

Developing Indicators for Sustainable Agriculture in Ireland and the EU: Irish Experiences

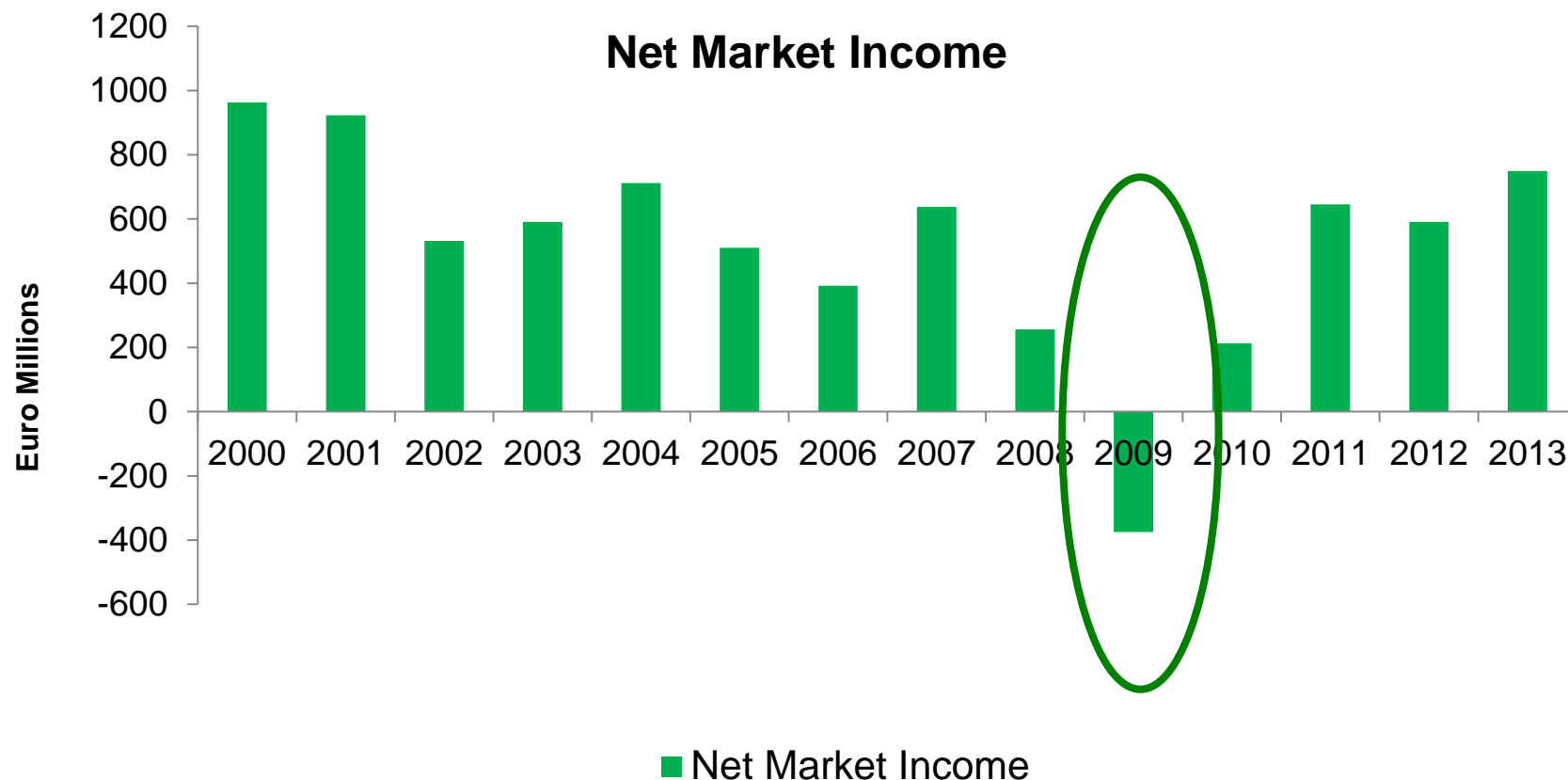
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Donnellan, Kevin Hanrahan, Brian Moran, Edel Kelly, John Finn

Rural Economy and Development & Environment Programmes
Teagasc

Sustainable Intensification Symposium
AES Conference
April 14 2015, Warwick

Irish Agricultural Output, Input & Income

- 2009 Market Income (Operating Surplus-Subsidy) wiped out



Source: CSO

Food Harvest 2020

Overall Vision

Act **smart**

- Prioritise R&D
- Improve skill levels
- Maximise adoption of best practice
- Foster creativity and entrepreneurship
- Rationalise and collaborate at industry level
- Improve focus on consumer preferences

Think **green**

- Prioritise environmental protection
- Capitalise on natural advantages and resources
- Build environmental credibility through research and actions
- Develop an umbrella 'Brand Ireland'
- Satisfy consumer requirements and preferences
- Conserve biodiversity
- Align sustainability across the supply chain

Achieve **growth**

- Increase the value of primary output in the agriculture and fisheries sector by €1.5 billion by 2020
- Increase value-added output by €3 billion by 2020
- Achieve an export target of €12 billion by 2020



