



Plant Biodiversity and Agriculture In Ireland

Role of HNV Farmland and Emerging Model of Payments for Ecosystem Services

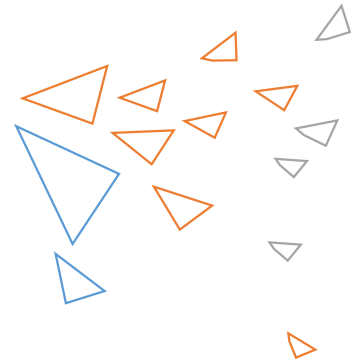
Ollscoil
Teicneolaíochta
an Atlantaigh

Atlantic
Technological
University

Mayo

Dr. James Moran (ATU)
Agroecology and Rural Development Research Group

Outline



- Overall Context
- Agriculture and Biodiversity in Ireland
- High Nature Value farmland and Payments for Ecosystem Services
- The case of hybrid results-based and locally adapted agri-environment payments for ecosystem services (nature, water, carbon)
- Key messages

Progress to date: work of range of project teams and partners



Census Of Agriculture 2020 Preliminary Results

Total Number of Farms

135,037

Average Farm Size

33.4 ha



Livestock Numbers



Poultry
16.5m



Pigs
1.6m



Sheep
5.5m



Cattle
7.3m

Total Agricultural Area

4,509,256 ha

Grassland
4,151,456 ha

Cereals
265,592 ha

Other Crops,
Fruit and
Horticulture
92,208 ha



Farm Ownership

Male Holders

116,936
86.6%

Female Holders

18,101
13.4%

Holders 65+

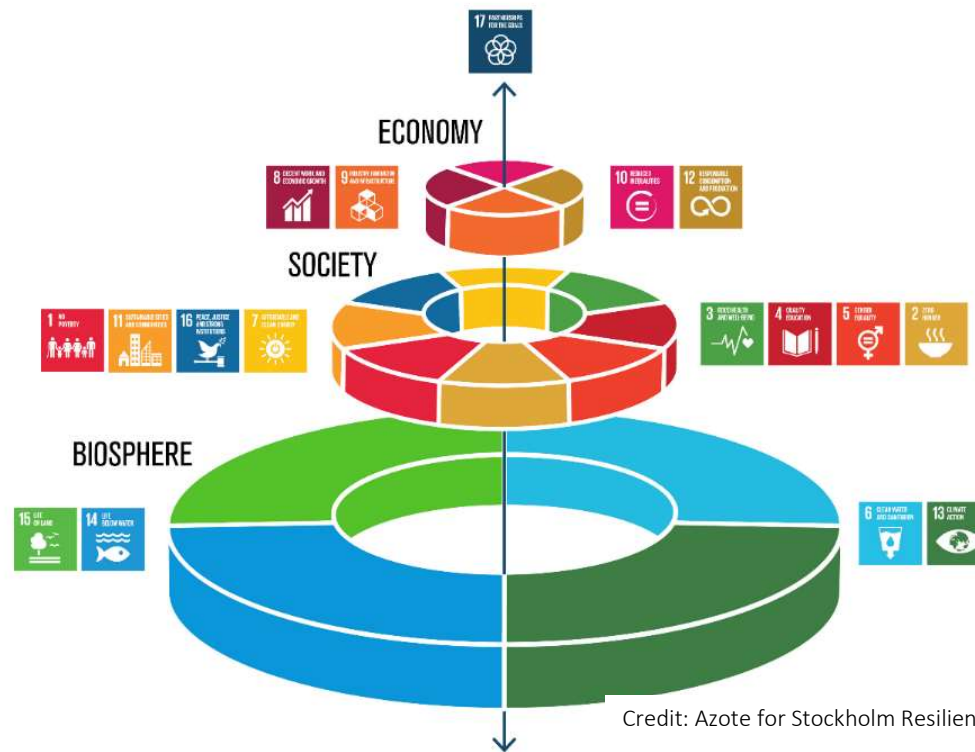
44,135
32.7%

Holders < 35

9,338
6.9%



Sustainable Agriculture and Land Use: Sustainable Development Goals



Economy is a
tool of a
functioning
society which is
dependent on
the biosphere

Credit: Azote for Stockholm Resilience Centre, Stockholm University (CC BY 4.0)

Graphics by Jochen Lakschmidt/Azote

Scale of the challenge



Climate Change



Habitat Loss



Pollution



Invasive
Species



Over exploitation/
consumption

← Interactions / cause-effect feedbacks →

**.... Leading to depletion of biodiversity, contributing to climate change
and reducing supply of ecosystem services for current and future generations**

Biodiversity loss in Ireland



85% Protected Habitats in unfavourable condition; 46% with a declining trend.

Overwintering waterbirds declined by 40% (500,000) since 90s

20% breeding birds in long term decline; 30% are stable/increased

Semi-natural grasslands: ~30% of area monitored lost in last 10-15 yrs



Policy CONTEXT: Lots of plans and strategies!

Co-ordination?

Integrated framework for action?

