Strategic Environment Sustainability Issues – Agriculture/Dairy

Joe Crockett, Chairman Dairy Sustainability Ireland Working Group

Overview

- National Policies - Market opportunities,
- Dairy Economics,
- Dairy Sustainability Ireland Initiative,
- Climate Change Teagasc Projections,
- Potential Mitigation Strategic elements,
- Potential Strategies – Teagasc,
- Climate Change Policy and Business Contexts,
- Ammonia/ Clean air,
- Soil Fertility,
- Water – ASSAP programme update
- CAP Reform New Requirements,
- Conclusion and Recommendations

Food Wise 2025 – Market Growth

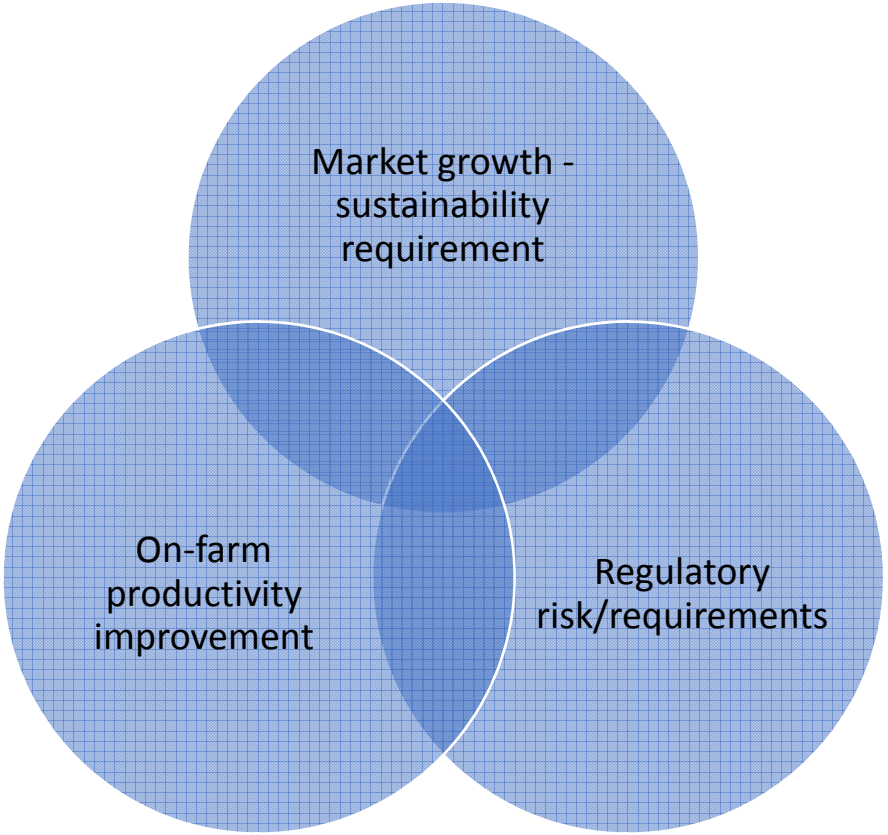
- Strong focus on Sustainability in Food Wise 2025, recognition of significant challenges of agri-expansion in meeting national and international targets for air quality, bio-diversity and water quality.
- Strategies outlined to address and surpass significant challenges for air quality, bio-diversity and water quality, if economic gains to be achieved.
- Identification of need for significant effort – recognition that environmental sustainability and economic sustainability are complementary – scientific evidence based data to underpin Origin Green
- Ambition for Ireland to be world leader in sustainable agriculture as a differentiating market growth strategy.