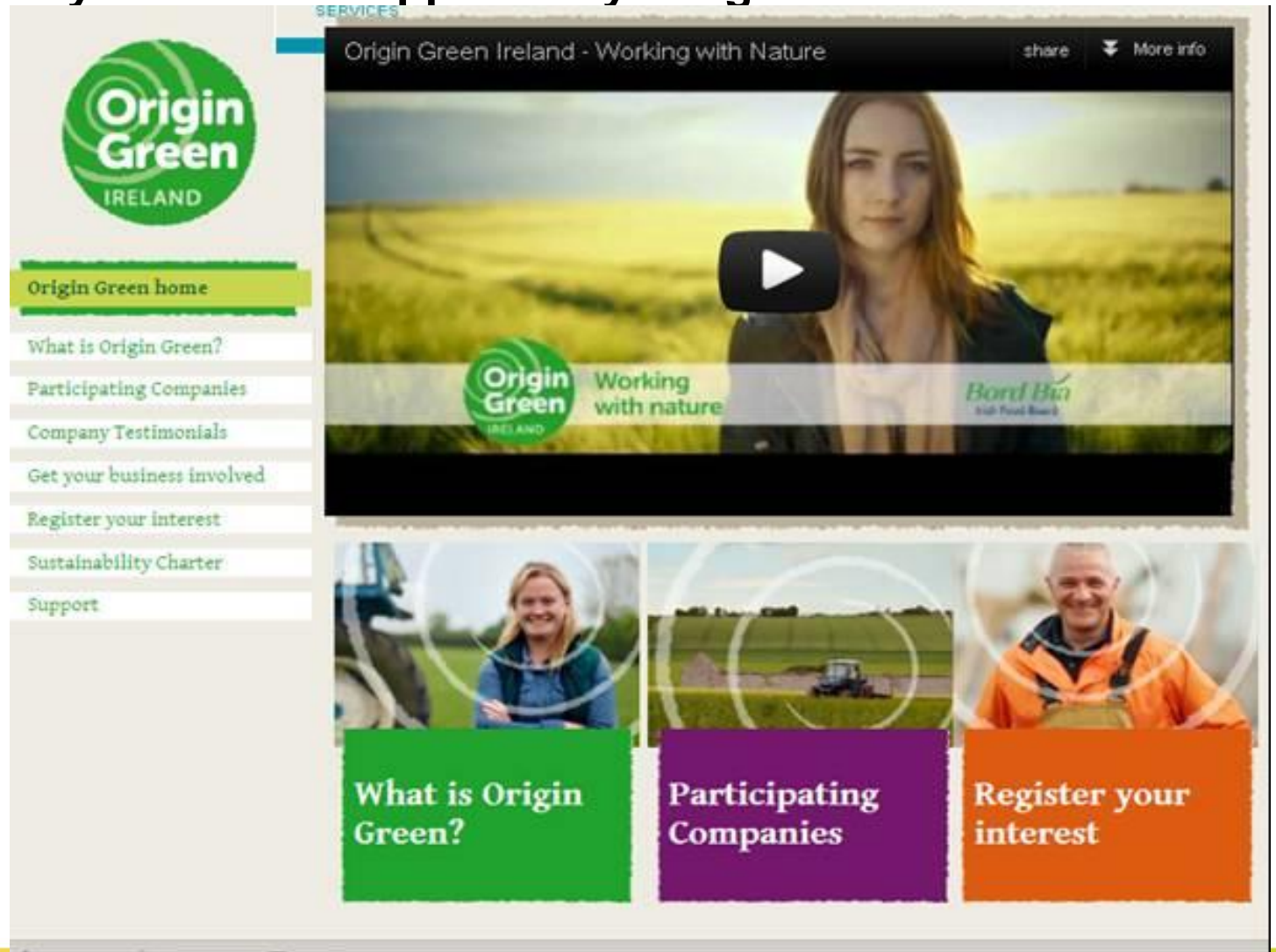
**Food
Harvest
2020.**

A vision for Irish agri-food and fisheries

- Industry Solution – Smart Green Growth

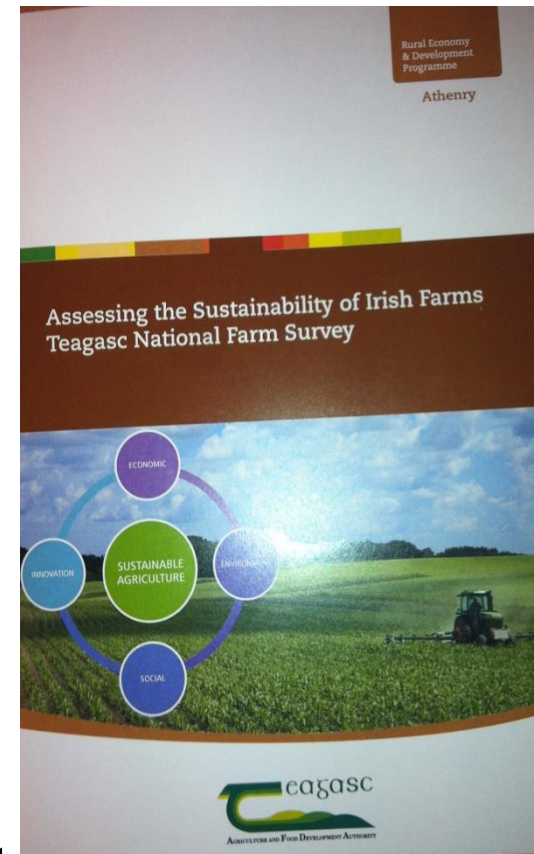
Sustainability is a Market Opportunity: Origin Green