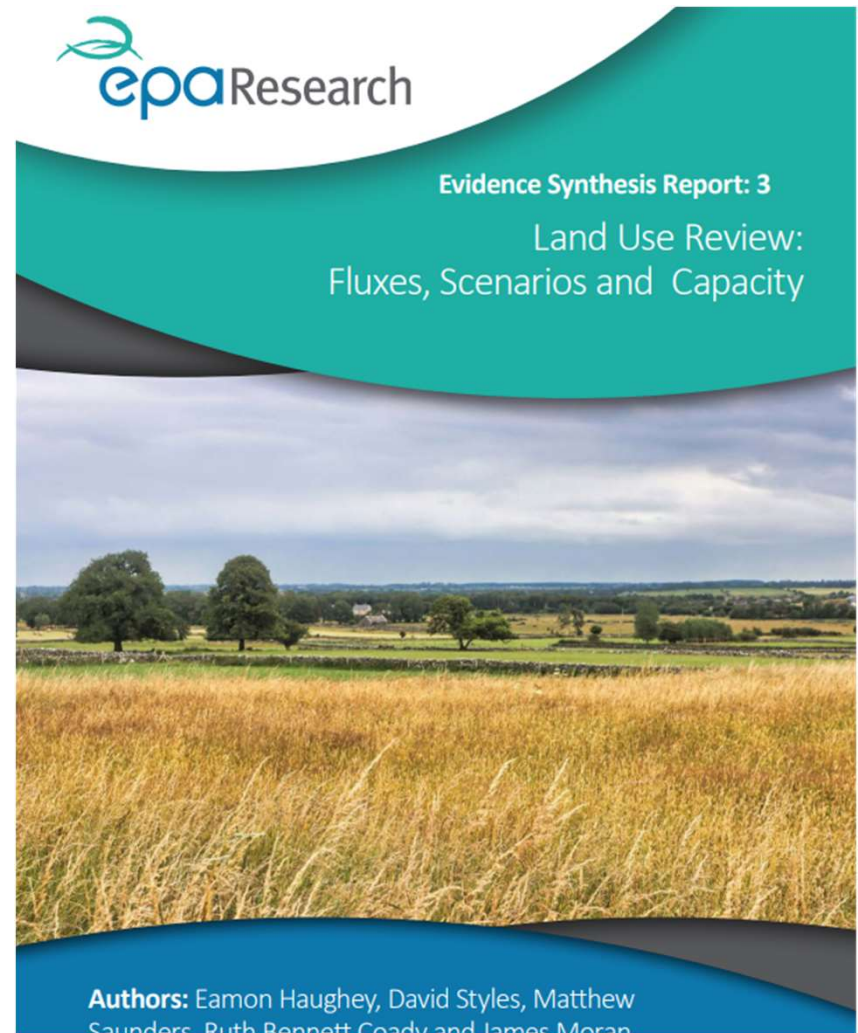
Capacity and Resourcing?

- EU Green deal; Farm to Fork Strategy; EU Biodiversity Strategy; Nature Restoration Plan
- Government declared Climate and Biodiversity emergency in 2019
- Climate Action Plan
- National Biodiversity Action Plan
- Nitrates Action Plan
- River Basin Management Plan
- Food Vision 2030
- CAP Strategic Plan 2023-2027
- Our Rural Future - Rural Development Policy 2021-25
- National Planning Framework-Project Ireland 2040
- Participative democracy – Citizens Assemblies (Climate Action; Biodiversity Loss)



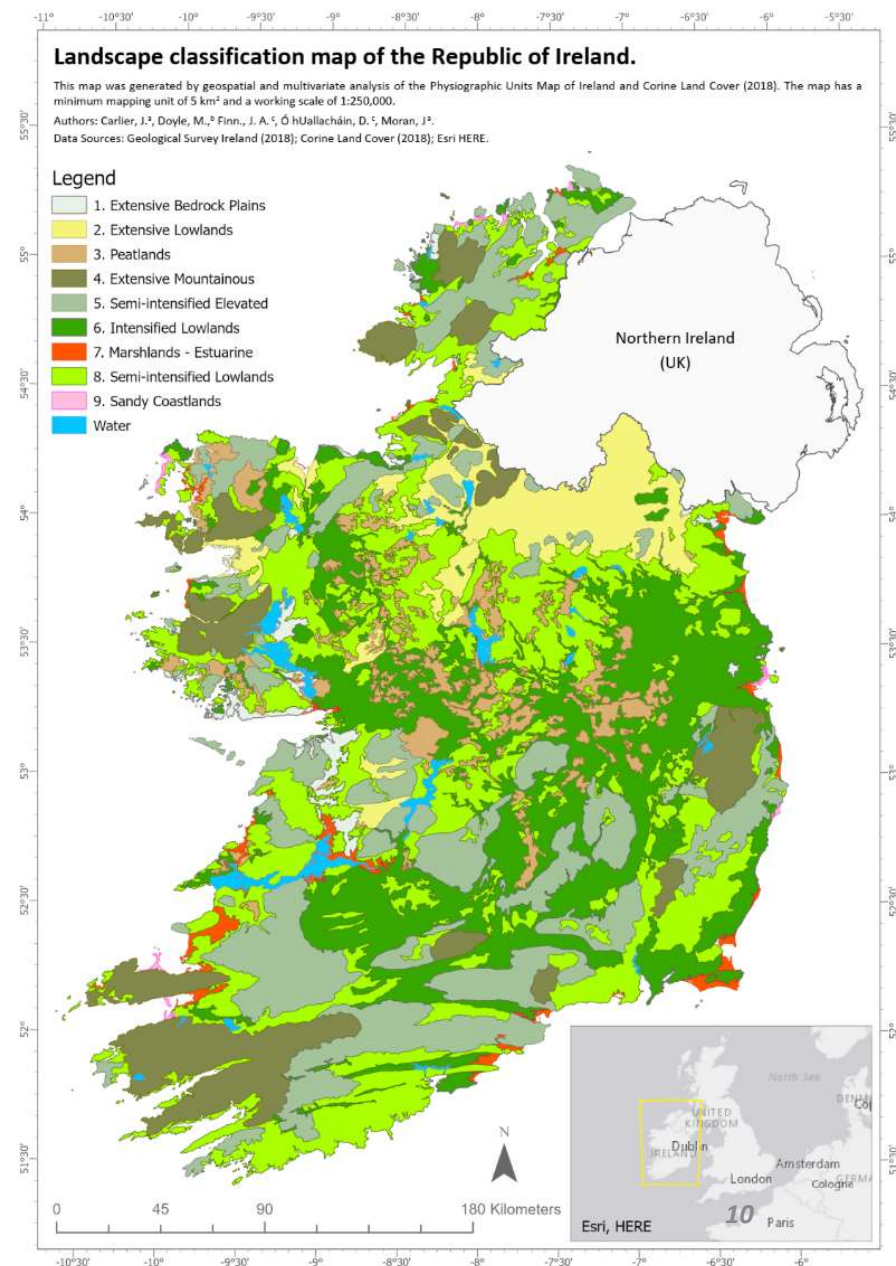
Land Use Review

- Explore land use change scenarios to reach AFOLU net zero by 2050
- Significant land use change required (current available data)
- Increased livestock production efficiency (30% emissions reduction); plus ruminant livestock number reduction (up to 30%); ambitious organic soil rewetting/raising water table (up to 90% of drained organic soils) and an additional forest area of 500,000 ha by 2050
- Need improved monitoring and data to inform decision making
- Potential significant impacts of this land use change on biodiversity and water resources, without effective spatial targeting and subsequent land management