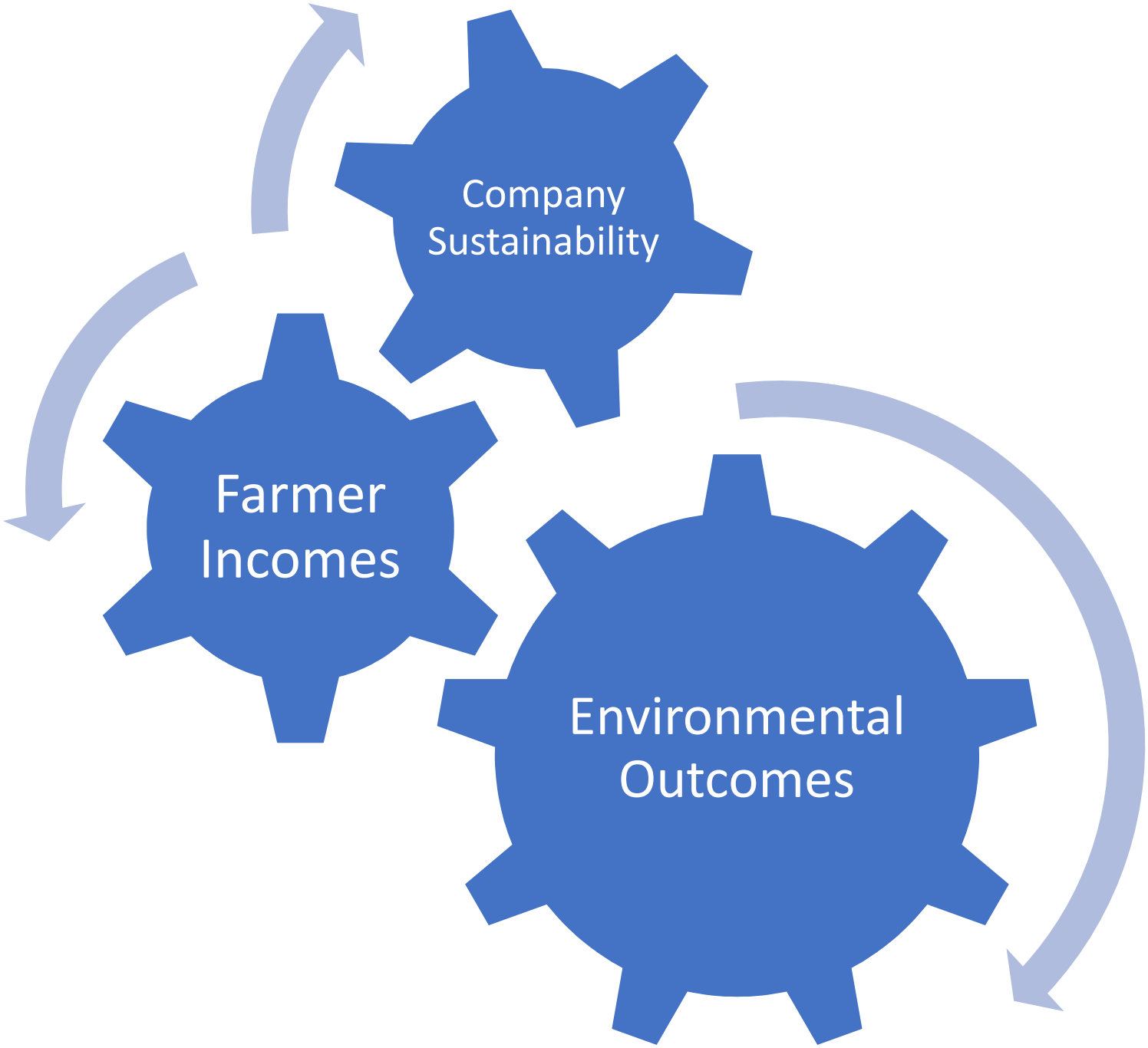
Bord Bia Origin Green Promise – Market Growth

- Verified Commitment to Sustainability all along the supply chain
- The only sustainability programme in the world uniting all sectors to achieve measurable sustainability targets – reducing environmental impact, serving communities and protecting rich natural resource
- The Green Charter – development of more stringent ways of working where 100% of Irelands exporters on the road to sustainability in 2016
- Proven and independently verified commitment to sustainability across all raw natural sources, manufacturing processes and social sustainability – five year plan for sustainability improvements
- Origin Green a major international marketing success, business impact and growth, Bord Bia Sustainability Report 2015 - evolution and development

SUSTAINABILITY REPORT 2015

Origin Green IRELAND Working


Market growth - sustainability requirement
On-farm productivity improvement
Regulatory risk/requirements


Company Sustainability
Farmer Incomes
Environmental Outcomes

2017 2018 Export Performance & Prospects

Irish Food, Drink & Horticulture

Bord Bia
Irish Food Board

€4bn

↑19% The value of dairy products & ingredients, an increase of 19 percent

↑44%

Exports to EU26 markets have expanded by 44 percent to €1.2bn

↑19%

Exports have increased by 19 percent since 2016

€850m

↑20% Cheese export rose to almost 20 percent to over €850m

↑60%

Butter reached a remarkable growth rate of 60 percent in 2017

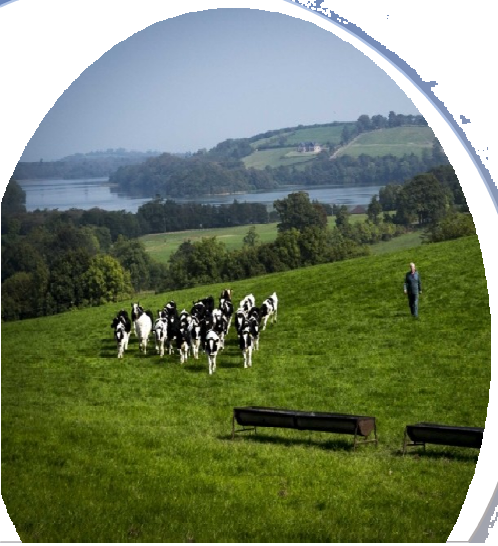
The top 5 markets

are the UK, China, the Netherlands, Germany & the United States

€730m

↑10% Dairy based enriched powders export rose 10 percent to some €730m


Dairy Industry Ireland
Ibec
Arrabawn
Aurivo
Nutrition
Abbott
A Promise for Life
CARBERY
glanbia
LacPatrick
DANONE NUTRICIA
Early Life Nutrition
dairygold
Golden Valleys, Growing Naturally
TIPPERARY
COOP
NORTH CORK CO-OP
Dromalour, Kanturk, Co. Cork & Cullen, Co.Cork
KERRY
Ornua
THE HOME OF IRISH DAIRY
KERRY
LAKELAND DAIRIES
Wyeth Nutrition



Modern Processing Sector

- Major investment program in new capacity and value-added dairy ingredient facilities over recent years