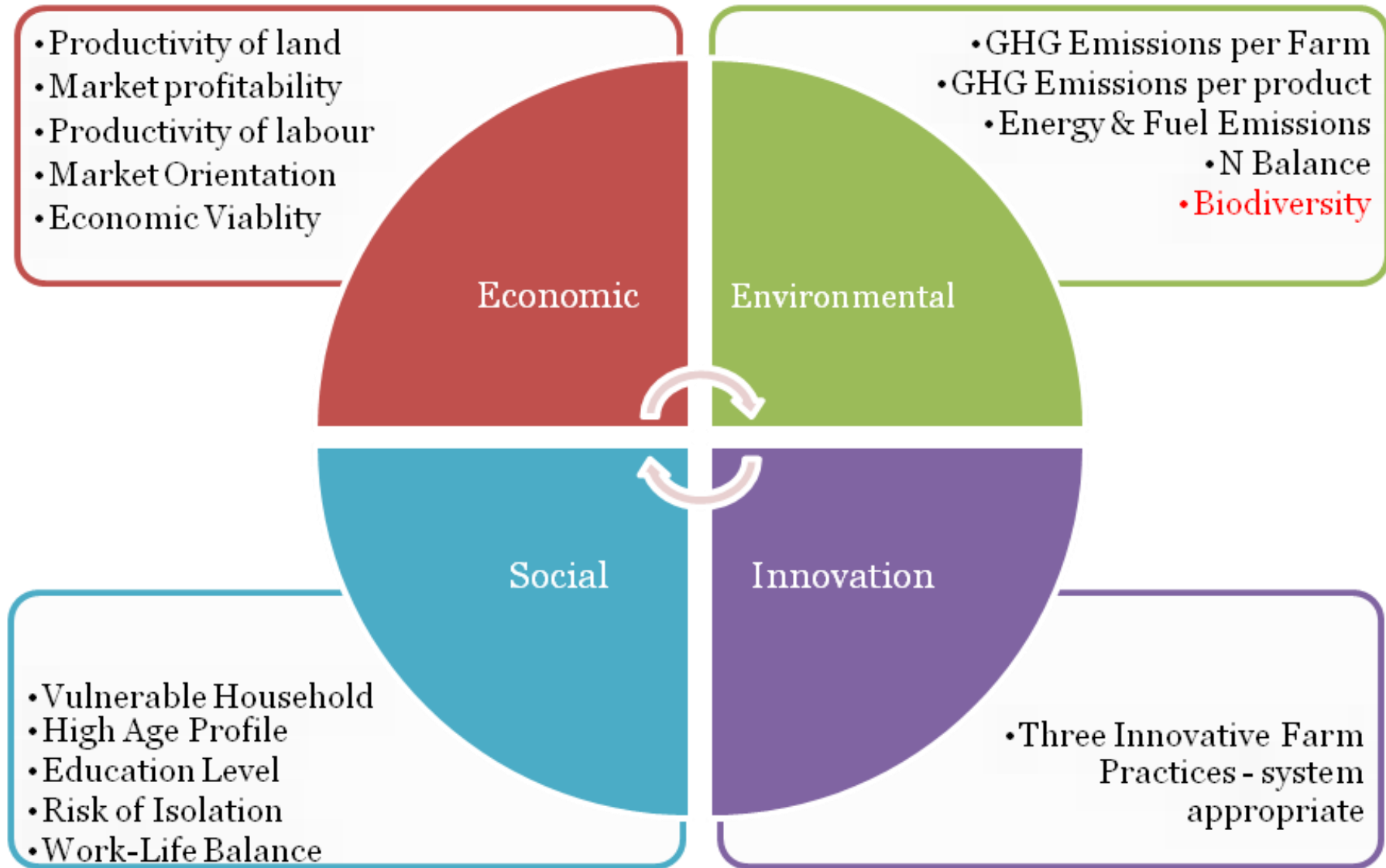
Sustainability an Opportunity



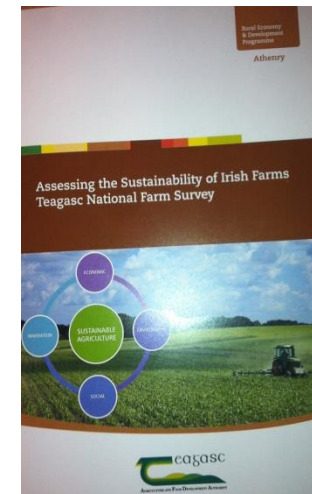
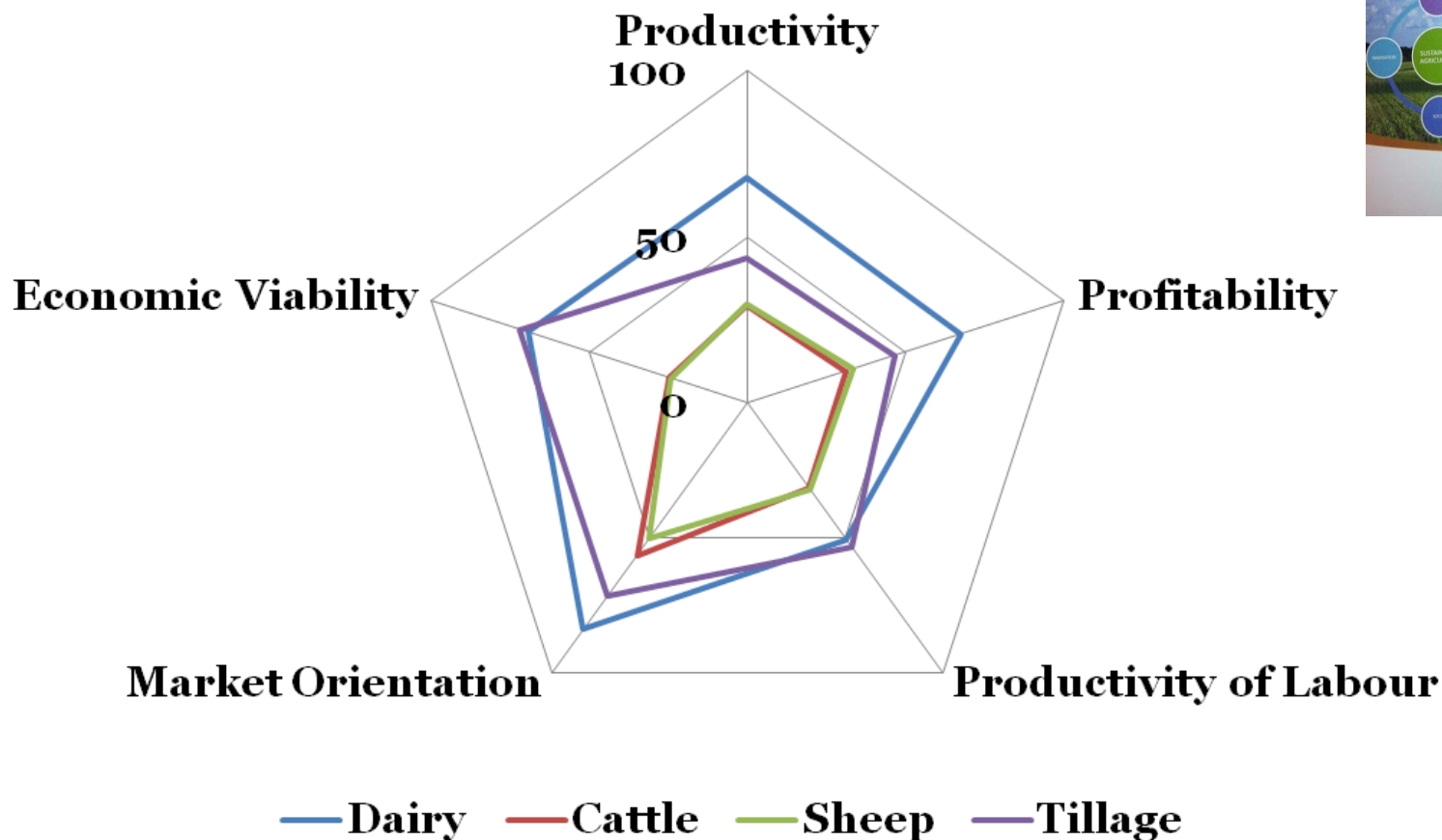
Data