Landscape Diversity

- Broad landscape classification of the country; 9 landscape classes
- Range from intensified lowlands to extensive mountainous areas
- Characterised by difference in geology, soils, climatic variation and land cover with a wide range in land use capacity.
- All land cannot be all things to all people!
- One size does not fit all!



Diverse land base -provides range of Ecosystem Services

- Diversity of Irish farmed landscapes
- Need to provide range of goods and services
- Under supply of non-market ecosystem services/public goods

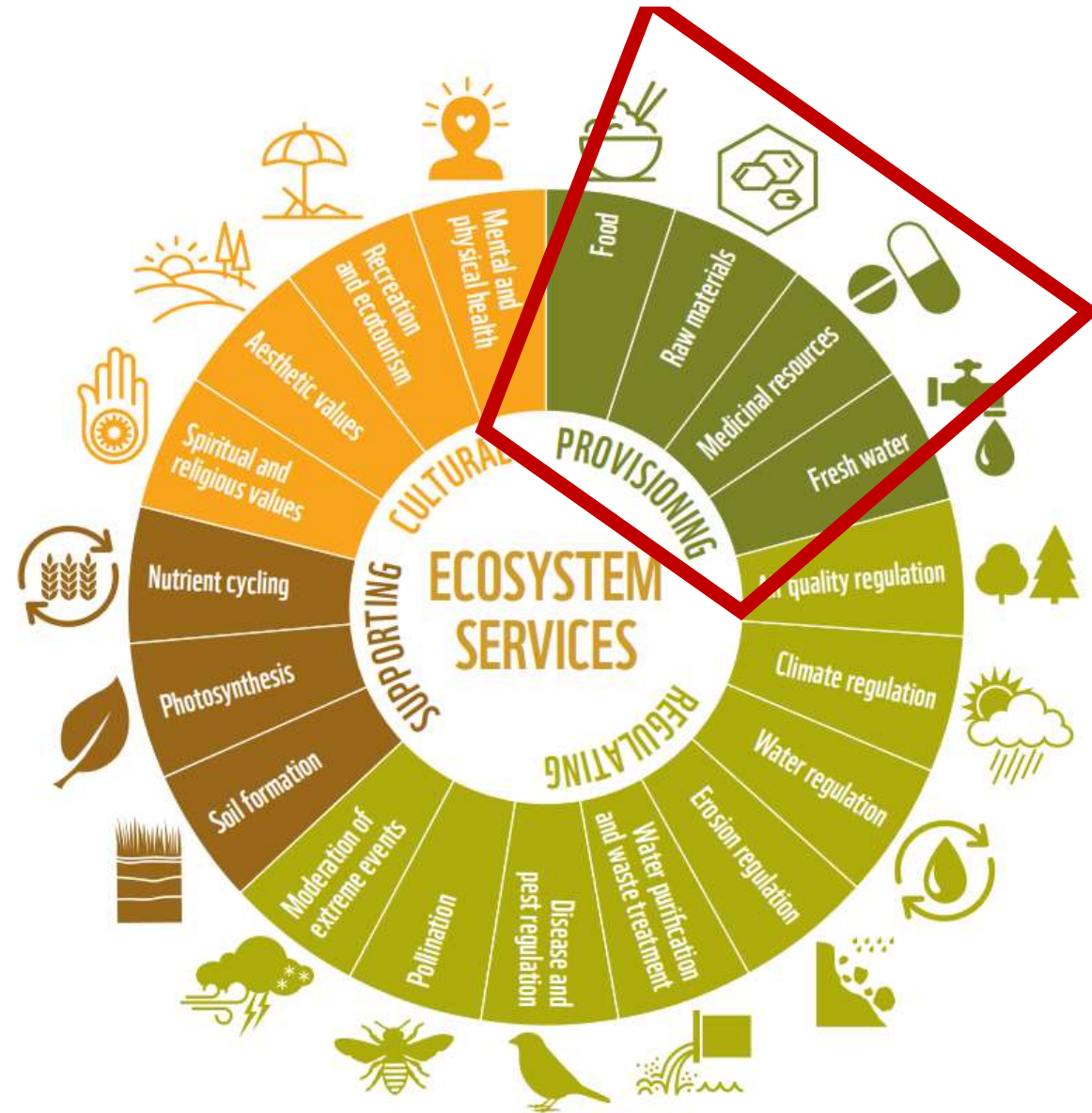
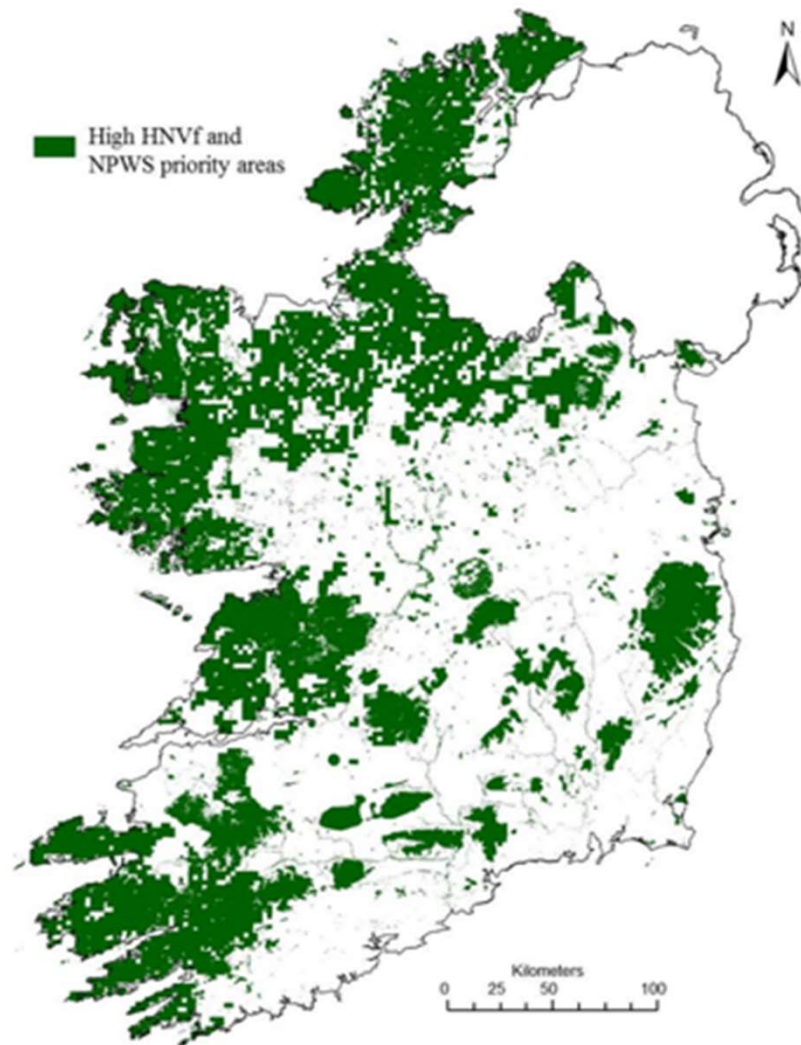