- Over *€1.5 billion investment over last 5 years in physical facilities to process our milk alone*

- Strong R&D capabilities and building our innovation base

Real Economic Development ‘Outside the Cities’

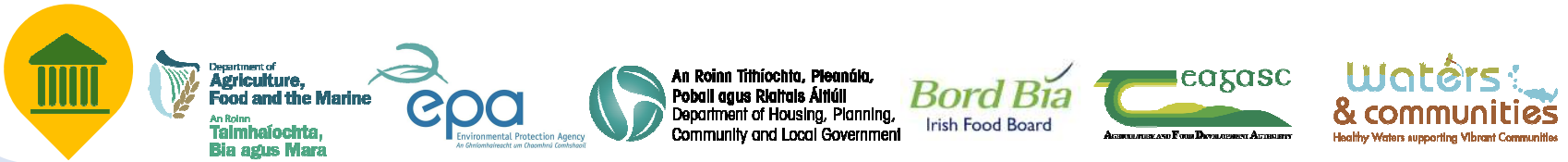
- €57.8m profit,
- €146m paid to farmers in Kilkenny,
- €126 m to Wexford farmers,
- €71.4m to Meath farmers,
- €69.9m to Laois farmers,
- These exclude CAP payments,
- Multiplier effect – very significant impact on ecor and social viability of rural counties,
- Same for other dairy processors pro rata, not cou plant investment and performance – de facto community enterprise 2-3% profit margin.

Collaborative Initiative running since 2016

1. Recognizing that environmental sustainability and economic sustainability are complementary
2. First Industry sustainability initiative involving Whole of Government and Whole of Sector
3. Address: Water, Soil & Air quality, Climate change targets on a multi annual basis to achieve Food Wise Sustainability objectives

Companies

Associations



Governmental Agencies

Dairy Sustainability Ireland

- Whole of Government & Whole of Industry Collaborati looking for win wins for all.
- Stakeholders meeting quarterly in a DSI Forum.
- ASSAP – 30 Sustainability Advisors (Teagasc and Dairy Processors) – all trained, working well together and w strong local authority science team.
- First sets of local public meetings, river walks and Farm meetings on water quality pressures in rivers in Priorit Action Areas (PAAs) have gone well.
- Helping Farmers in PAAs.
- Helping farmers with Nutrient Management Planning.
- Heavy work on reducing footprint of factories.
- Looking at new areas such an energy, ammonia, biodiv to link in with Origin Green efforts.

Climate Change Projections

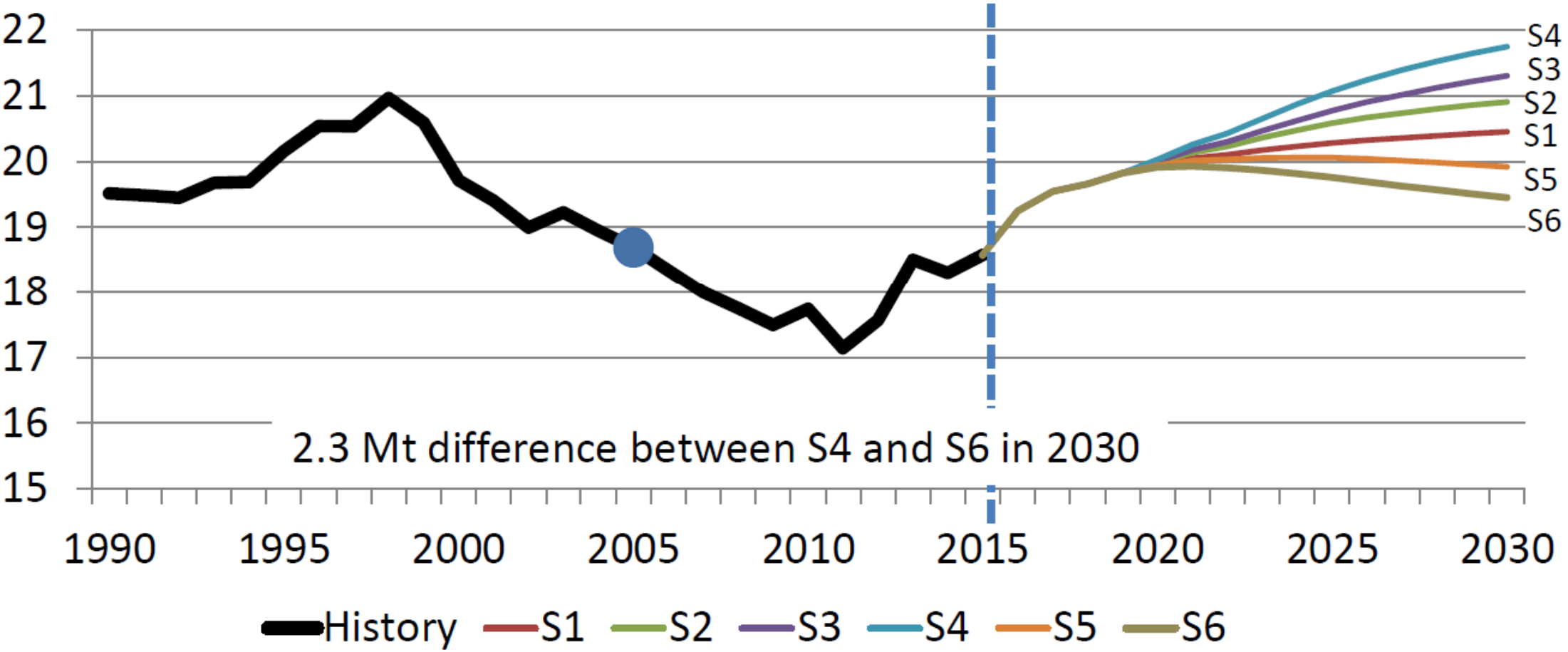
- At present circa 20 million tonnes GHG ag emissions of which beef is estimated at 11m and dairy estimated at 9m,
- Six growth scenarios – Teagasc MACC curve
- Brexit impact on beef numbers is an unknown but potentially very significant variable, as are beef numbers generally - beef numbers on dairy farms are counted as dairy.

