AGRICULTURE AND FOOD DEVELOPMENT AUTHORITY

The Irish Agriculture and Food Development Authority
Greenhouse gas emissions from livestock systems: Irish perspectives on a global issue

Paul Crosson

Seminar: Reductions of GHG-emissions from livestock production

Ski, Norway, 7 February 2018
Presentation overview

- Irish agriculture - an overview
- GHG policy context – global, EU and Irish
- Development of a national GHG mitigation programme
Presentation overview

• Irish agriculture - an overview

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• Development of a national GHG mitigation programme
Irish economy has rebounded strongly

- GDP increased 2001 to 2007, decreased during the financial crisis & is now growing rapidly

- Unemployment increased from 4.5% in 2005 to 16% in 2010 and is now at 6%

Source: Central Statistics Office
Agriculture continues to play an important role

### Key Indicators for Primary and Agri-Food Sectors

<table>
<thead>
<tr>
<th></th>
<th>Primary Sector</th>
<th>Agri-Food Sector</th>
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<tbody>
<tr>
<td>% of GVA at factor cost (2014)</td>
<td>2.4%</td>
<td>7.6%</td>
</tr>
<tr>
<td>% of employment (2015 average)</td>
<td>5.5%</td>
<td>8.4%</td>
</tr>
<tr>
<td>% of merchandise exports (2015)</td>
<td>7.0%</td>
<td>10.7%</td>
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</tbody>
</table>

- **Agriculture accounts for**
  - 24% of industry turnover
  - 22% of industry gross output
A pasture-based agri-industry

Source: Irish Dept Agr, Fisheries and the Marine; Central Stats Office
Surge in dairy production

- 140,000 farms, 18,000 dairy
- Average farm size 33 ha
- Long growing season
- Major expansion of dairy herd after quota abolition
- Sucker herd contracting

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Graph showing changes in livestock production from 2005 to 2017:

- Cattle Rearing: -16% (2008), +3% (2010), -3% (2012), -10% (2017)
- Cattle Other: €16,853 (2010)
- Sheep: €15,708 (2012)
- Tillage: €30,840 (2017)

Legend:
- Dairy cows
- Suckler cows

Graph showing cattle and tillage production with yield per cow from 2005 to 2017.
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Policy Actors

- Limit global temperature increase to 1.5°C
- EU commitment: -40% by 2030 relative to 1990
Policy Actors

Low-carbon strategy for 2050
Targets compared to 1990 levels

Teagasc
Agriculture and Food Development Authority
2.14 the multiple objectives of the agriculture and land use sector, with their lower mitigation potential, should be acknowledged, as well as the need to ensure coherence between the EU's food security and climate change objectives. The European Council invites the Commission to examine the best means of encouraging the sustainable intensification of food production, while optimising the sector's contribution to greenhouse gas mitigation and sequestration, including through afforestation. Policy on how to include Land Use, Land Use Change and Forestry into the 2030 greenhouse gas mitigation framework will be established as soon as technical conditions allow and in any case before 2020.
Policy Actors

- UNFCCC Parties
- EU Climate Targets
- Ireland’s Policy Position

- National Climate Policy Position 2014
- Reduce GHG emissions by 80% by 2050

Sets out actions for each sector including agriculture

Plan and an adaptation framework
Ireland’s agricultural GHG emissions profile

- Emissions 5%-6% below 1990 levels while output has increased substantially
Specific Challenges for Ireland

- Agricultural emissions account for 45% of non-ETS sector

- Emissions from agriculture projected to be 4%-6% below 2005 levels by 2020 (target -20%)
Land-based solutions?

Main carbon stores: incentivise maintenance

Areas most suitable for new afforestation

Potential unsaturated long-term storage?

Plug carbon hotspots: selective remediation

Optimise productivity (address nutrient imbalances)

Emission sensitive soils: reward non-drainage

Ref scenario: BAU (no mitigation)

Total emissions

Emissions gap

GHG emissions (offset by C-sequestration)

C-sequestration

Fossil fuel displacement

Pathway E: residual emissions

2050 Carbon Neutrality Report

Teagasc, 2013

The Irish Agriculture and Food Development Authority
Public perception?

89% of the members recommended that there should be a tax on agricultural emissions.
Government remains committed to agriculture

- **Food Harvest 2020**: increase in milk output 50% & beef value 40%
- **Food Wise 2025**: 65% increase in primary production
- National mitigation plan endorses Teagasc’s Carbon Neutrality Report
Why grow the Irish dairy and beef industries

- Average supply of ~9 kg/capita & consumption of ~6 kg/capita
- Projected increase of 73% in meat demand by 2050
- Projected increase of 80% in dairy demand by 2050
As a major exporter, “carbon leakage” is likely
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https://www.youtube.com/watch?v=xtxwmfNwieM
Step 1 – Measure emissions

Farm Quality & Sustainability Assessments

- 45,000 beef farms
  - 90% of beef exports

- 18,000 dairy farms
  - 100% of milk production

GHG activity data
National integrated approach

Department of Agriculture
(Animal Inventory)

Activity data

Teagasc GHG Model

Irish Cattle Breeding Federation
(Animal performance)
National integrated approach

Department of Agriculture (Animal Inventory)

Activity data

Irish Cattle Breeding Federation (Animal performance)

Carbon Assessment
Step 2 – Assess economics of mitigation

Marginal Abatement Cost Curve (LCA)

Quantity of emissions mitigated

Cost of mitigation

Abatement potential (Mt CO₂eq)

Cost Neutral

Technical intervention

High cost

Increased efficiency

Cost negative

Measure based on increased efficiency

Measure based on land-use change

Measure based on technological interventions
Step 3 – Reduce emissions. Carbon Navigator

➢ To mitigate emissions and increase awareness

Practical measures: GHG mitigation and profitable

1. Grazing season length
2. Age at first calving
3. Calving interval
4. Daily live weight gain
5. Nitrogen fertiliser efficiency
6. Manure management
Carbon Navigator

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Practical measures: GHG mitigation and profitable

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Set targets with advisor

Review current & potential performance

Potential GHG & € benefits

<table>
<thead>
<tr>
<th>Efficiency Measure</th>
<th>Current</th>
<th>Target</th>
<th>Chart</th>
<th>GHG Change</th>
<th>€ Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at first calving</td>
<td>28 mths</td>
<td>27 mths</td>
<td></td>
<td>-0.6%</td>
<td>+502</td>
</tr>
</tbody>
</table>
Research & Extension critical – example of dairy industry

<table>
<thead>
<tr>
<th></th>
<th>GHG measure</th>
<th>2008</th>
<th>2020</th>
<th>2023</th>
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<tbody>
<tr>
<td></td>
<td>kg CO₂e/kg milk</td>
<td>1.1</td>
<td>1.0</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td>kg CO₂e/kg MS</td>
<td>15.7</td>
<td>13.2</td>
<td>11.7</td>
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Take home messages

- Agriculture plays a key role in the Irish economy
- Dairy industry growing; strong commitment to sustainable development with a focus on land use policy
- GHG emissions targets will be challenging – short term will be missed
- Continued commitment to the agri-food sector but...

"The agricultural sector urgently needs to step up to the plate when it comes to meeting the COP21 targets. Clear and measurable targets will be built into the national CAP action plans, and failure to meet them will result in penalties."

*EU Commissioner for Agriculture, Phil Hogan*
Go raibh maith agaibh