Economic feasibility of growing grass and fibre crops in EU Marginal Lands

Giant Reed, Miscanthus and Switchgrass

Peter Soldatos
Bruxelles, Nov 2015
Economic feasibility of growing Perennial Grasses on EU Marginal Lands

“Boosting market share of fibre crops between EU and China”

FIBRA Workshop, Brussels, 23rd November 2015
Peter Soldatos
PGS Research sp.
Scarcity and degradation of Land and Water

• Widespread degradation and deepening scarcity of land and water resources

• food production systems around the globe are at risk,

• 25 percent of the earth’s lands are degraded

FAO, 2011

Growing threat to food security

UK faces 'significant' shortage of farmland by 2030 - University of Cambridge Research

In a world hungry for biofuels, food security must come first. Farmers and policymakers must prioritise hungry people and think local
Horizon 2020 Calls for:
Resource-efficient and profitable industrial crops on marginal land

- To avoid land-use competition with food, it is important to promote the development of resource-efficient varieties that can grow on marginal land.

- Proposals should map marginal land in Europe that is most suitable for industrial crops, taking account of socio-economic (e.g. accessibility) and environmental considerations.

- Proposals should identify the most promising industrial crop species suited to cultivation on large areas of appropriate marginal land in Europe.

What is marginal land?

*I cannot define an elephant, but I know one when I see it.*

Joan Robinson, Economist and Philosopher
1903-1983
<table>
<thead>
<tr>
<th>Definition</th>
<th>Source</th>
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</thead>
<tbody>
<tr>
<td>Areas affected by significant natural handicaps, low soil productivity and poor climate conditions (iLFA)</td>
<td>European Commission</td>
</tr>
<tr>
<td>Low quality land the value of whose production barely covers its cultivation costs</td>
<td>Eur. Environmental Agency</td>
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<tr>
<td><strong>Land</strong> of poor quality with regard to agricultural use, and unsuitable for housing and other uses.</td>
<td>OECD</td>
</tr>
<tr>
<td><strong>Land</strong> having limitations which in aggregate are severe for sustained application of agriculture</td>
<td>FAO</td>
</tr>
<tr>
<td><strong>Low fertility</strong> land, resulting in poor returns due to biophysical, economic, environmental, social, legislative, ... reasons</td>
<td>Soldatos, Cosentino, Scordia, Osborne</td>
</tr>
</tbody>
</table>
Problems with Marginal Land Definitions

- There is no commonly agreed definition

- What is the degree of marginality?

- Are financially supported lands “sufficiently marginal” to be considered for non-food cultivation?

- One third of non-mountainous areas are supported by the EU as Less Favoured. Most of them grow food crops. Are they Marginal?
Less Favoured Areas
Agricultural Support Basis until 2016

Criteria:
- LAND of poor productivity
- Low ECONOMIC returns in agriculture
- Diminishing POPULATION

EU-25 support Statistics (no. of farms):

TOTAL no. of Farms: …… 10.6 million
Receiving LFA: ………… 1.4 million (half of which mountainous)

Towards a better targeting of the aid to farmers in areas with natural handicaps
Less Favoured Areas

New Insights into Mountain Farming in the European Union, EC 2009
The Real Cost of using Prime Land for fuel is High

**Food vs Fuel**

15% of world corn fuels US cars. US ethanol support programme lasted 33 years and cost over 20 billion dollars.

Corn price tripled between 2005 and 2013.
Why EU supports cultivation on Marginal Lands?

The US produce 1/3 of world corn and exports 20% of it.

A rise in the price of US corn hits mostly poor countries importing US corn.

Food vs Fuel

EU wants to avoid food scarcity problems

Subsidised Green Energy Programmes (mainly in the US) have reduced grain supplies pushing food prices up.

EU is seeking to solve the puzzle of securing food sufficiency without harming renewable energy momentum and committed investment.

Compromise: Cultivation of energy plants in non-food lands (MARGINAL)
The Fibre Market

The World consumes more man-made fibres (polyester, polyamide, polypropylene, etc.) than natural (cotton, wool, jute, flax, kenaf, etc.).

The global market share of natural fibres has dropped below 50%, with cotton and wool maintaining the lion’s share among natural fibres, with 40% of the world fibre market and over 80% of the natural fibres sales (Mackiewicz 2008).

All other natural fibres (jute, flax, hemp, kenaf, ramie, etc.) are squeezed within an 8% of the world fibre market with jute being the major competitor holding 75% of this market niche.
Cotton and synthetic fibres dominate the most important fibre markets.

Evolution of world apparel fibre consumption in m. tonnes

Source: FAO, WORLD APPAREL FIBER CONSUMPTION SURVEY, 2013
Perennial Grasses

High yield cropping
Miscanthus - Switchgrass - Giant Reed
Cost Analysis of Miscanthus*

YIELD (dry tonnes/ha)  12.67

Selling price €/DT  65

Sales  824

- Initial Investment  200
- Oper expenses  499
- Logistics  120

= Return to Land  5

- Land rent  100

= Profit €/ha  -95

Profit €/tonne  -7.52

* Only Marginal Land Average

TOTAL annual cost €/ha = 947.00
Dry biomass cost €/tonne = 74.74

Annual Equivalent Cost distribution (€/ha)
Cultivation in S. European Marginal Lands is less attractive, in spite of the lower Land Rent

MO: Marginal Land in high precipitation areas
ML: Marginal Land - Low input agriculture
MH: Marginal Land - High input agriculture
SH: Agricultural Land - High input agriculture
The cost of delivered biomass from perennial grasses is generally higher than expected selling price.
Financial Return to Marginal Land farming is insufficient … Financial support is necessary

Cost and Revenue €/ha

Yield DT/ha

- Giant Reed Cost
- Miscanthus Cost
- Switchgrass Cost
- Cardoon Cost

Farmers profit if price is increased by 15 €/t …

… or by increasing yields, e.g. by 20%
Life Cycle Costing used in Economic Analyses has been facilitated by the abc software.

The ABC package is a user friendly downloadable piece of software, designed to facilitate tasks of Activity Based Costing (ABC) and Life Cycle Cost Analysis (LCCA) of any business plan with special emphasis on the evaluation agricultural projects. ABC may also estimate the profitability and the financial feasibility of investments by means of well established, commonly used project evaluation criteria.

ABC is designed to decompose and analyse any activity or operation of investment proposals and construct a bottom-up financial profile of all related details throughout the whole economic life of the project.

ABC is the most recent development of the earlier COST and BEE models developed by the same team of experts. It requires significantly less user effort and offers more ready made standard reports and charts illustrating all financial results.

ABC is currently being available as FreeWare downloadable from www.abc.aua.gr, the official ABC software web site.