What will happen anima numbers to 2030?

- **We don't know!**
  - Expect that dairy cow numbers wil rise
  - Expect that beef cow numbers will
  - Size of rest of herd (beef cattle, > 4 currently) will depend on size of combined dairy and beef cow herd
- Using FAPRI Ireland model, Teagasc has modelled six possible scenarios size of cattle herd

What would GHG emissions look like?

NB: excludes mitigation actions



APRI-Ireland Model

cludes emissions from Fuel Combustion and Fishing which appear in the EPA "Agriculture" definition

Sustainability - Climate Change Ag Mitigation Strategies

Six core possibilities

- An ag wide general mitigation strategy based on N limit on fa Nutrient Mgt Planning, widespread use of clover, banning of splashplate, additions/amendments to slurry (acidification), change of fertiliser type from CAN to protected UREA, reduce protein in feed, EBI – breeding, etc
- On farm/rural woodland planting programme– sitka and deci – non commercial – carbon, bio-diversity, and water benefits
- Rethink/repositioning of commercial forestry to achieve nati targets – new approaches needed,
- Energy reductions programme on farm - use of on farm renewables solar, and energy reductions Dairymaster etc, bat technologies,
- Bio-economy – 10BN EU programme,
- Precision/Smart agriculture – Intel etc, investment/econ dev programme,
- Integrated /holistic – water, climate change, ammonia and bi diversity, and economically sustainable.
- Whole of Govt – whole of Sector – whole of market - 10 year programme – two blocks of five years
- Developmental and progressive – suggest next iteration of po

1. Agricultural Abatement

Measure		Mean ann. saving 2021-30	Saving 2030
1.	Improved Beef Maternal Traits (CH_4)	0.03 Mt	
2.	Beef Genetics: live-weight gain (CH_4)	0.06 Mt	
3.	**Dairy EBI** (CH_4)	**0.43 Mt**	
4.	Extended grazing (CH_4)	0.07 Mt	
5.	**Nitrogen-use efficiency** (N_2O)	**0.10 Mt**	
6.	**Improved animal health** (CH_4)	**0.10 Mt**	
7.	Sexed Semen (CH_4)	0.02 Mt	
8.	Inclusion of Clover in pasture (N_2O)	0.07 Mt	
9.	**Change Fertiliser Type*** (N_2O)	**0.52 Mt**	
10.	Reduced crude protein in pigs* (N_2O)	0.05 Mt	
11.	Draining wet mineral soils (N_2O)	0.20 Mt	
12.	Slurry amendments* (CH_4)	0.03 Mt	
13.	Adding Fatty Acids to dairy diets (CH_4)	0.03 Mt	
14.	**Low-emission slurry spreading*** (N_2O)	**0.12 Mt**	
Total		**1.85**	**3.07**

* Double dividend as it also reduces ammonia emissions

2. Land-Use: Carbon Sequestration

Measure	Mean ann. saving 2021-2030	Saving 2030
15. Grassland Mgt.	0.26 Mt	
16. Water table mgt. of org. soils	0.44 Mt	
17. Forestry	**2.10 Mt**	
18. Tillage Mgt – Cover crops	0.10 Mt	
19. Tillage Mgt – Straw incorp.	0.06 Mt	
Total	2.96	**3.89**

Under flexibilities, only 26.8 M tonnes CO_2 can be banked over 2021-2030 period

3. Energy Efficiency, Bioenergy and Biofuels

Measure		Mean ann. saving 2021-30	Saving 2030
20.	Energy efficiency on farm	0.03 Mt	
21.	**Wood Biomass* for energy**	**0.76 Mt**	
22.	SRC & Miscanthus for Heat	0.11 Mt	
23.	SRC for Electricity	0.10 Mt	
24.	Anaerobic Digestion**	0.22 Mt	
25.	Biomethane	0.15 Mt	
Total		**1.37**	**2.03**

*thinnings and sawmill residues

**slurry and grass for CHP

Policy and Business Context Climate Change/Sustainability

- Political change - Taoiseach, Minister for Climate Change, Minister for Ag, Commissioner Hogan, have indicated that Climate change regulatory requirements are real.
- Taoiseach – Ireland will achieve 2030 GHG targets,
- New CAP reform proposals re environmental outcomes incorporating EU law re climate change, water, clean air/ammonia, bio-diversity and impact on whole or part of CAP payments are very significant.
- Sustainability requirements of international buyers/competitors – Danone, Arla - market demand re verifiable carbon footprint reduction.
- Four reports - Oireachtas all party Committee report published 29 March – significant recommendations, the go to report, Minister Bruton whole of Govt policy due end of this month, Climate Change Advisory Council and NESC reports due thereafter.