- Teagasc National Farm Survey (NFS)
 - Basis of Irish FADN report
 - Objective and verifiable
- Time series (1972) - but complicated by
 - changes in farm system definitions
 - change in sample size
- Advantage of NFS
 - Agricultural Economics and Farm Surveys Dept
 - Data collection + analysis + research
- NFS data exceeds that required by FADN
 - Broadening environmental data collection in recent years

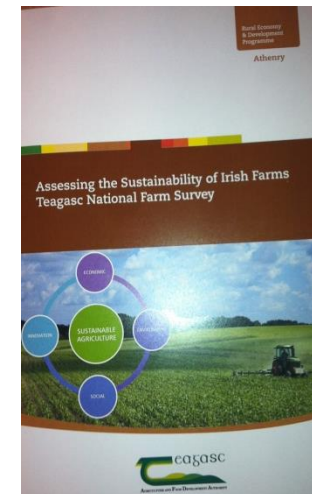
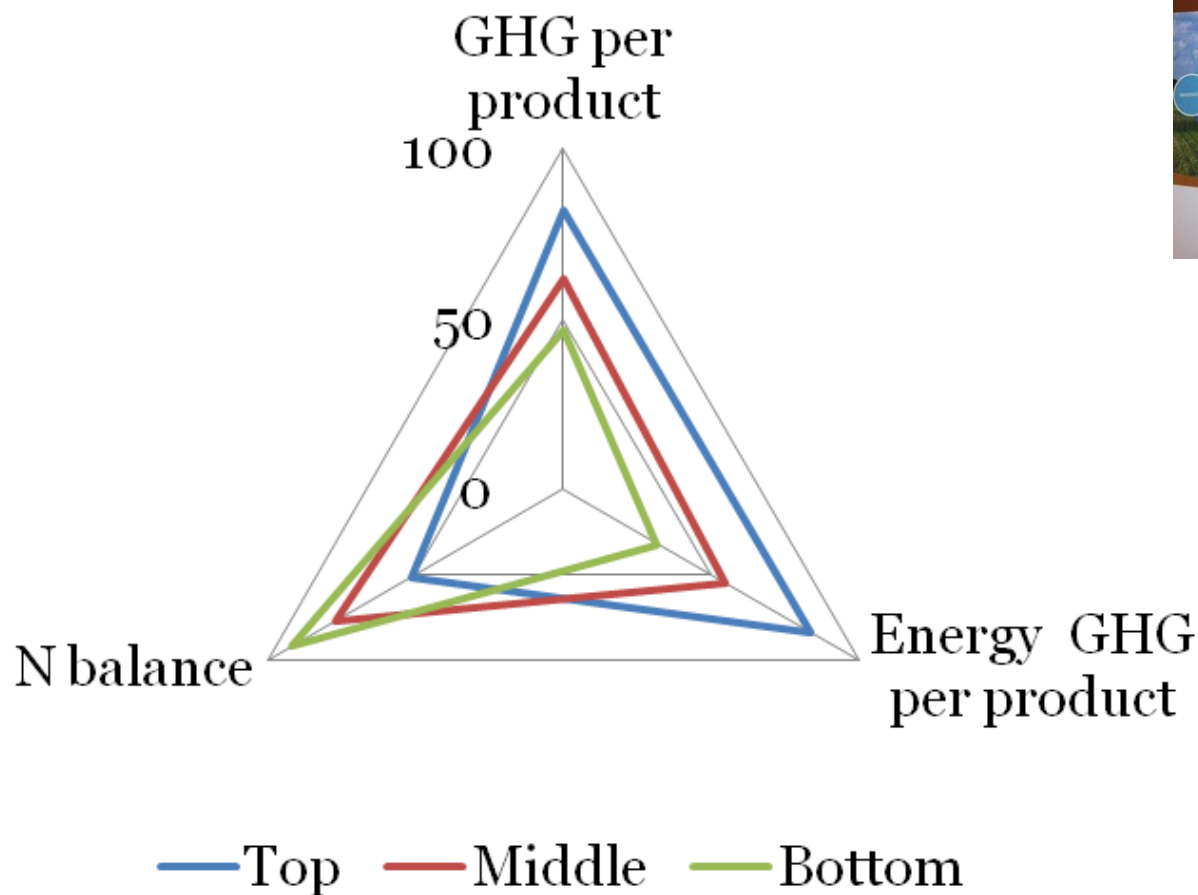