Image Source: WWF 2016

HNV: Range of Nature Value of Agricultural Land



HNV Farmland

33% of agricultural area = HNV farmland

Approximately 50% of total HNV farmland is part of Natura 2000 network

Approximately 50% of HNV farmland occurs in upland areas

Dual Threats: Abandonment and intensification of land use

8% of forest area = HNV Forests (~1% of total land area)

ARD

Extensive upland areas



Drumlin-wet grasslands



Calcareous grasslands, heaths and limestone pavement



Agricultural Mosaic Landscape (partial HNV)



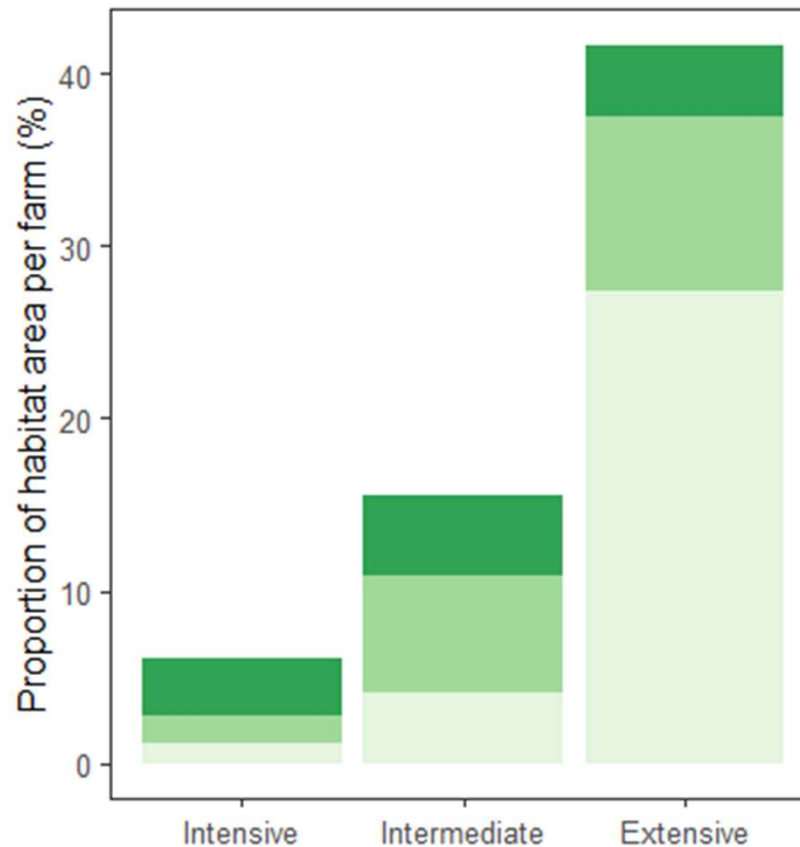
HNV Landscapes are complex mosaics

Hard to tell where the pasturelands end and the woodlands begin



Important ecosystems undervalued in current system

Habitat type	
Semi-natural habitats	Hedgerows
	Treelines Valued
	Drainage ditches
	Semi-natural grasslands
	Wet grasslands
	Stonewalls Optional
	Field copses
	Earth banks
	Grassy margins
	Dense bracken
	Heath
	Peatland Undervalued or ignored
	Woodland
	Scrubland
	Ponds
	Streams



Ambio
https://doi.org/10.1007/s13280-020-01344-6

RESEARCH ARTICLE

Assessment of semi-natural habitats and landscape features on Irish farmland: New insights to inform EU Common Agricultural Policy implementation

Roser Rotchés-Ribalta , Sara Ruas, Karzan D. Ahmed, Michael Gormally, James Moran, Jane Stout, Blánaid White, Daire Ó hUallacháin