Ammonia/Clean Air

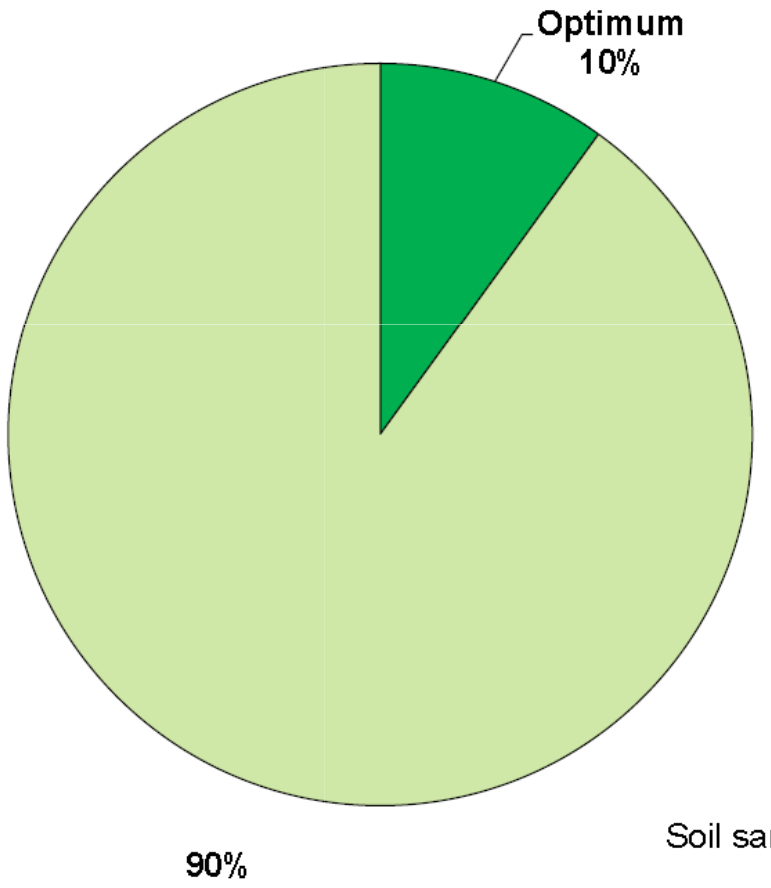
- EU limits re Ammonia/Clean Air were breached by Irl for first time last year – 98% are ag.
- Ammonia emissions can be reduced by better landspreading of manures inc trailing shoe, better fertiliser practices.
- Nitrates Derogation Review – public consultation at present.
- EU legal requirement to be part of new CAP Sustainability requirements

Economics and Finances

- Dr D Wall of Teagasc estimates that only 10-11% of soils in Ireland at peak productivity
- He estimates that here are significant financial/productivity benefits with a grassland soil fertility improvement/nutrient management planning programme.
- Economics are compelling – boost grass dry matter production, reduction in fertiliser use, reduction in use of meal/concentrates, boost profitability.
- Nutrients to where needed in soil – not to water.

Soils with Optimum Soil Fertility

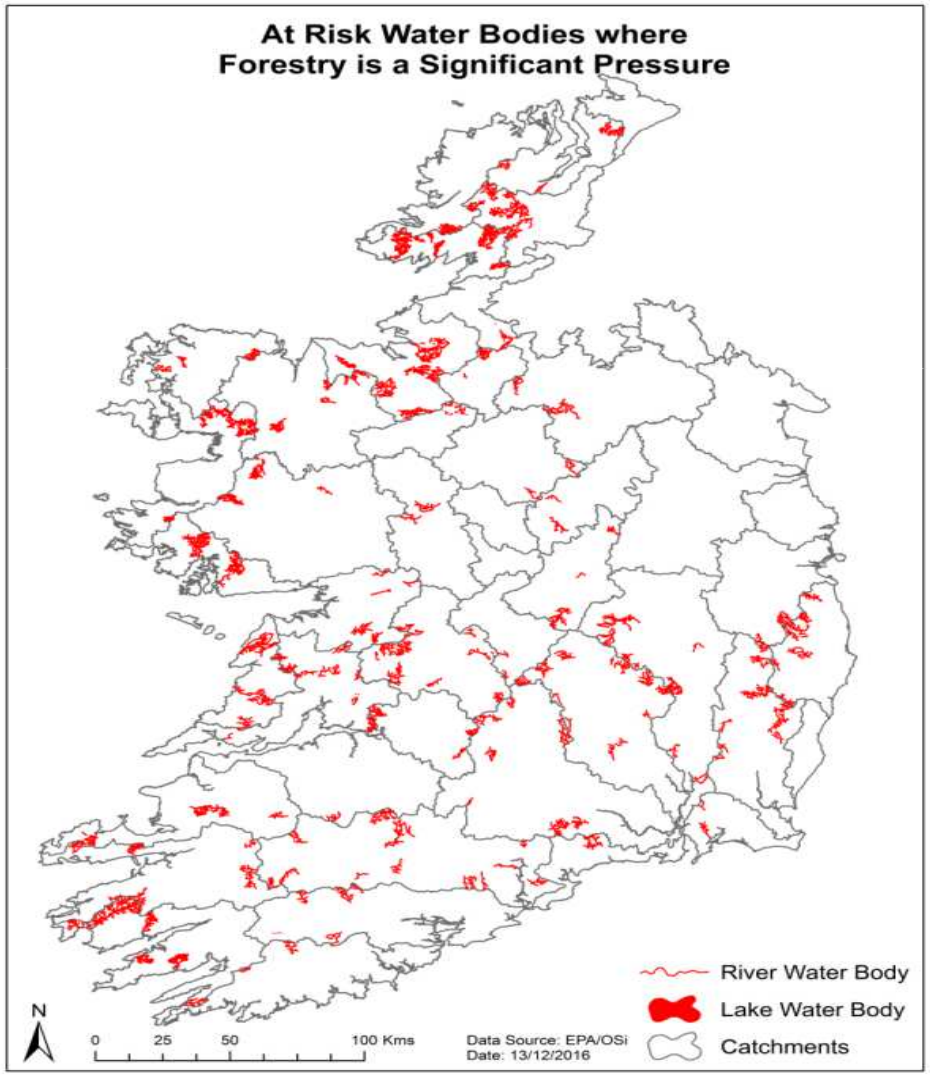
Good Overall Fertility :
Soil pH > 6.2; Soil P and K Index ≥ 3

