations will be sought.
- **A framework of strategic policies options** will be formed
WP6  Best practice scenarios  
(months 7-24, leaded by A&F - Netherlands)

- The work accomplished in WP1-5 will be used as a base to elaborate scenarios for successful non-food cropping alongside food cropping systems, which will provide answers whether a competitive bioeconomy is a viable option for EU27.
A whole dissemination plan will be presented and discussed in the kick off meeting and the main elements are:

- The development of the web-site (intranet)
- The project workshops (with key themes)
- Dissemination activities such as articles, leaflets, conferences, fact sheets, links, etc.
Graphical presentation of the project’s components

WP8: Coordination Management and Reporting

WP1. Land Use in EU27
WP2. Cropping Possibilities
WP3. Economic Analysis and Social impacts
WP4. Environmental Analysis
WP5. Regulatory Framework


WP7: Dissemination and Supports Actions
### B 1.3.2 Timeline of work packages and their components

<table>
<thead>
<tr>
<th>Work Package</th>
<th>Year 1</th>
<th>Year 2</th>
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<tbody>
<tr>
<td>WP1: Land Use in EU27</td>
<td>M1</td>
<td>M2</td>
</tr>
<tr>
<td>WP2: Crop production</td>
<td>M5</td>
<td>M6</td>
</tr>
<tr>
<td>WP3: Economic analysis and socio-economic impacts</td>
<td>M11</td>
<td>M12</td>
</tr>
<tr>
<td>WP4: Environmental analysis</td>
<td>M15</td>
<td>M16</td>
</tr>
<tr>
<td>WP5: Regulatory framework</td>
<td>M19</td>
<td>M20</td>
</tr>
<tr>
<td>WP6: Best practice dissemination</td>
<td>M22</td>
<td>M24</td>
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<tr>
<td>WP7: Communication and support actions</td>
<td>M23</td>
<td>M24</td>
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<tr>
<td>WP8: Other dissemination activities</td>
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<tr>
<td>WP9: Coordination, management and reporting</td>
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</tbody>
</table>
Organization and management structure of the project

WP8 Coordinator
CRES (GR)

Steering Committee

Management Reporting to EU

Coordinator, WP leaders, invited stakeholders

WP1 Leader
EC BREC (PL)

WP2 Leader
UNICT (IT)

WP3 Leader
AUA eco (CR)

WP4 Leader
IFEU (DE)

WP5 Leader
CRES (GR)

WP6 Leader
A&F (NL)

WP7 Leader
CRES (GR)

WP2 Group
EC BREC (PL)
A&F (NL)
INIA (ES)
UNICT (IT)
UNIBO (IT)
CRES (GR)
NAGREF (GR)

WP3 Group
CRES (GR)
UN ICT (IT)
UNIBO (IT)
INIA (ES)
UNINNOVA (PT)
INF (PL)
USASB (PL)
AUA bio (CR)
NAGREF (GR)

WP4 Group
AUA eco (GR)
CRES (GR)
INIA (ES)
UNIBO (IT)
CRES (GR)
NAGREF (GR)

WP5 Group
IFEU (DE)
UNINNOVA (PT)

WP6 Group
CRES (GR)

WP7 Group
A&F (NL)
The WP leaders of WP1, WP2, WP3, WP4 and WP5 will provide data

WP7 Group
CRES (GR)
INIA (ES)
USASB (RO)
NAGREF (GR)
UNIBO (IT)
(all the other partners will participate on WP7)

• A **Steering Committee (SC)** will be nominated made up of Work Packages Leaders and the Coordinator. The Committee will meet regularly after each technical meeting and will review progress report before their delivery to the EU.

