Woody Species Role in Agriculture & Environment Sustainability

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Chairman, N. Ireland Sustainable Land Management Strategy

AROWRN CONNECTS, June 2017
Development of a Land Management Strategy for N. Ireland Agriculture, Recognising the Role of Woody Species, at its Core

Launched October 2016

Downloadable from https://www.daera-ni.gov.uk/
European Recognition of N.I. Sustainable Land Management Strategy

Worth £198m of Extra Farm Income, to N. Ireland, per Year

Inspirational Ideas

Delivering Farm Profitability and Better Environmental Performance using multi-functional technologies: Ingredients for a Sustainable Agriculture Strategy for Northern Ireland

DG Ag/DG Env, Joint Workshop
Bratislava Oct 16

DG Agriculture, eip-agri Newsletter, Feb 17
The Driver – Economic Recession

May 2013 – Launch of Agri-Food Strategy Board’s “Going for Growth” Report

Set Industry “Ambition” for 2020
- 60% Growth in Sales to £7bn
- 15% Growth in Employment
- 75% Growth in External Sales

Recommendation 22 – Government must develop a Strategic Land Management Policy, specific to Agriculture

……Whilst enhancing Environmental Sustainability.
Observations
Current Environmental Performance in N.I.

Since 2004 - N balance down 10%; N efficiency up 12%
P balance down 32%; P efficiency up 28.5%
N Levels in Water, Good 15 – 20mg

But
- 62% of Water Bodies failing Good Quality Status
  EU average 47% failing Good Water Quality status
- 80% of P enters water by “Over Land” flow
- The Tail of our Phosphate legacy, 50 Years ????
- Only One, of 49 Priority Habitats, at Favourable Status
Observations of Current Farming Production Efficiencies & Practices in N.I.

- **Grass DM Utilisable Yields** – NI Average 5.1t/ha/yr  
  Top Grassland Yields 16t/ha/yr
- **Soil Analysis** – Only 2% analysed on an annual basis
- **Soil pH** – Optimal 6.0, 64% not achieving optimal
- **% Soils at optimal fertility** – 18%
- **30% of Land in rented on 11 month lease** - Conacre
The Catalyst – Purchase of the Devenish Lands at Dowth

170 ha of Permanent Grass & Woodlands
A Research & Communication Platform for
One Health..... From Soil to Society
The Devenish Vision
One Health…. from Soil to Society

One Health

Human & Environmental Health

Retailer

Consumer

Processor

Producer

...From Soil to Society

DEVENISH™
Beyond Nutrition

The Lands at Dowth
One Health…… from Soil to Society

1st Case Study, Chicken enriched with “Marine” Omega 3 fatty acids

Adding Value “Pre Farm Gate,” with unique Human “Bio Availability,” delivering rapid Human Health Improvement (within the 1st week!!!)

You are what you eat, Eats!!!
Lands at Dowth, Bru na Boinne, UNESCO World Heritage Site

Lands of Dowth - 22% of World Heritage Site
13 Monuments – 6 with Statutory Protection
The Devenish Lands at Dowth
A Science Based Approach to Exploration & Discovery

Surveys carried out since 2014
Aerial LiDAR, Geophysics by the Romano Germanic Commission, GPS Soil Analysis,
in Partnership with School of Archaeology, UCD & Teagasc
The Devenish Lands at Dowth – LiDAR Surveying

Initially, Using LiDAR to find new Archaeological Landscape features

Subsequently, to aid Credible Land Management Decisions
Initially, using GPS Soil Sampling to aid Phosphate Management

Subsequently, to find Archaeology
The Devenish Lands at Dowth – Geophysical Surveying

Initially, using Geophysics to find our Archaeology
Subsequently, to aid Credible Land Management Decisions
The Conclusion – 6,000 yrs of Food Production Innovation

Demonstrated uniquely, by the presence of five Heritage Landscapes

1. The Passage Tombs, Middle Neolithic, c. 5,500 years old
2. The Henge, Late Neolithic, c. 4,500 years old
3. The Concentric Enclosures, Early Medieval, c. 1,400 years old
4. The Rectangular Enclosures, Late Medieval, c. 1,000 years old
5. The Demesne Landscape, c. 300 years old
The Devenish Lands at Dowth – An Emerging Vision

2016 – Lands at Dowth become Platform for Public Engagement
11,000 People in One Year

- EU Ag Commissioner
- USDA/FDA
- Minister of Ag. N. Ireland
- EAAP
- UCD President
- Community Day
- Farm Africa Charity Ball
- Point to Point
- DAERA Senior Team
- DAFM Senior Team
One Health….. from Soil to Society

