Opportunities for the development of sustainable biomass value chains on underutilized lands in the Region: the FORBIO project

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FORBIO: *Fostering sustainable production of advanced biofuels on underutilized lands*

- FORBIO will assess the feasibility of using underutilized lands in **Italy**, **Germany** and **Ukraine** for biomass production *without interfering with* the production of food or feed, or with **land currently used for** recreational and/or conservational purposes. **Romania**, Poland, Ireland, UK and Hungary are outreach countries.

- Competition with other uses of the land is only one component of bioenergy sustainability and a number of cross-cutting environmental, social and economic aspects may present challenges while ensuring that sustainability standards are met.

- FORBIO will *develop a methodology to assess bioenergy production potential on available “under-utilized lands” in Europe* (contaminated, abandoned, fallow land etc.) at national and local level.
Project Partners

FORBIO is made of 11 partners from 8 EU Member States + 1 partner from Ukraine

Started in January 2016 and expected to end in December 2018, for a duration of 36 months, the project received funding for 1.9 million EUR

The coordinator of FORBIO is WIP-Renewable Energies (Germany)

This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No691846.
FORBIO

PROJECT COMPONENTS

This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No691846.
1. Evaluation of the **agronomic and techno-economic** potential of the selected advanced bioenergy value chains in the case study sites of the target countries;

- Partners responsible for this activity are the **national teams** in Italy, Germany and Ukraine: FIB and Biochemtex, with support of CREA, SECBio, Bi;

- Data **collection and verification** to assess biomass production potential and limitations (literature and on-going projects); Technical feasibility of bioenergy conversion; and Economic feasibility of the proposed value chains

D2.1 Feasibility Study Italy – Agronomic feasibility. **June 2016**
D2.2 Feasibility Study Italy - Technical and economic feasibility. **Dec 2016**
D2.3 Feasibility Study Germany – Agronomic feasibility. **Dec 2016**
D2.4 Feasibility Study Germany - Technical and economic feasibility. **June 2017**
D2.5 Feasibility Study Ukraine – Agronomic feasibility. **Dec 2016**
D2.6 Feasibility Study Ukraine - Technical and economic feasibility. **June 2017**
2. Assessment of environmental, social and economic sustainability of the selected advanced bioenergy value chains in the target countries

• Partner responsible for this activity is FAO with contributions from the national teams in Italy, Germany and Ukraine

• Development of a tailored set of sustainability indicators for bioenergy based on the specific conditions of each of the case study sites
  • Reference tool: GBEP Sustainability Indicators for Bioenergy
  • Adaptation: National, ex-post => Local, ex-ante

• Compilation of existing environmental, social and economic data necessary for the measurement of the tailored set of sustainability indicators and data gaps analysis

• Measurement of the set of sustainability indicators for bioenergy in the case study sites (report available on June 2018)
## The Global Bioenergy Partnership Sustainability Indicators for Bioenergy

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<tbody>
<tr>
<td>3. Harvest levels of wood resources</td>
<td>10. Price and supply of a national food basket</td>
<td>19. Gross value added</td>
<td></td>
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<td>4. Emissions of non-GHG air pollutants, including air toxics</td>
<td>12. Jobs in the bioenergy sector</td>
<td>20. Change in consumption of fossil fuels and traditional use of biomass</td>
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<td>5. Water use and efficiency</td>
<td>13. Change in unpaid time spent by women and children collecting biomass</td>
<td>21. Training and re-qualification of the workforce</td>
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<td>6. Water quality</td>
<td>14. Bioenergy used to expand access to modern energy services</td>
<td>22. Energy diversity</td>
<td></td>
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<tr>
<td>8. Land use and land-use change related to bioenergy feedstock production</td>
<td></td>
<td>24. Capacity and flexibility of use of bioenergy</td>
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www.globalbioenergy.org
3. Identification and removal of barriers to the market uptake of bioenergy in the case study sites

- Partner responsible for this activity is FAO with contributions from all partners and in consultation with national stakeholders in each study site.

- Analysis of the economic and non-economic barriers to the market uptake of the selected sustainable bioenergy technologies in the case study sites.

- Exchange of information on Best Management Practices for bioenergy policy, regulations, support schemes and technical actions which allow the most sustainable and energy efficient use of bio-resources.

- Development of strategies to remove the afore-mentioned barriers including roles and likely timelines (by November 2018).
4. Knowledge transfer and capacity development for innovative value chains

• Inform farmers and owners of contaminated and underutilized lands in the selected sites on how to start actions concerning the sustainable production of non-food biomass by presenting and discussing the results of the different assessments and scenarios (by June – Sept 2018)

• Replicate the knowledge gained on these sites to other regions or countries (outreach countries)

• Strengthen the capacity of relevant stakeholders in areas where conditions of feasibility are documented by FORBIO in order to enable them to set up sustainable bioenergy supply chain:
  • Capacity Assessment
  • Info days
  • Trainings
  • Study tours
CASE STUDY EXAMPLE: GERMANY
**German Case Study: II. Sewage Irrigation Fields in the Metropolis Region Berlin & Brandenburg**

Sewage irrigation fields:

Total area: 10,010 ha

Number: 71
Irrigation field (in the narrow sense) / 85 %

Canal and drainage system / 4 %

Infrastructure / 10 %

Mud settling pond / 0.5 %

Waste water settling pond / 0.5 %

Canal and drainage system / 4 %
Vegetation Aspect and Soil Dynamics
Soil Organic Matter Accumulation & Contamination
CASE STUDY EXAMPLE: UKRAINE
Kyiv oblast (Ivankiv region, Ukraine)

- The study area is located 50 km south of Kiev (about 10,000 ha)
- Underutilized marginal agricultural land characterized by sandy and loamy soils with low precipitation (500 – 600 mm)
- Until 2005, rye and oats were grown
- The land was abandoned starting from 2005 because of poor performances of the fields (low productivity) and of the local economy (lack of competitiveness of the commodities)
- Currently, SRC (willows) are planted over a surface of 55 ha.
Kyiv oblast (Ivankiv region, Ukraine)

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CASE STUDY EXAMPLE: ITALY
Sulcis (Sardinia, Italy)

- The **study area** is located in the largest Site of National Interest (SIN) in Italy (about 22,000 ha).

- It is one of the most contaminated land of the country, with **heavy metals** (mainly Pb, Cu, Zn) from **industrial flumes** derived from **coal power** generation, bauxite and **aluminum** production, as well as by the centuries-old previous **mining activities**.

- In the municipality of **Portoscuso**, contaminated by **dust fallout** of surrounding industrial area, the topsoil heavy metals content exceeds the legal limit values, and the **cultivation and commercialization of agricultural goods and milk production is forbidden** for the potential threat to human health.
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Sulcis (Sardinia, Italy)
The potential of dedicated short-rotation plantations for energetic use in Romania is not fully exploited. Starting from 2011, energy crops (non-farm, non-food) are eligible to get support from the Government.

<table>
<thead>
<tr>
<th>Year</th>
<th>No of farmers</th>
<th>Surface (ha)</th>
<th>Value of incentives (euro/ha)</th>
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<tbody>
<tr>
<td>2011</td>
<td>146</td>
<td>8346</td>
<td>100.65</td>
</tr>
<tr>
<td>2012</td>
<td>175</td>
<td>4132</td>
<td>119.66</td>
</tr>
<tr>
<td>2013</td>
<td>288</td>
<td>4036</td>
<td>139.17</td>
</tr>
<tr>
<td>2014</td>
<td>416</td>
<td>5564</td>
<td>156.89</td>
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Available data of Romania:

• Badland area, improper for agriculture, is estimated at cca 2 Mio ha (8% as a proportion of overall arable land), mostly situated in hill and mountain region (Bouriaud et. All).

• In Romania, there are identified some areas of uncultivated land, in various stages of decay, making them improper for agricultural cultivation under sustainable conditions. About 800,000 ha of uncultivated land were estimated in 2013, (this number does not include contaminated land). (MDAR-"Renewable Energy in Agriculture")

• In 2006 cca 25471 ha were identified as Contaminated Sites Area

• Inventory in 2013: a number of cca 1183 potentially contaminated sites. No surface given.

• Yearly average afforestation: 20000 ha
Previous projects: Project M2RES:

2013: An assessment of the potential of using marginal lands for RES to energy use in South Region of Romania:
• 14.54% (34,453 km²) of total Romanian territory
• 153-204 km² of degraded land available
• Estimated energy production from SRC:
  » Capacity: 15 MW
  » Power production: 90 GWh/y
  » Heat Production: 350 GWh/y
Previous Projects: STROMA - The sustainability of SRC for biomass production (poplar) – University of Suceava

Experimental tests regarding

• environmental soil indices
• environmental biodiversity indices
• biomass production:
• social sustainability:

The final result of the project: A Guide for sustainable short-term production of woody biomass for industrial purposes
Opportunities to be capitalized through FORBIO

• Existence of underutilised lands, especially contaminated sites

• Government support for energy crops cultivation

• Scheme for RES Promotion, supporting biomass projects

• Good public acceptance of biomass use

• Tradition in energy production at regional level

• Existence on the local market of RE technologies production

• Fairly good development of the infrastructure (road, electricity dispatch)
Potential Barriers: what can be learned from FORBIO?

• Lack of available and reliable data on underutilized lands: *Agronomic and techno-economic assessments*

• Finalising the support scheme for RES use: *Support to policymaking linked to sustainability performances*

• Lack of awareness regarding the advantages of using underutilised terrains for RES projects (marginal terrains are seen only as a burden from the environmental protection point of view): *Sustainability assessment, capacity development and coaching to BMP*
Potential Barriers: what can be learned from FORBIO?

• Complicated, expensive and time consuming legal and administrative procedures for getting all necessary permits: **Strategy for overcoming barriers includes governance issues**

• Lack of local strategies regarding RES development and valorization of underutilised terrains: **Assessment of potential and development of roadmaps**

• Big investments necessary, reluctance of bank sector: **Links, networking and opportunities mainstreaming**
CONCLUSIONS
• Underutilized lands in Europe and neighbouring countries have the potential to produce biomass for energy use without interfering with other uses of the land

• However, sustainability (environmental, social and economic) is key

• First step when approaching an investment is a thorough feasibility assessment

• FORBIO will develop versatile methodologies and strategies based on internationally recognized tools and broad stakeholder consultations that can be applied to similar EU and neighbouring countries for providing farmers, local and national administrators as well as investors with the necessary information to build a sustainable value bioenergy chains
THANK YOU