Valued: currently protected, eligible for BPS and obliged to retain

Optional: Eligible under BPS but not obliged to retain but supports in AECM

Undervalued: Not obliged to retain, generally no support in AECM (Commonage exception)

CONTEXT SUMMARY: State of Nature In Ireland and Interactions with Agriculture

- Unfavorable conservation status with a declining trend.
- Large areas of semi-natural vegetation completely undervalued in policy framework (semi-natural grasslands ~30% of area monitored lost in last 10-15 yrs.)
- No clear policy/land use targets for high nature value farmland
- Legacy issues and inadequate policy response to date
- Positive moves - locally adapted pilots, results-based payments for biodiversity and related ecosystem services.
- Threats identified, solutions identified
- Now moving from pilots to wider roll out **(CHALLENGING)**



UP-SCALING

BurrenLIFE
Concept (20 farms)

2004-2009

Burren Programme
Testing and Upscaling (~160
farms)

2010-2015

Burren Programme
Full Roll out (~350 farms)

2016-2023

Burren Region:
Integrated Land Use
Continuous Development

2023-2027

OUT-SCALING

EU RBAPS Pilots
Ireland, Spain, UK,
Romania (~150 farms)

2014-2018

EIP Agri + EU LIFE +
Horizon 2020 +
INTERREG
R&D (~2000 farms)

2016-2023

National Pilot
RBAPS Development and
Admin. Capacity Building
(~5000 farms)

2021-2023

CAP Strategic Plan
(Ireland)
HNV farmland regions
Incl. Burren (~20,000?)

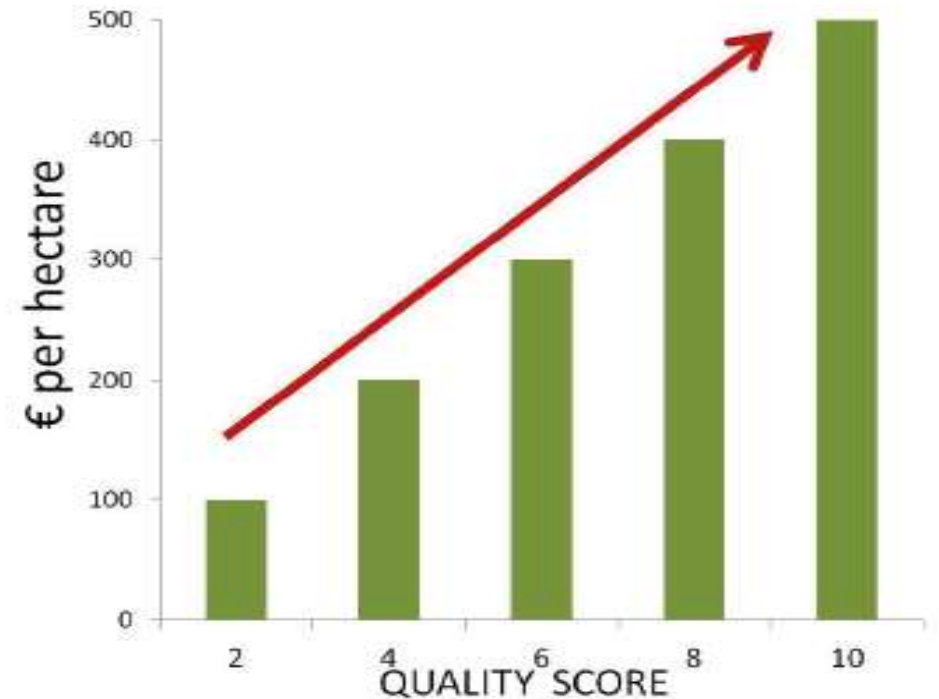
2023-2027



What are Results Based Payments

Agri-environment schemes where payments are linked directly to delivery of results rather than actions expected to deliver result.

Higher Nature Quality = Higher Payment



General Scorecard Structure

Ecological Integrity (Positive plant indicators and vegetation/indicators of ecosystem structure important for specific target taxa)

Ecological Integrity (Negative Plant Indicators e.g. non-native invasive species)

Soil Integrity e.g. % bare soil, erosion

Hydrological Integrity e.g. water features and drainage system near natural to highly modified

Damaging activities e.g. burning, feed site damage, dumping, evidence of inappropriate herbicide/pesticide use

Incentivising and rewarding provision of multiple ecosystem services

RESEARCH



Score card Development

- Grassland list of positive and negative indicators species (O'Neill et al 2013)
- Adapted and tested in field (Maher et al. 2018; Ruas et al 2021)
- Final list: measure of ecological overall ecological quality and ease of identification (some species aggregates);
- 180,000 fields (excluding commonage)
- 10 score cards (grassland, peatland and scrub/woodland)