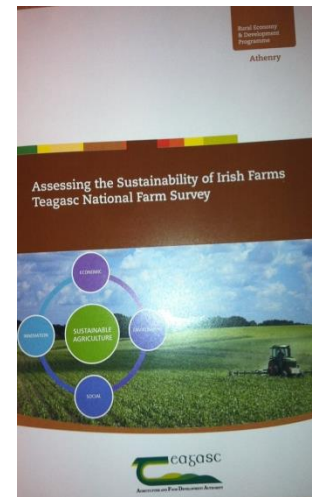
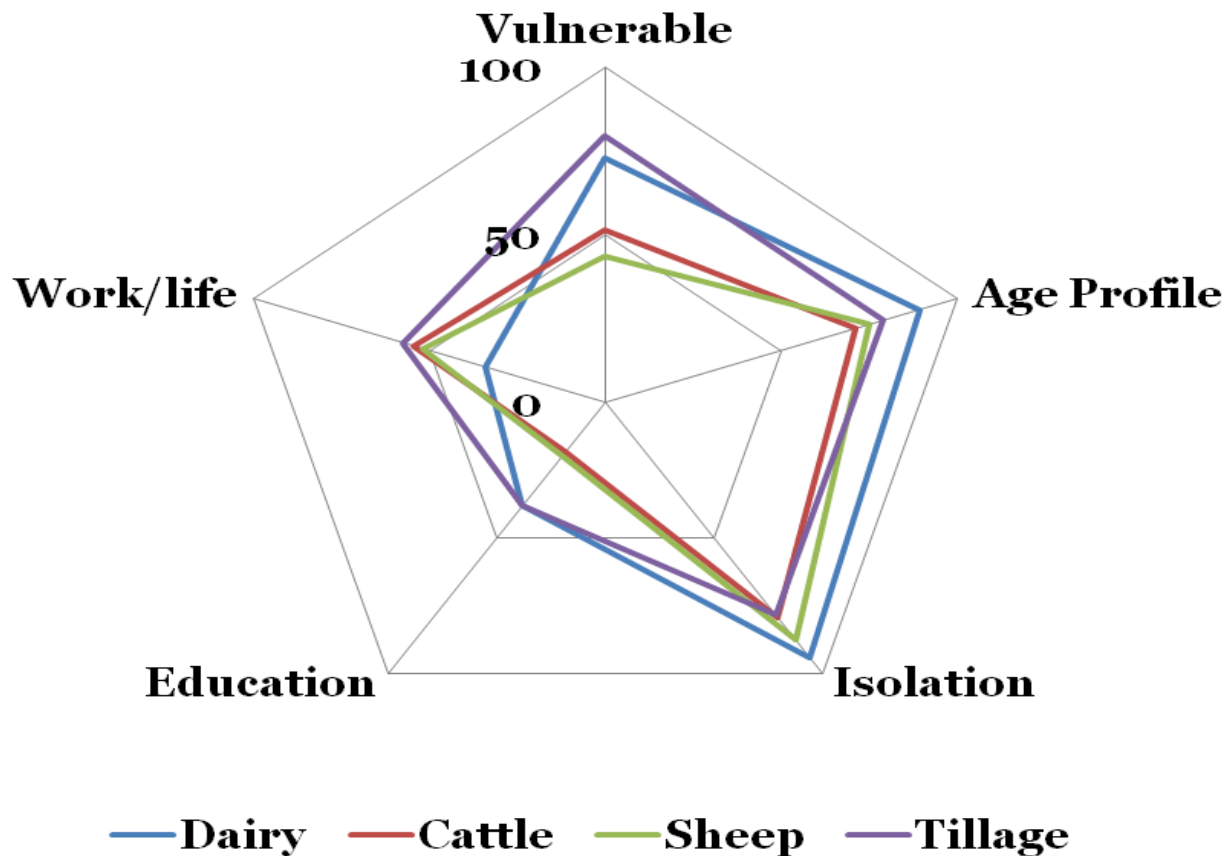
Economic Sustainability



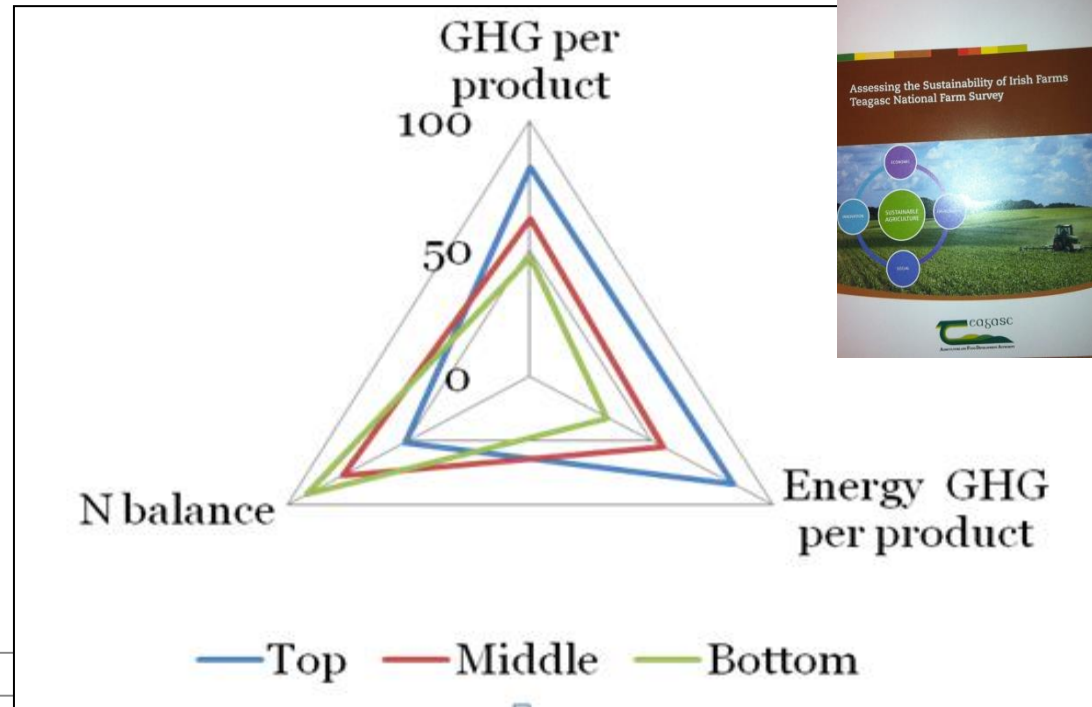
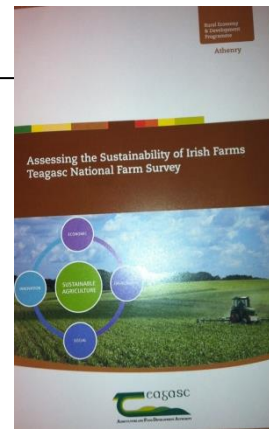
Environmental Sustainability Dairy Farms