Improving Cow Welfare, through Improving our Customers’ Soils

- Molybdenum is a potent suppressor of cow fertility and health
- Molybdenum represents a significant challenge to dairy cow profitability
- National grass Molybdenum levels have increased by 1/3 over the past 25 years
- Grass Molybdenum is a useful marker of soil health
- Introducing the Soil Improvement Programme has reduced Molybdenum by 51% in grazing pasture
One Health..... from Soil to Society
Validating the Devenish, 3 Step, Soil Improvement Programme

Precision Soil Sampling & Analysis; Removing Soil Compaction; Applying Lime & Treated Slurry

Monitoring & Measuring the Results

10 - 22% Increase in Grass Yields, 36% Reduction in Ammonia
One Health..... from Soil to Society

Improving Ruminant Landscape to Sequester more GHG Emissions

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<th>C Sequestration (Above Ground)</th>
<th>Renewable Heat</th>
<th>Total</th>
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<td>Current Trees</td>
<td>9.5%</td>
<td>3%</td>
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<tr>
<td>Better Management</td>
<td>32%</td>
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<tr>
<th>Woods</th>
<th>Hedges</th>
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<td>Biomass Density (t C/ha)</td>
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<td>127</td>
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<table>
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<tr>
<th>Total Biomass in Dowth (t C)</th>
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<td>3495</td>
<td>385</td>
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<th>Sequestration Potential for Dowth (t C/Yr)</th>
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<tr>
<td>50</td>
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<table>
<thead>
<tr>
<th>Woods</th>
<th>Hedges</th>
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<td>3880</td>
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S. Green, Teagasc, 2014
DairyCo. 2011
J. Gilliland, Devenish, 2014

GHG Sequestration Potential of 35%, for 200 Dairy Cows, with Followers, at Dowth
WWF-DRC completes its first national biomass map using LiDAR sampling

The Democratic Republic of Congo has become the first African country to build a national biomass map using LiDAR, furthering the scientific underpinning of their REDD+ processes.
80% of Phosphate enters Water by flowing over land, during heavy Rain
63% of NI Water not achieving “Good” or “Better” Quality Status
NI Sustainable Land Management Strategy Recommendations

“Measuring & then Managing!!”

1. Hourly Monitoring of Catchment Water Quality
   60 – 80 of 403 NI Catchments to be Real Time monitored
   Results used through Discussion Groups to secure change

D. Wall, Teagasc
NI Sustainable Land Management Strategy Recommendations

“Measuring & then Managing!!”

2. Aerial LiDAR Survey over Total of N. Ireland
Accessing Water “Run Off” & Auditing Above Ground Carbon

R. Cassidy, AFBINI

S. Green, Teagasc
NI Sustainable Land Management Strategy Recommendations

“Measuring & then Managing!!”

3. GPS Soil Sampling & Analysis of Productive Land
pH, P,K, Soil Organic Matter, Mg, Calcium, 2 ha areas

Devenish
NI Sustainable Land Management Strategy Recommendations

“Measuring & then Managing!!”

4. **Creation of Central Data base** to collate results & other relevant data e.g. Geological Survey Data, Priority Habitats, Digital Farm Maps, Weather Records etc…..

5. **An Online, Cloud-based, Decision Support Tool** to give farmers & chosen “advisers” access to comprehensive detailed information about their own farm and not their neighbours, or wider catchment, to empower farmers to make “informed” decisions of how to manage land in best way
NI Sustainable Land Management Strategy Recommendations

Delivering Behavioural Change

Prioritise & Implement Multi Functional Technologies


J. Gilliland
NI Sustainable Land Management Strategy Recommendations

Delivering Behavioural Change

2. Prioritise & Implement Multi Functional Technologies

- Woody Biofiltration Zones downhill of Farm Yards & Septic Tank discharges, Filtering “Grey” water, enhancing Biodiversity, Carbon Sequestration, etc

- Woody Bio Security Corridors, to reduce spread of BVD, TB, while providing multi benefits as above
NI Sustainable Land Management Strategy Recommendations

*Delivering Behavioural Change*

7. Prioritise & Implement Multi Functional Technologies

- **Pasture Agro-forestry**, extend Grazing Season while providing multi benefits as before
Woody Species Role in Agriculture & Environment Sustainability

Essential in the Future Management of Agricultural Land!!!!!

Dr John Gilliland OBE