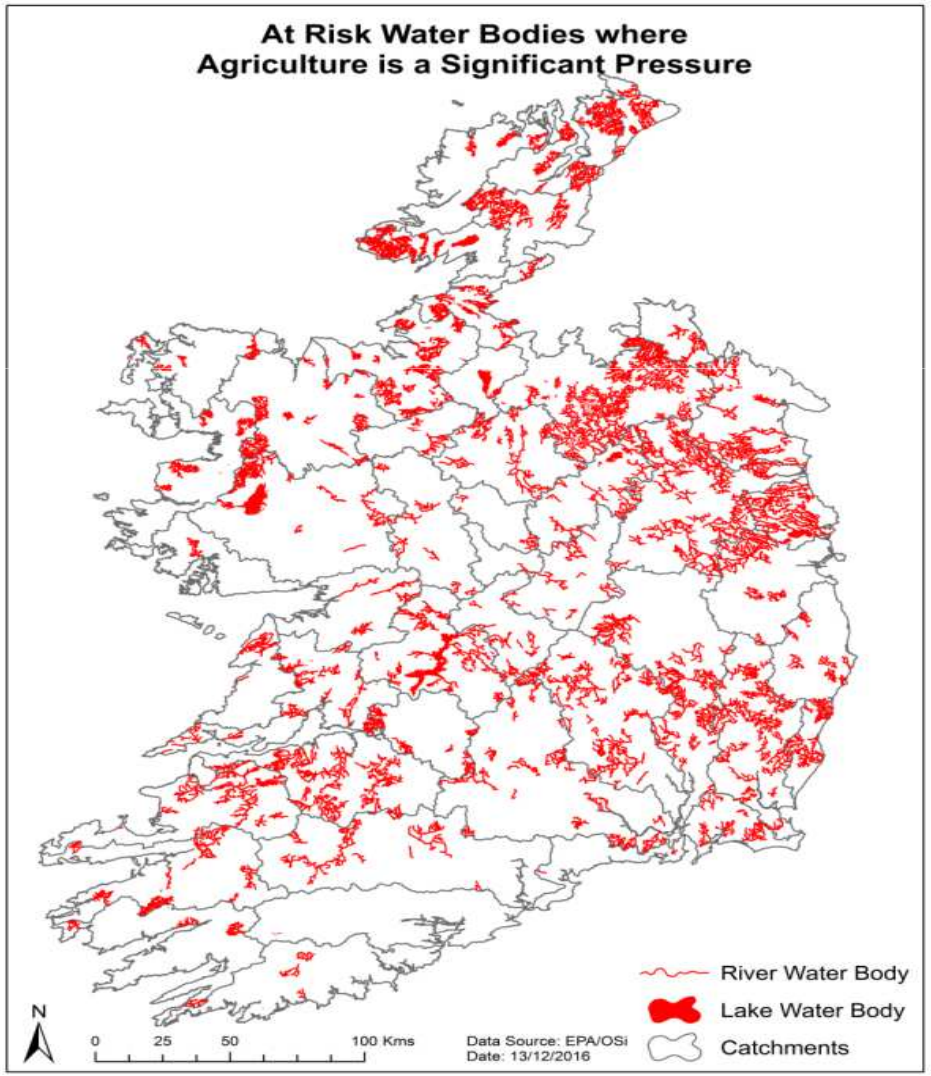


Soil samples submitted through Teagasc in 2015

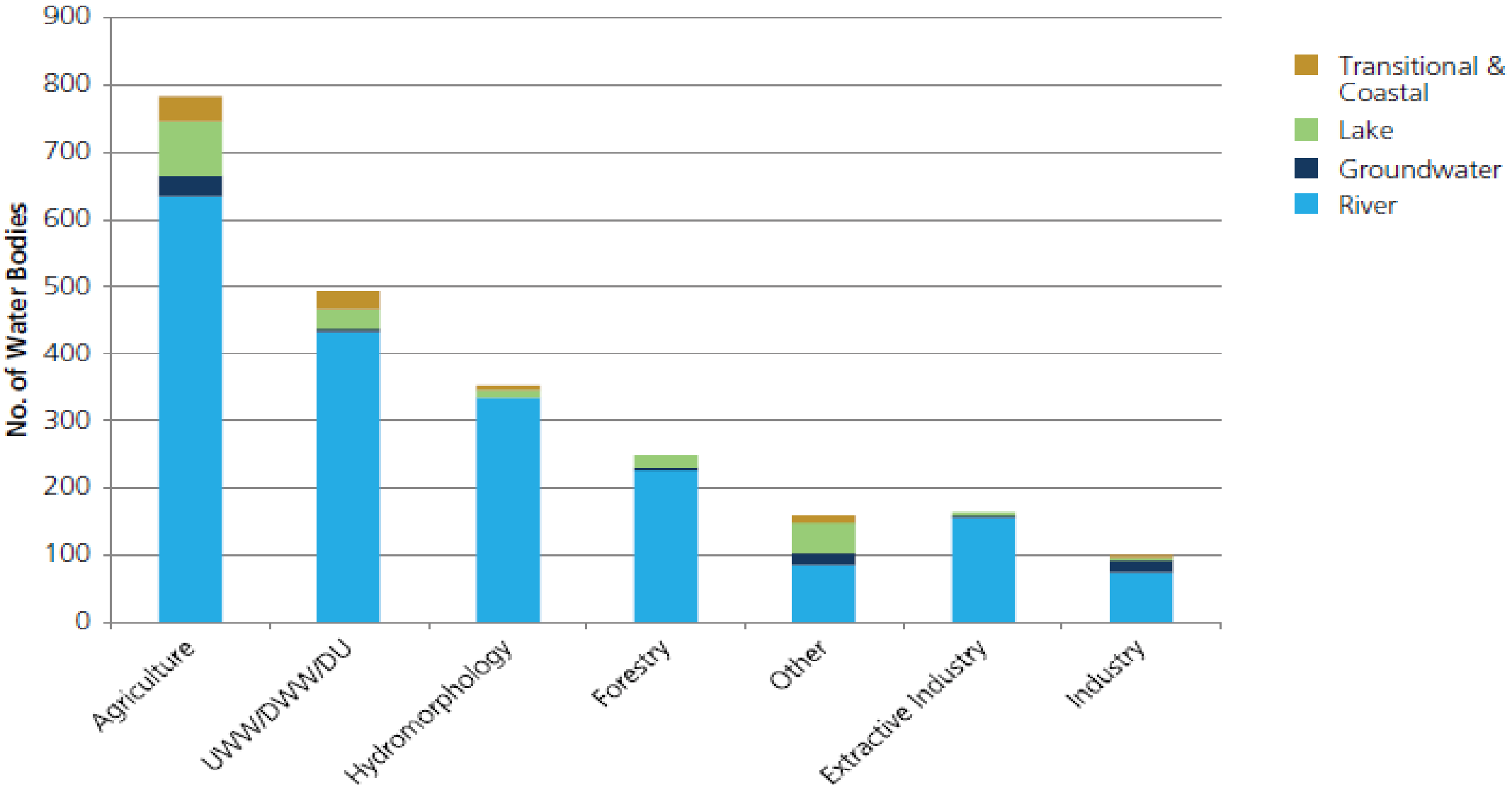
Significant pressures

Catchments of water bodies where forestry & agriculture are the significant



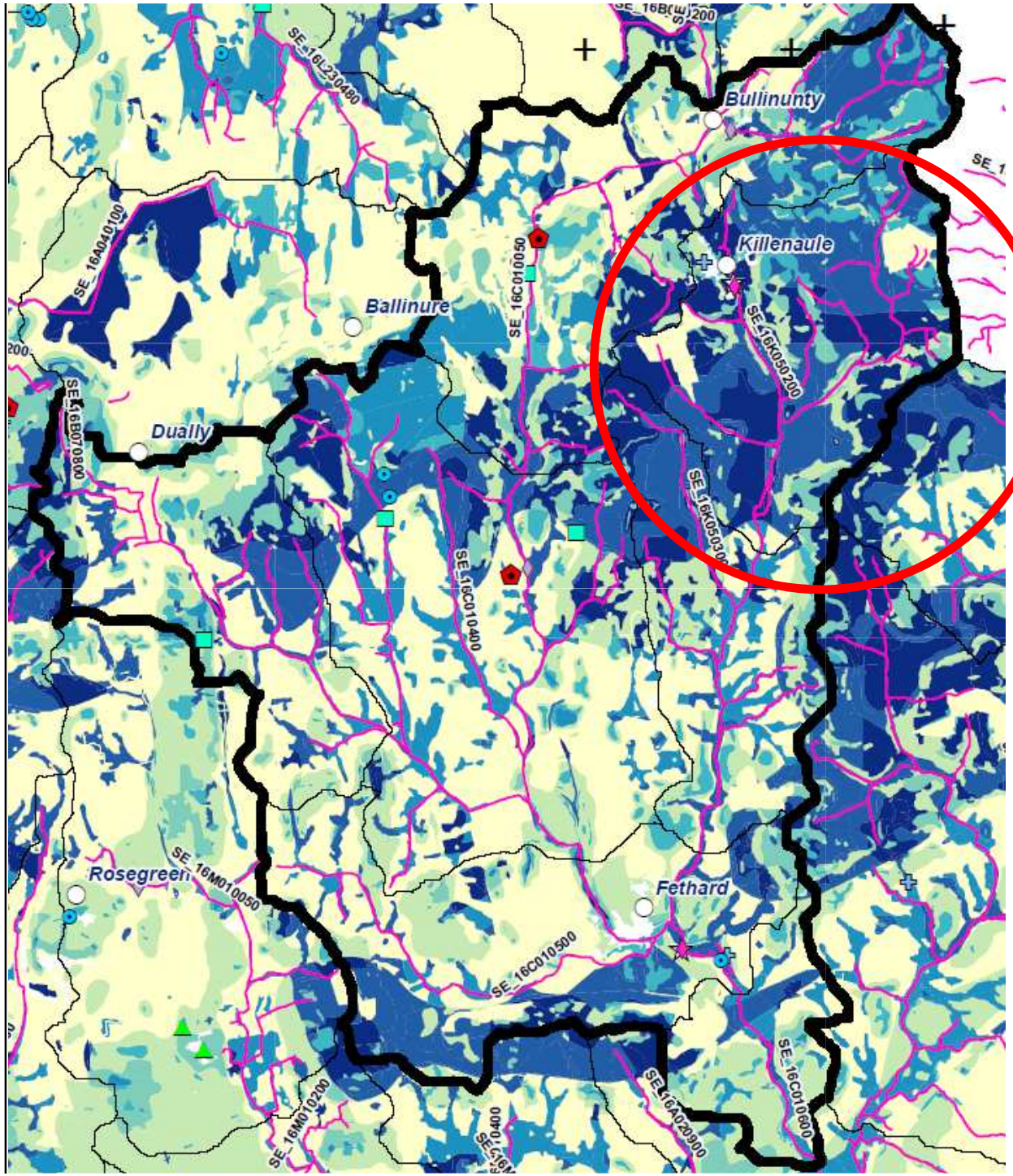


Significant pressures in *At Risk* water bodies



Agricultural Sustainability Support and Advisory Programme - ASSAP

- Dairy Processors part of ASSAP programme.
- Focus is water quality – over 800 water bodies affected diffuse ag pollution - largest sectoral pollution impact,
- 30 Sustainability Advisors – 10 Co-op sector, 20 Teagas
- 30 Scientists – LAWSAT providing science data - EPA Scientific overview - LG Waters and Communities office significant initiative.
- All trained together to same standard - EPA and LG.
- Co-op commitment is to 10 Advisors and Co-op Managment and Board support, promotion of NMP to suppliers with voluntary objective of all suppliers using NMP by 2021 with 10 sets of pilots re NMP best practi as an exemplar/demonstration strategy, Co-op advisor work collaboratively with Teagasc Advisors to advise ar support farmers in Priority Action Areas (PAAs).