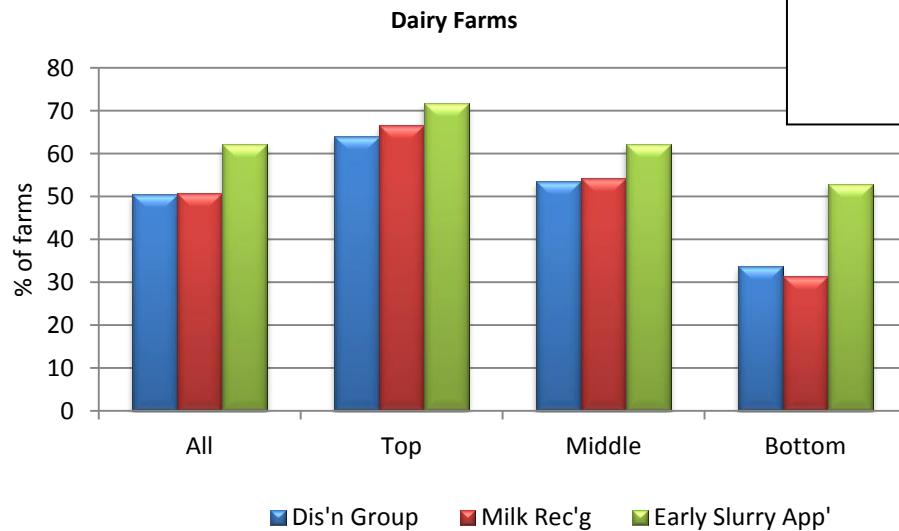
Social Sustainability



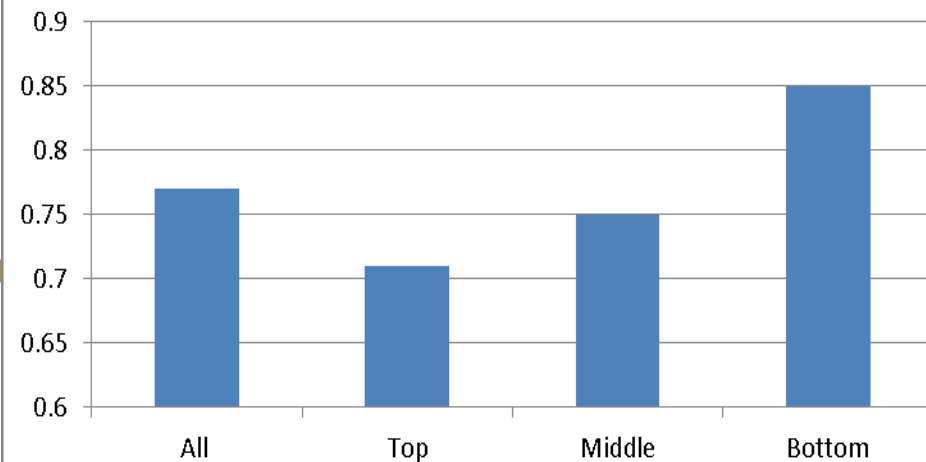
Demonstrate: National Dairy Farms



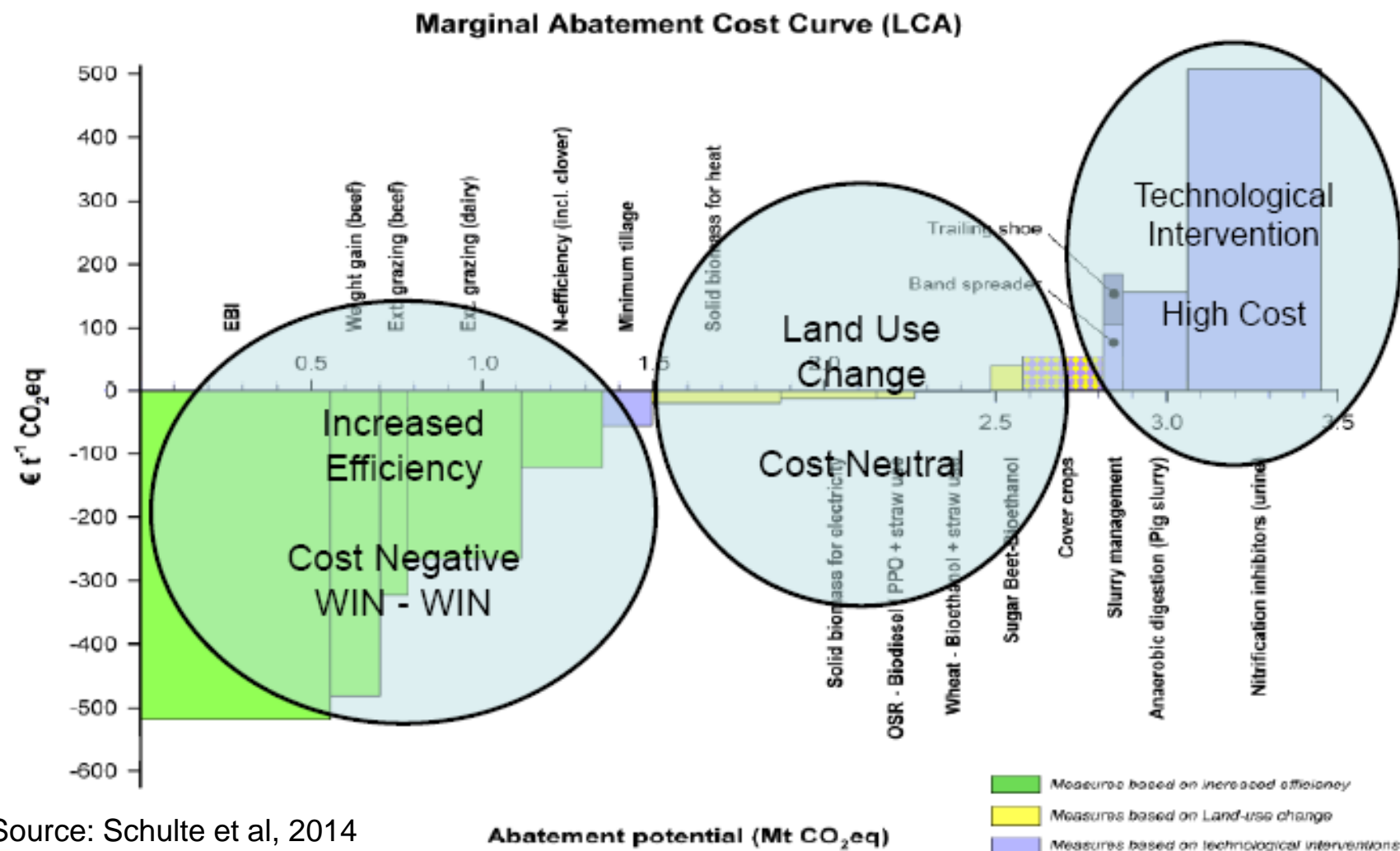
Innovation - Practice Adoption



Dairy system emissions per unit product (kg CO₂-eq/kg milk)



