Functional Land Management: A governance tool to develop the bio-economy?

Rogier Schulte & Dina Popluga
Ireland - Latvia

**Latvia**

Area – 64 589 km\(^2\)
Population – 1 989 768
Population density – 30.8/km\(^2\)
Highest point – 311 m (Gaiziņš)
Agrarian sector – crucial for economy

Agriculture: 29% of land area
Forests: 45%

**Ireland**

Area – 84 421 km\(^2\)
Population – 4 819 750
Population density – 57.1/km\(^2\)
Highest point – 1 038 m
Agrarian sector – crucial for economy

Agriculture: 64%
Bioeconomy in Ireland...

Keeping renewable returns in the sector

A domestic industry

Promised market for miscanthus crop fails to er...

Barry Cuslin

Caitriona M

AgriLand

In Ireland's largest farming news

YOU ARE HERE: Home → Willow and miscanthus crop

Marese McDonagh

PUBLISHED
06/10/2015 | 02:30

Farmers can earn extra cash from new biomass plant: Kenny

The Irish Agriculture

2010

2013

CASH IN HAND: The Department is not aware of any participants knowing the correct fertiliser dosage.

More than 1,700ac of miscanthus was planted last year but the market demand for the crop is not keeping up.

One quarter of an acre per year is being ploughed in as the scheme failed to materialise.

The Department has had a biomass plant scheme in place since 2007 that specifically provides support for willow and miscanthus plantings.

The Scheme has been variously funded by the Exchequer, the EU and the renewable energy scheme.

At present, the scheme is working to delivery 250,000 tonnes of biomass each year, leading to a biomass power generating station will have the capacity to supply 140,000 homes.
Demand & supply from our land...

**Functional Land Management**

= framework for governance of supply and demand of ecosystem services;

Including food production & environmental services

**Question:**

Can Functional Land Management be adapted into a framework for governance of supply and demand of the bio-economy sectors?
Functional Land Management: managing supply & demand of soil functions
Demands on our land

I want to grow my milk output by 50%
Demands on our land

We will provide clean drinking water
Demands on our land

We need to sequester carbon
Demands on our land

Protect the home of biodiversity

Save “Europe’s Amazon”!

Stop Channelling

the Danube, Drava and Mura!

WWF
Demands on our land

We need to find a home for our waste...
What can our land supply?

All soils / land perform all functions...

- Primary productivity: food, fibre, fuel
- Water regulation & purification
- Carbon regulation & sequestration
- Habitat for functional & intrinsic biodiversity
- Nutrient Cycling
- Archaeological (archive)
- Building platform

...but different parts of the land(scape) are better at delivering different functions
Soil Functions: a landscape approach

Grassland (unimproved)
Soil functions in relation to land use

Relative importance depends on land use

land use

- Tillage (crops)
- Biomass / biofuel
- Grassland (improved)
- Forestry (coniferous)
- Grassland (unimproved)
- Forestry (deciduous)
- Peat (upland)
- NATURA 2000
Soil functions in relation to land use

Relative importance depends on land use and soil type:

- Tillage (crops)
- Grassland (improved)
- Forestry (coniferous)
- Grassland (unimproved)
- Forestry (deciduous)
- Peat (upland)
- NATURA 2000

Well drained

Moderately drained

Poorly drained
Soil functions in relation to land use

<table>
<thead>
<tr>
<th>Soil Functions Matrix</th>
<th>Arable</th>
<th>Bio-energy</th>
<th>Broadleaf Forest</th>
<th>Coniferous Forest</th>
<th>Managed Grass</th>
<th>Other Grass</th>
<th>Natura 2000</th>
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<tbody>
<tr>
<td>Well &amp; Excessive</td>
<td><img src="image1" alt="Diagram" /></td>
<td><img src="image2" alt="Diagram" /></td>
<td><img src="image3" alt="Diagram" /></td>
<td><img src="image4" alt="Diagram" /></td>
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<td><img src="image6" alt="Diagram" /></td>
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<td>Moderately &amp; Imperfect</td>
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<td><img src="image9" alt="Diagram" /></td>
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<td>Poorly</td>
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<tr>
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Mapping the supply of soil functions