• Additionally, to the SC a **Scientific Committee** will be established in the kick-off meeting and will be consisted from the members of the whole consortium and selected invited key players that play an important role to the development of the non-food crops in EU27 (such as members of Industries, with success stories - like the case of Brassica in Germany, of KEFI company in Italy, Hempflax in Netherlands - coordinators of on-going relevant activities).
## Deliverables

<table>
<thead>
<tr>
<th>WP no</th>
<th>Deliverable name</th>
<th>Delivery</th>
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<tbody>
<tr>
<td>WP1</td>
<td>Review of the current situation for the land use in EU27</td>
<td>Month 6</td>
</tr>
<tr>
<td></td>
<td>List of the restrict factors for EU agriculture</td>
<td>Month 6</td>
</tr>
<tr>
<td></td>
<td>Report on the market demand for non-food crops in EU27</td>
<td>Month 9</td>
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<tr>
<td></td>
<td>Report entitled “Land use in EU27 now, 2020 and 2030”</td>
<td>Month 13</td>
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<tr>
<td>WP2</td>
<td>List of the non-food crops</td>
<td>Month 6</td>
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<tr>
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<td>Report entitled “Cropping parameters”</td>
<td>Month 12</td>
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<tr>
<td></td>
<td>Report on “Cropping possibilities of selected non-food crops in the future agricultural analysis”</td>
<td>Month 18</td>
</tr>
<tr>
<td>WP3</td>
<td>Report on the economic analysis of conventional crops in EU</td>
<td>Month 6</td>
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<tr>
<td></td>
<td>Report on the economic analysis of conventional crops in EU</td>
<td>Month 12</td>
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<tr>
<td></td>
<td>Report on the economic analysis of future non-food crops in EU</td>
<td>Month 21</td>
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<tr>
<td></td>
<td>Social impacts of non-food cropping systems</td>
<td>Month 21</td>
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<tr>
<th>WP no</th>
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<tr>
<td>WP4</td>
<td>Environmental analyses (EIE)</td>
<td>Month 12</td>
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<td>Life cycle analysis (LCA)</td>
<td>Month 12</td>
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<td></td>
<td>Set of best options</td>
<td>Month 21</td>
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<tr>
<td>WP5</td>
<td>Report on existing policies, best cases, success factors and barriers</td>
<td>Month 12</td>
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<tr>
<td></td>
<td>Review co-existence and safety measures</td>
<td>Month 21</td>
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<td></td>
<td>Formation of a strategic policy framework</td>
<td>Month 21</td>
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<tr>
<td>WP6</td>
<td>Report on non-food crops facts and figures including an output markets overview</td>
<td>Month 15</td>
</tr>
<tr>
<td></td>
<td>Report on scenarios for implementation of new crop-application-market implementation</td>
<td>Month 21</td>
</tr>
<tr>
<td></td>
<td>Report on the economic analysis of conventional crops in EU</td>
<td>Month 24</td>
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# Deliverables

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<thead>
<tr>
<th>WP no</th>
<th>Deliverable name</th>
<th>Delivery</th>
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<tbody>
<tr>
<td>WP7</td>
<td>Web site</td>
<td>Month 1</td>
</tr>
<tr>
<td></td>
<td>Intranet</td>
<td>Month 3</td>
</tr>
<tr>
<td></td>
<td>Report on the first, second, third and fourth workshop</td>
<td>Month 7, 13, 19, 24</td>
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<tr>
<td></td>
<td>Dissemination plan</td>
<td>Month 1</td>
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<tr>
<td></td>
<td>Articles to conferences and journals, etc.</td>
<td>Month 4-24</td>
</tr>
<tr>
<td></td>
<td>Leaflet for the 1\textsuperscript{st}, 2\textsuperscript{nd}, 3\textsuperscript{rd}, 4\textsuperscript{th} Workshop</td>
<td>Month 7, 13, 19, 24</td>
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<td>Fact sheet 1, 2, 3, 4</td>
<td>Month 8, 14, 20, 24</td>
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<td>Reports</td>
<td>Month 6, 13, 18, 24</td>
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<td>Link establishment with relevant activities and on-going projects</td>
<td>Month 3</td>
</tr>
<tr>
<td></td>
<td>Link establishment with relevant organization and associations</td>
<td>Month 6</td>
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