Research Win-Wins: Mitigation Solutions



Source: Schulte et al, 2014

Educate: Carbon navigator output

Farmer Name	<input type="text" value="Pat Murphy"/>	Average number of dairy cows	<input type="text" value="100"/>
County	<input type="text" value="Kilkenny North"/>	Average number of cows planned (3 years)	<input type="text" value="130"/>
Soil Type	<input type="text" value="Moderately Drained"/>	Livestock Units Other Stock	<input type="text" value="60"/>
Area farmed (ha)	<input type="text" value="85"/>	Livestock Units Other Stock (3 years)	<input type="text" value="30"/>
Plan Year	<input type="text" value="2014"/>		

Potential impact of meeting all targets

-12.9% **+€10957**

Year 2014		Current	Target	Chart	GHG change	€ benefit
Grazing season length	Turnout Date - Part Time	<input type="text" value="10/Mar"/>	<input type="text" value="01/Mar"/>	<p>Grazing Season</p> <p>Current Target</p> <p>Low Good Excellent</p>	-2.9%	+€4590
	Turnout Date - Full Time	<input type="text" value="20/Mar"/>	<input type="text" value="15/Mar"/>			
	Housing Date - Part Time	<input type="text" value="01/Nov"/>	<input type="text" value="07/Nov"/>			
	Housing Date - Full Time	<input type="text" value="01/Nov"/>	<input type="text" value="15/Nov"/>			
EBI	EBI	<input type="text" value="85"/>	<input type="text" value="115"/>	<p>EBI</p> <p>Current Target</p> <p>Low Good Excellent</p>	-6.0%	+€3900
Nitrogen Efficiency	Stocking rate (Kg N / Ha grass)	<input type="text" value="160.00"/>	<input type="text" value="160.00"/>	<p>Nitrogen Usage</p> <p>Current Target</p> <p>Low Good Excellent</p>	-1.7%	+€1045
	Chemical N used (Kg N / per Ha) : Urea	<input type="text" value="20.00"/>	<input type="text" value="50.00"/>			
	Ammonium N	<input type="text" value="140.00"/>	<input type="text" value="110.00"/>			
	Import (+) or Export of Org Manure N/Ha	<input type="text"/>	<input type="text"/>			
	Meal keeding Kg / Cow	<input type="text" value="600.00"/>	<input type="text" value="600.00"/>			
	Milk output / cow (Kg milk solids)	<input type="text" value="400.00"/>	<input type="text" value="420.00"/>			
Slurry Spread Timing	% in Spring	<input type="text" value="40"/>	<input type="text" value="60"/>	<p>Manure Management</p> <p>Current Target</p> <p>Low Good Excellent</p>	-1.2%	+€154
	% Summer following 1st cut	<input type="text" value="60"/>	<input type="text" value="40"/>			
	% Later in Summer	<input type="text" value="0"/>	<input type="text" value="0"/>			
	Application Method	<input type="text" value="Splash Plate"/>	<input type="text" value="Splash Plate"/>			
Energy Efficiency	Plate Cooler Present	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<p>Energy Efficiency</p> <p>Current Target</p> <p>Low Good Excellent</p>	-1.0%	+€1268
	Average Temperature of Milk after Plate Cooler	<input type="text" value="20.0"/>	<input type="text" value="14.0"/>			
	Variable Speed Vacuum Pump	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
	Method of Water Heating	<input type="text" value="Electricity"/>	<input type="text" value="Oil"/>			

Update

Challenges for Irish indicator development

- Variables restricted to available data
 - Biodiversity.....
- Indicators based on one year of complete data – 2012
 - Back-casting as part of Dept Ag Food & Marine project
- Climate change data:
 - Stronger on dairy
 - Less data for other enterprises
 - Generated additional variables on fuel and electricity usage
 - Need to move to higher tiers in longer term
- Methodology issues
 - IPCC/LCA
 - Impact of management practices/technology adoption
- Impact of policy changes
 - Greening, etc

Demonstrate: EU Dimension

FLINT will provide an updated data-infrastructure needed by policy makers to:

- support the implementation of relevant strategies, policies and legislation in the Europe 2020 strategy
- assist in targeting of policies by taking into account
 - the performance of farms on a wide range of relevant topics
 - the heterogeneity of the farming sector across the EU



Farm Level Indicators for New policy Topics

FLINT Project Partners

A collection of logos for the FLINT project partners. The logos include: WageningenUR (For quality of life), zalf (a green square with white text), a green line graph, the University of Hohenheim (1818), AKI Agrárgazdasági Kutató Intézet, eAgasc (Agriculture and Food Development Authority), MTT (a green and blue circular logo), a green face logo, CROP-R (the switch to sustain), INRA (Science & Impact), and INTIA.

The Irish Agriculture and Food Development Authority

FLINT: SUSTAINABILITY CONCEPTS

Economic

Production of
goods and
services

Income Support
Market Stabilisation
Innovation

Environmental

Environmental
management

Climate
Soil
Water
Biodiversity
Energy
Resource efficiency

Social

Contribution
to rural
dynamics

Decision making
Health and well-being
Social engagement
Education

FLINT: How?

- Analyse developments in relevant policies and identify the need for new indicators relevant for new policy orientations
 - ...the wish list of possible indicators....
- The farming and agri-food sectors determine the feasibility of collection of these indicators
 -stakeholders refine the indicator list....
- Pilot network of at least 1000 farms (representative of farm diversity at EU level) to collect data on the basis of farm-level indicators to test indicators and methodologies
 -test data collection.....
- Test the value added of these additional data and indicators by incorporating them in a number of policy analyses case studies and assess applicability in all 28 MS
 - ..test indicator usefulness.....