- Commitments being delivered with good progress
- New Co-ops MILK – FLEX finance package re Sustainab measures.



Pollution Impact Potential Map
(CSAs for
Phosphate to Surface Water)

A map of relative risk

Based on:

1. Loading of phosphate from farm animals and tillage
2. Soils, subsoils and bedrock information.
3. Interpretation of pathways for water and P movement
4. Attenuation capacity of P

Enables targeting of investigations and 'measures'

CAP REFORM PROPOSALS

- National Ag Econ and Env Sustainability Plan to b submitted to EU Commission incorporating existi EU legal requirements re Water, Climate Change, Clean Air and Bio diversity. Potentially also renewables.
- EU Commission to decide on whether National A Plan is sufficient.
- Between 20% and 50 % weighting to climate cha measures.
- National Ag Plan to be prepared 2020 – and in ef in 2021, annual and triennial KPIs.
- Whole or part of CAP payment can be withheld if insufficient progress re legal outcomes.
- Semi judicial process to determine whether suffic progress made.
- Base payment if full compliance, additional CAP payments if medium or maximum sustainability criteria met

Conclusion

- Food Harvest/Food Wise/Origin Green major policy an market successes, more success is achievable if all sustainability challenges are embraced and overcome.
- Dairy Sustainability Ireland Initiative and ASSAP was rig strategy - continued implementation and consolidation needed,
- Convergence and Success – Agri, Food, Drink, Tourism, Economics and Sustainability, or Dissonance and Disas NZ,
- Local, National and EU policies, and international mark requirements demand change,
- New strategic approaches are achievable re climate ch ammonia, bio-diversity and water – building on ASSAP/Water approach, all mechanisms will be needed transformational change – holistic and integrated programme.
- It is suggested that whole of sector/whole of Govt app is only way to go – collaborative, smart, focussed on su as a social/business-market/ policy imperative, major e all stakeholders
- World leader in Sustainable and Smart Agriculture – significant competitive advantage.