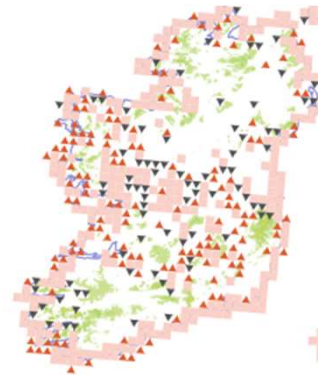
ACRES Grassland SCORECARD		Farmer name:	Surveyor:								
		Field number:	Survey date:								
		Business ID:									
Dominant grassland type: Wet grassland ☐ Dry grassland ☐		Soil type: Mineral soil ☐ Peat soil ☐									
		Total Score: (A+B) /100									
A Ecological integrity		Total score A (sum of A1 to A6) /90									
A1 What is the number of positive indicators in the field? Tick all positive indicators present below. <i>Note all positive indicators present as you walk a "W" through the field.</i>		<table border="1"> <tr> <td>Low: 0-4</td> <td>0</td> <td>High: 9-12</td> <td>20</td> </tr> <tr> <td>Medium: 5-8</td> <td>10</td> <td>Very high: 13+</td> <td>25</td> </tr> </table>		Low: 0-4	0	High: 9-12	20	Medium: 5-8	10	Very high: 13+	25
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<table border="0"> <tr> <td> Positive indicators: (tick those present) ☐ Bedstraws & Stitchworts ☐ Bird's-foot-trefoil ☐ Carline thistle ☐ Cowslips & Primrose ☐ Eyebrights ☐ Forget-me-nots ☐ Heathers ☐ Kidney vetch ☐ Knapweeds ☐ Lady's mantle </td> <td> ☐ Lady's smock (Cuckooflower) ☐ Lesser spearwort ☐ Louseworts (Common & Marsh) ☐ Marsh cinquefoil ☐ Marsh marigold ☐ Marsh pennywort ☐ Marsh thistle ☐ Meadowsweet ☐ Meadow thistle ☐ Mints (all) </td> <td> ☐ Orchids ☐ Ox-eye daisy ☐ Purple loosestrife ☐ Ragged robin ☐ Scabious (Devil's-bit & field) ☐ Sedges ☐ Self-heal & Bugle ☐ Sorrel (Common & Sheep's) ☐ Small rushes (Spike, Woodrushes, Heath) </td> <td> ☐ Sphagnum & Branched mosses ☐ Tormentil (Common & English) ☐ Umbels large (and/or Common Valerian, Common hogweed) ☐ Umbels small (Pignut, Yarrow, Wild carrot) ☐ Vetches & Vetchlings ☐ Violets (all species); Harebell ☐ Wild Thyme ☐ Yellow Composites (Cat's ear, Hawkweeds, Hawkbits & Goat's beard - not Dandelion) ☐ Yellow Flag Iris ☐ Yellow rattle (Hay rattle) </td> </tr> </table>				Positive indicators: (tick those present) ☐ Bedstraws & Stitchworts ☐ Bird's-foot-trefoil ☐ Carline thistle ☐ Cowslips & Primrose ☐ Eyebrights ☐ Forget-me-nots ☐ Heathers ☐ Kidney vetch ☐ Knapweeds ☐ Lady's mantle	☐ Lady's smock (Cuckooflower) ☐ Lesser spearwort ☐ Louseworts (Common & Marsh) ☐ Marsh cinquefoil ☐ Marsh marigold ☐ Marsh pennywort ☐ Marsh thistle ☐ Meadowsweet ☐ Meadow thistle ☐ Mints (all)	☐ Orchids ☐ Ox-eye daisy ☐ Purple loosestrife ☐ Ragged robin ☐ Scabious (Devil's-bit & field) ☐ Sedges ☐ Self-heal & Bugle ☐ Sorrel (Common & Sheep's) ☐ Small rushes (Spike, Woodrushes, Heath)	☐ Sphagnum & Branched mosses ☐ Tormentil (Common & English) ☐ Umbels large (and/or Common Valerian, Common hogweed) ☐ Umbels small (Pignut, Yarrow, Wild carrot) ☐ Vetches & Vetchlings ☐ Violets (all species); Harebell ☐ Wild Thyme ☐ Yellow Composites (Cat's ear, Hawkweeds, Hawkbits & Goat's beard - not Dandelion) ☐ Yellow Flag Iris ☐ Yellow rattle (Hay rattle)				
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A2 What is the cover of all positive indicators (listed above) throughout the entire field?		Cover is the proportion of the field taken up by all positive indicators present. <table border="1"> <tr> <td>Low: None present or you can take several steps without encountering any positive indicators at all.</td> <td>0</td> </tr> <tr> <td>Moderate: You encounter a positive indicator with every few steps taken.</td> <td>10</td> </tr> <tr> <td>High: You encounter positive indicators with every step taken.</td> <td>20</td> </tr> <tr> <td>Very high: You encounter multiple different positive indicators with every step taken (and in between steps).</td> <td>25</td> </tr> </table>		Low: None present or you can take several steps without encountering any positive indicators at all.	0	Moderate: You encounter a positive indicator with every few steps taken.	10	High: You encounter positive indicators with every step taken.	20	Very high: You encounter multiple different positive indicators with every step taken (and in between steps).	25
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A3 What is the combined cover of negative indicators/weeds throughout the plot? (tick if present)		<table border="1"> <tr> <td>High >25%: Occurring in dense patches or abundant throughout the field. Very visible in the sward.</td> <td>-20</td> </tr> <tr> <td>Moderate 5-25%: Occurring in medium to large patches in the field. Readily visible in the sward.</td> <td>-10</td> </tr> <tr> <td>Low <5%: None present or scattered or small clumps of negative indicators. Where present, overall cover should be less than 5%.</td> <td>5</td> </tr> </table>		High >25%: Occurring in dense patches or abundant throughout the field. Very visible in the sward.	-20	Moderate 5-25%: Occurring in medium to large patches in the field. Readily visible in the sward.	-10	Low <5%: None present or scattered or small clumps of negative indicators. Where present, overall cover should be less than 5%.	5		
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A4 Vegetation Structure. Note: If grassland is primarily grazed use A4(a) (including marsh fritillary suitability assessment): OR. if grassland is cut for hay or silage, use A4(b). Refer to the guidance for sward quality details.											