FLINT: INDICATOR SELECTION



FLINT: Social Sustainability

S1: Advisory service provide to the farm

S2: Education and training

S3: Ownership/management

S4*: Social engagement/participation

S5*: Employment and working conditions

S6*: Quality of life/Decision Making

S7*: Social diversification: improving the image of farmers/agriculture in local communities

FLINT: Economic/Innovation sustainability

El 1*: Innovation (CIS)

El 2: Producing under a label or brand

El 3*: Types of market outlets

El 4: Past/Future duration in farming (Survival propensity)

El 5: Efficiency field parcel (LPIS)

El 6: Modernisation of the farm Investment

El 7: Insurance (events outside control of farm) Also to include personal (disability) & farm (building structure) insurance

El 8*: Share of output under contract with fixed price (delivery contracts)

El 9*: Risk exposure (non-agricultural activities)

FLINT: Environmental Sustainability Indicators

E1: Greening: Permanent grassland

E2*: Greening: Existing/created areas of EFA

E3*: Semi-natural farmland areas

E4*: Pesticide usage (Pesticide risk score)

E5*: Nutrient balance (N, P) (farm-gate balance)

E6*: Soil organic matter in arable land

E7*: Indirect energy usage

E8*: Direct energy usage

E9*: On-farm RE production

E10*: Farm management to reduce nitrate leaching

E11: Farm management to reduce soil erosion

E13*: GHG Emission per product









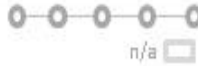




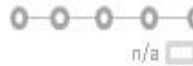

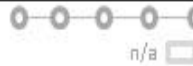


E14*: GHG Emissions per ha

E15: Carbon Sequestration in FADN

E 16*: Water usage and storage

E 17: Irrigation practices

FLINT: Stakeholder evaluation of Indicators

Indicator	Variables	How feasible is to collect reliable data? (from very feasible to impossible)	Why?	How useful is for you? (from very useful to no useful)	Why?	Additional comment
EI1 Innovation	- Questionnaire (yes/no) about new improved methods during the last 3 years on: logistics, supporting activities, goods, improved services, product design, product promotion, product placement, pricing methods.	 n/a <input type="checkbox"/>		 n/a <input type="checkbox"/>		
EI2 Producing under a label	- Share % total output crops and total output livestock under certification label. - Number of markets for certification label production. (Examples of certification label: Protected Designation of Origin, Protected Geographical Indication, Traditional Speciality Guaranteed, organic farming, other private certification label).	 n/a <input type="checkbox"/>		 n/a <input type="checkbox"/>		
EI3 Types of market outlet	- Share % of farm outputs sold to processors, retailers, cooperative, middleman, consumers, other farms, other. - Type and time period of contract	 n/a <input type="checkbox"/>		 n/a <input type="checkbox"/>		
EI4 Past/future duration in farming	- Identified successor to take over the farm.	 n/a <input type="checkbox"/>		 n/a <input type="checkbox"/>		
EI5 Efficiency field parcel (LPIS)	- Number of plots - Size of plots - Average distance of the plots	 n/a <input type="checkbox"/>		 n/a <input type="checkbox"/>		
EI6 Modernisation of the farm investment	- Depreciation of assets - Financial investment	 n/a <input type="checkbox"/>		 n/a <input type="checkbox"/>		
EI7 Insurance	- Presence and amount of insurance (production, assets, personal)	 n/a <input type="checkbox"/>		 n/a <input type="checkbox"/>		
EI8 Share of output under contract with fixed delivery contract	- Share % of farm outputs sold to processors, retailers, cooperative, middleman, consumers, other farms, other. - Type and time period of contract	 n/a <input type="checkbox"/>		 n/a <input type="checkbox"/>		
EI9 Non- agricultural activities	- Revenues from health-care - Revenues from energy sales - Revenues from agricultural wild life management	 n/a <input type="checkbox"/>		 n/a <input type="checkbox"/>		

FLINT: Data Checks

Tests for Table Z9: Environment	
Group of information EU 1010-2080	
Severity level	Logical rule
Group of information EU	
anomaly	Values in column Q and must be between 0 and 100. This holds true for var's [Z9_EU_1010_Q, Z9_EU_1020_Q, Z9_EU_1030_Q, Z9_EU_1040_Q, Z9_EU_1050_Q, Z9_EU_1060_Q, Z9_EU_1070_Q, Z9_EU_1080_Q, Z9_EU_1090_Q, Z9_EU_1100_Q]
anomaly	Values in column C [existing in FADN give code] must be greater than zero if Q and U greater than zero. If value in C > 0, C must be plus/minus Q x country avg CPI cost of fuel. This holds true for vars [Z9_EU_1010_C, Z9_EU_1020_C, Z9_EU_1030_C, Z9_EU_1040_C, Z9_EU_1050_C, Z9_EU_1060_C, Z9_EU_1070_C, Z9_EU_1080_C, Z9_EU_1090_C, Z9_EU_1100_C]
anomaly	Column U cannot exceed a single value between 1-8. This holds for var's [Z9_EU_1010_U, Z9_EU_1020_U, Z9_EU_1030_U, Z9_EU_1040_U, Z9_EU_1050_U, Z9_EU_1060_U, Z9_EU_1070_U, Z9_EU_1080_U, Z9_EU_1090_U, Z9_EU_1100_U]
anomaly	Column SU cannot exceed a single value between 1-5. This holds true for var's [Z9_EU_1010_SU, Z9_EU_1020_SU, Z9_EU_1030_SU, Z9_EU_1040_SU, Z9_EU_1050_SU, Z9_EU_1060_SU, Z9_EU_1070_SU, Z9_EU_1080_SU, Z9_EU_1090_SU, Z9_EU_1100_SU]

Challenges for EU Sustainability Indicator Development

- Heterogeneity - existing data, farm systems
- “Tricky indicators” - largely environmental
- 2021: concentrate on measures where impact can be readily assessed
 - targeting of future funding for max impact
 - soil = critical measure (EU commission)
- Composite Indicators???? - complexity
- Linking with other datasets
 - LPIS / marketing and quality labelling info
- FLINT Pilot network
 - 2015 accounting year - 65 Irish farms in total: 40 Dairy + 25 Beef
 - Pilot (the pilot) in April 2015: 2-3 farms from each partner country

Go raibh maith agaibh

Thank You

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<http://www.teagasc.ie/publications/2013/3042/SustainabilityReport.pdf>