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Land use map of Ireland
Soil functions: demand
Agricultural policy framework
- Common Agricultural Policy (Pillar 1)
- Areas of Natural Constraints (Pillar 2)

Environmental policies
- Greening Measures (Pillar 1)
- Nitrates Directive
- Water Framework Directive (DG Env)
- Habitat & Birds Directive (DG Env)
- Agri-Environmental Schemes (Pillar 2)
- EU 2030 Climate and Energy Package (European Council)
- Sewage Sludge Directive
Soil functions: demand
How?
Policy framework

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<th>Scale</th>
<th>Policy Objectives</th>
<th>Pathway</th>
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<td>Farm Management (local)</td>
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- High Status Sites
- Surface water quality
- GHG mitigation
- Protection of Rare species habitats
- Sewage Sludge Management
- Manure Management (intensive enterprises)
- Drinking water quality
- Soil Quality
- Drinking water quality
- Soil Quality
Policy framework

Scale

National
- Food / Fuel Sovereignty
- High Status Sites
- GHG mitigation
- Protection of Rare species habitats

Regional
- Regional development
- Surface water quality
- Sewage Sludge Management

Local
- Farm viability
- Drinking water quality
- Soil Quality
- Manure Management (intensive enterprises)

Pathway

Land Use Management (National / EU)

Farm Management (local)
Policy framework

Pathway

-existing Policy Instruments

Value-chain

Market

Mandatory

Voluntary

Land Use Management (National / EU)

Farm Management (local)

Marketing

Designation of NATURA 2000 & High Status Waterbodies

Afforestation Schemes

Manure trading

River Basin District Management Plans

Areas of Natural Constraint

Quality assurance schemes

Nitrates

GAEC

Agri-environment schemes

Environmental Impact Assessment

Greening measures

Single Farm Payment
To be continued…

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Functional Land Management

Question:
Can Functional Land Management be adapted into a framework for governance of supply and demand of the bio-economy sectors?
What can our land supply?

**Functions of the Bioeconomy?**

- Food, drinks, functional food, feed
- Non-food products: packaging, cosmetics, bioplastics, biopharma
- Energy: biogas, biofuels, electricity, heat
- Raw materials: wood, by-products, biomass
- Carbon sequestration?
A landscape approach

Grassland (unimproved)
Relative importance depends on land use \texttimes\ soil type:

- Tillage (crops)
- Grassland (improved)
- Forestry (coniferous)
- Forestry (deciduous)
- Peat (upland)

Biomass / biofuel land use

Well-drained
Moderately-drained
Poorly-drained

Functions in relation to land use

Forest  Ag land  Marsh  Shrub  Other
Mapping the supply

CORINE Land Cover 2012 - Latvia

Peat map

Peat?
supply & demand

Supply

Food

Non-food

Demand

Population density in Latvia, 2011

Source: LGIA
Latvia’s vision for the bioeconomy development

Research and innovation
- National Reform Programme of Latvia for the Implementation of Europe 2020 Strategy
- National Development Plan of Latvia for 2014–2020
- Guidelines for Science, Technology Development, and Innovation 2014-2020 which includes Smart Specialisation Strategy and sets knowledge-intensive bioeconomy as one of specialisation priorities
- Action Plan of the EU Baltic Sea Region Strategy calls for exploiting full potential in research and innovation for marine energy and blue biotechnology

Agriculture
- Latvia - Rural Development Programme 2014-2020
- National Development Plan 2014-2020
- Sustainable Development Strategy of Latvia until 2030 which foresees use of biowaste in biogas production

Aquaculture
- Aquaculture multi-annual strategic guidelines 2014 to 2020

Industry
Demand & supply from our land...

In principle: yes

Advantages:
- Allows for holistic management of competing targets
- Allows us “to get the most from our land”

Question:
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