BSBI ATLAS

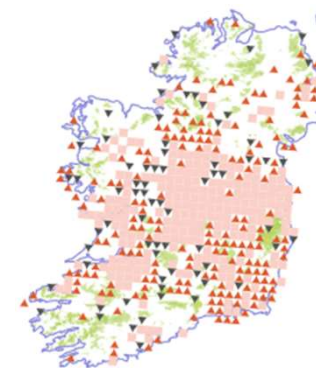
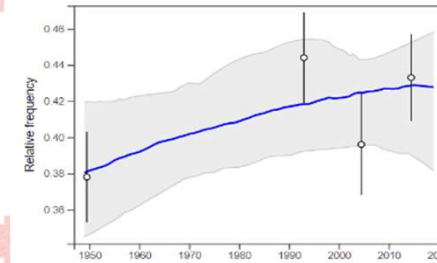
- Many of the plant indicator species displaying contrasting fortunes
- Stark findings (56% decline in native species)
- Loss and deterioration of habitat
- RBPS seeks to put value on quality semi-natural habitats

Change from 1987–1999 to 2000–2019

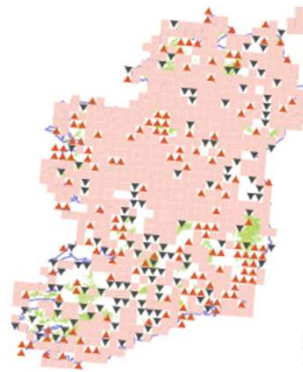
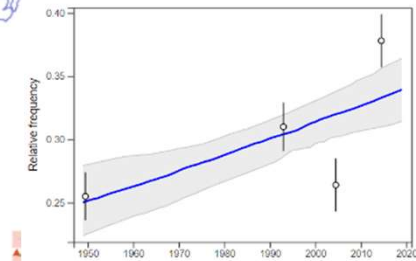
- ▲ Gain
- No change
- ▼ Loss



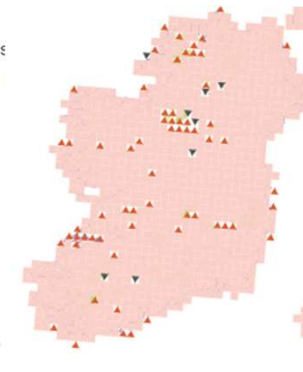
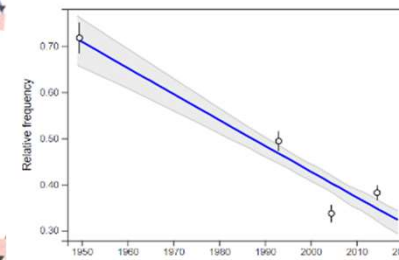
Kidney Vetch *Anthyllis vulneraria* L.
Post-1930 effort-adjusted 10 km distribution trend:
Figure 1. Smoothed time trend.



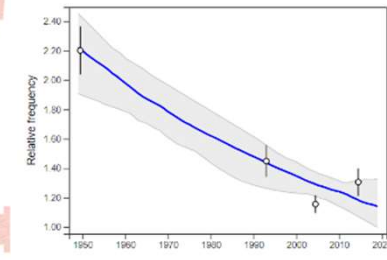
Cowslip *Primula veris* L.
Post-1930 effort-adjusted 10 km distribution trend:
Figure 1. Smoothed time trend.



Yellow-rattle *Rhinanthus minor* L.
Post-1930 effort-adjusted 10 km distribution trends
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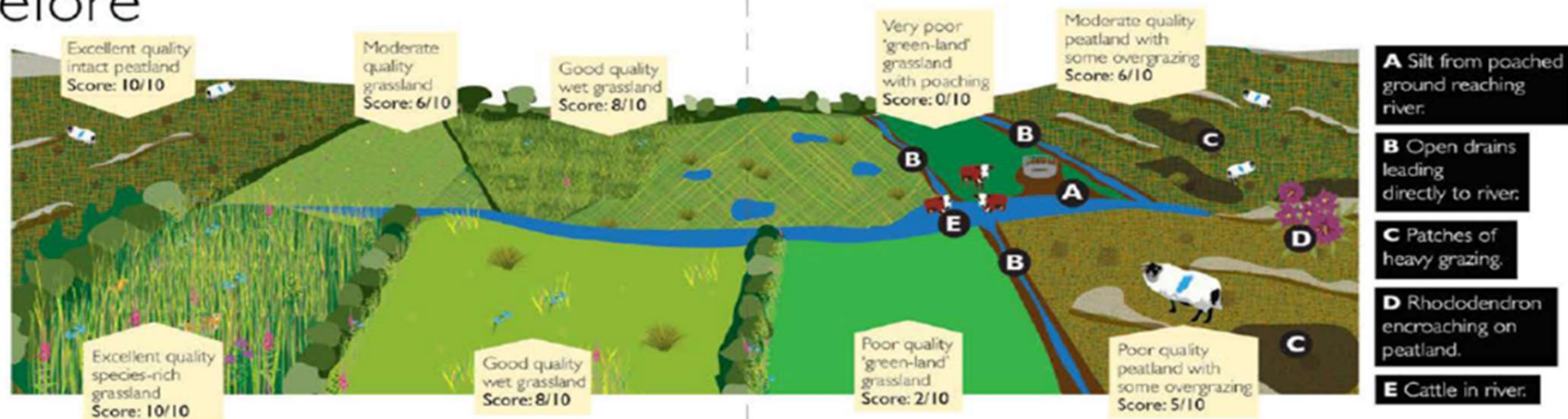
Common Bird's-foot-trefoil *Lotus corniculatus* L.
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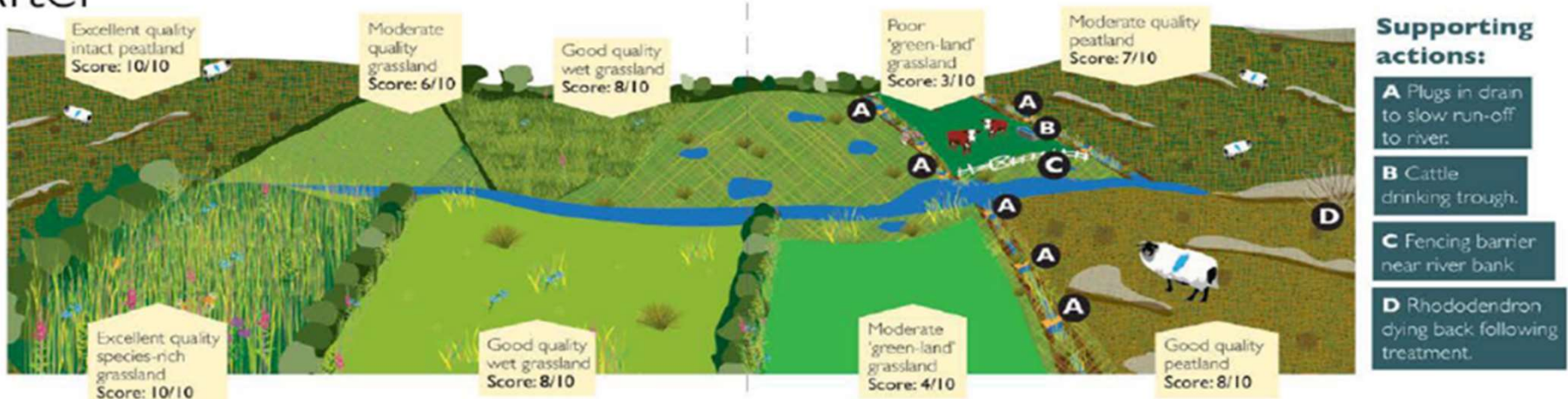


Pearl Mussel EIP

Before



After

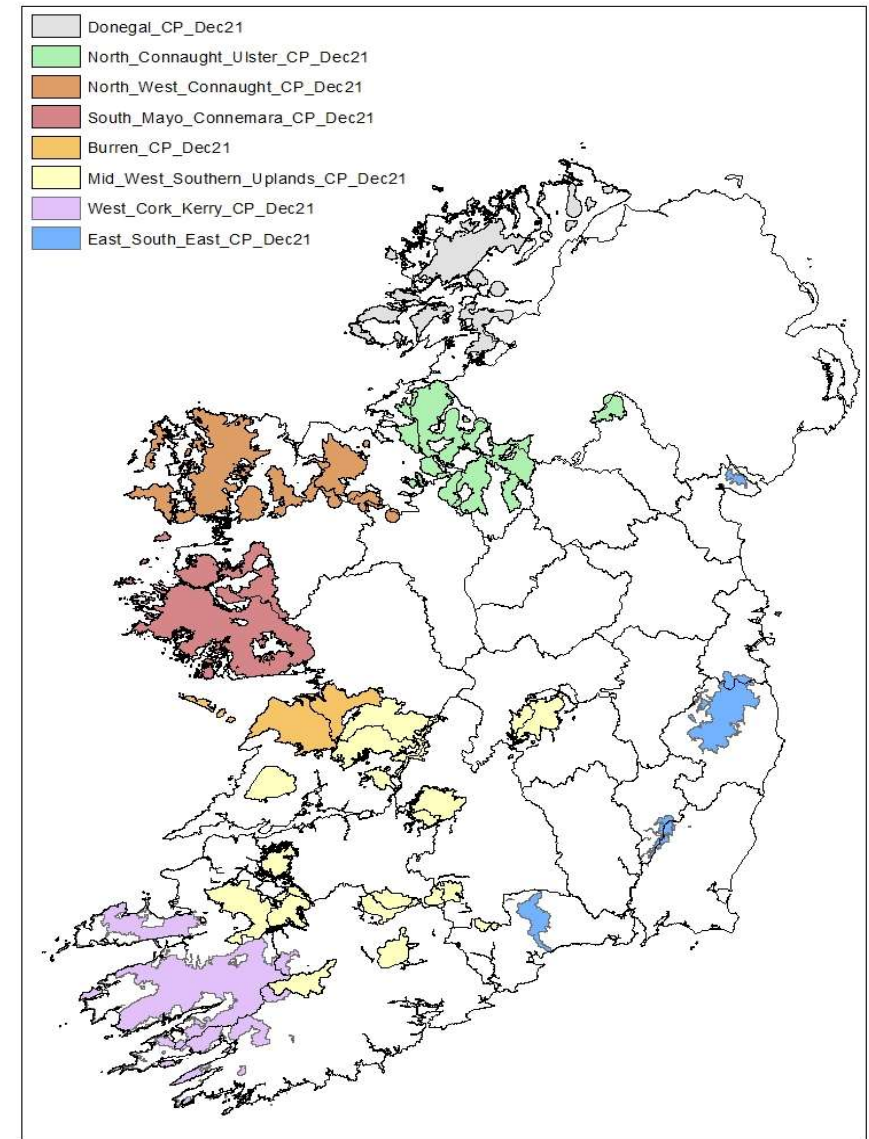


The results-based approach rewards & encourages the continuation of good management practices.

Supporting actions payment allows farmers to increase their results-based payment.

Agri-environment co-operation areas (Delivery framework in CSP 2023-2027)

- AECM (agri-environment climate measure)
 - General Measure (similar to previous national scheme)
 - Cooperation Measure (targeted at high environment priority areas-see map coloured areas; areas with high proportion of designated nature areas under EU legislation plus high status water catchments identified under the water framework directive)
- 8 local area plans: diagnosis and action plan that adapts the overall measure framework to the local context (one size does not fit all recognised in proposal of this measure)
- Specialist CP teams
- Design based on lessons learnt from previous European Innovation Partnership projects & LIFE programme
- Hybrid RBPS model
- Specialist advisory support
- Investments in supporting actions and landscape actions
- Potential big break through in rewarding delivery for nature, carbon and water services from our land
- Realising locally-adapted hybrid results based payments



Source: Dept. of Agriculture Food and the Marine



Key message

Transforming our food system as part of a wider integrated land use strategy.

LAND USE CHANGE IS INEVITABLE: Climate Change, Land Use Policy, Increasing Pressure on Natural Resources

RAPID SYSTEMS CHANGE NEEDED: Evolution rather than revolution (need to bring stakeholders with you – systems collapse and rebuild not an option).

SOLUTIONS: need to be developed, locally adapted and scaled

HNV AND PES CAN PLAY A KEY ROLE: an integral part of wider biodiversity strategy (expansion of PES model across whole country key)