Environment, Soils and Land-Use Research Department

Teagasc

Agriculture and Food Development Authority

Environment, Soils and Land-Use Research Programme

Strategic Vision: To underpin the economic and environmental sustainability of Irish agriculture.

Department Objective: To develop technologies and management strategies that facilitate farmers to achieve? economic and environmental sustainability.

- **Sub-Program Objectives**
  - To improve nutrient efficiency and soil fertility on farms.
  - To reduce the impact of agriculture on water quality.
  - To reduce greenhouse gas & ammonia emissions and improve the carbon footprint of Irish Agriculture produce.
  - To maintain and enhance biodiversity in Irish agricultural systems.

Policy Challenges

- Achieving expansion targets in Food Wise 2025 while achieving environmental targets.
- Improving quality of all waters (Nitrates and Water Framework Directive)
- Reducing greenhouse gas emissions/increasing carbon capture (EU Climate and Energy Directive).
- Reducing national ammonia emissions (National Emissions Ceiling Directive)
- Halting and reversing the decline of biodiversity (EU Habitats and Birds Directives)

Department Structure



Climate Change & NECD

Gaseous Emissions

Water Quality/



Nitrates and Water Framework Directives

Stakeholders
Farmers
Policy makers
General public

Food Wise 2025

Agro-ecology

Soils

Soil Function/Protection

Nutrient Efficiency

Land Use & modelling


Habitats/Birds Directives

Human Resources: 14 FTE

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Soils

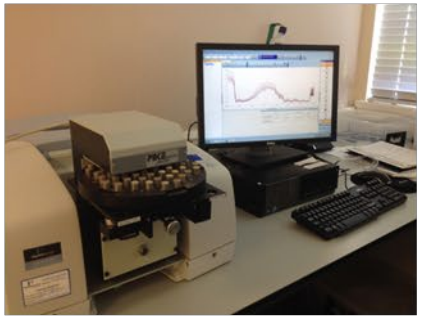


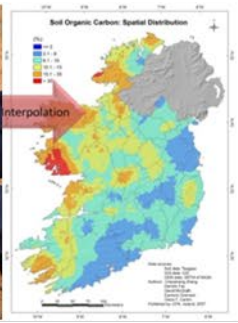



Objective: Soils research programme is focussed on improving our knowledge of spatial variability and soils factors influencing crop growth

- Develop new soil test methods to improve agronomic and environmental advice
- Understanding the role of soil biodiversity and ecology in soil functions, processes and quality.
- Design and targeting of land drainage to sustainably improve pasture growth
- Design of tools to enhance soil quality to underpin crop production while minimising environmental impact
- Development of national soil maps and an associated digital soil information.





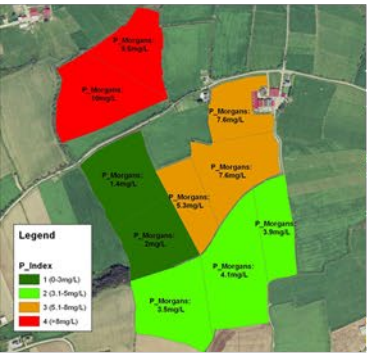



Nutrient Efficiency




Objective: To improve nutrient efficiency and soil fertility on Irish farms.

- Development of soil specific nutrient advice for nitrogen and phosphorus
- Increase nutrient use efficiency and minimise environmental losses on Irish farms
- Develop tools to aid with nutrient management planning and cross compliance
- Dissemination of integrated nutrient advice for farmers
- Maximising nutrient use from organic residues

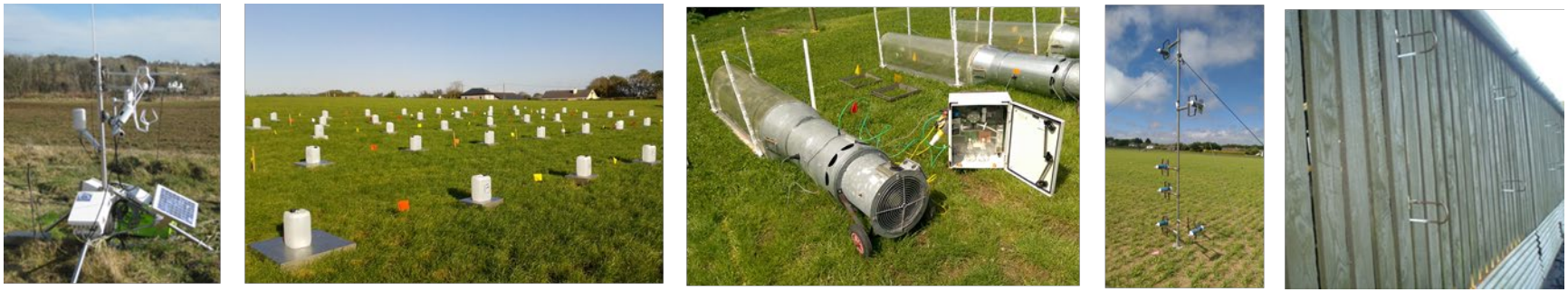




Gaseous Emissions

Objective: Reduce gaseous emissions and improve carbon footprint of Irish agriculture produce.

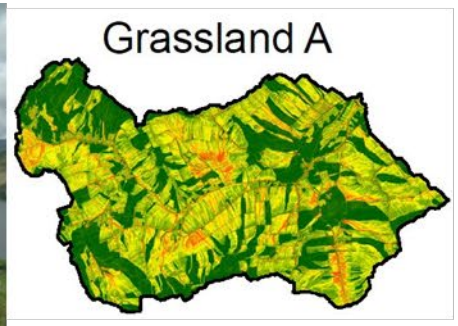
- Refinement of national emissions factors for gaseous emissions (N_2O, NH_3)
- Technologies for reducing gaseous emissions on farms
- Quantify and test measures to improve grassland carbon sequestration
- Assessing pollution swapping / interactions of mitigation measures
- Focus on integrated farm management to optimise production and environmental impact



Water Quality

Objective: To improve water quality in agricultural catchments

- Reduce nitrogen, phosphorous and sediment losses at farm to catchment scales.
- Assess current and develop new targeted mitigation strategies to improve the chemical and biological quality of waters.
- Investigation of management strategies to improve river ecology.
- Spatially target mitigation measures to increase efficacy
- Nutrient legacies / time lag of water quality responses



Agro-Ecology

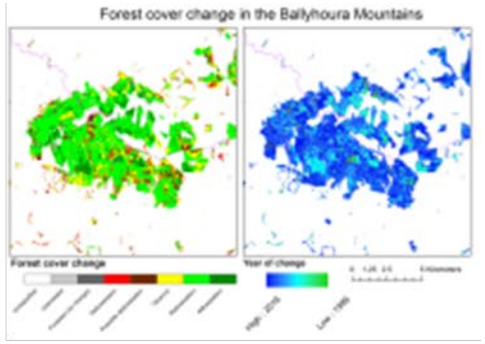
Objective: To maintain and enhance biodiversity in agricultural systems.

- Enhancing biodiversity in agricultural systems across a gradient of intensities and enterprises
- Development of effective indicators for farm-scale assessments of sustainability that include farmland wildlife.
- Improving the environmental effectiveness and economic efficiency of management plans for High Nature Value farming systems.
- Improving the understanding of the relationship between diversity and ecosystem function within agricultural systems.

Soil & Land-Use Management

Objective: To develop tools for optimising soil and land use management planning for sustainable intensification

- Integrated landscape modelling of soil based ecosystem services
- Identifying indicators for MRV of policy targets at multiple scales
- Develop tools for spatial targeting of measures to enhance sustainability
- Research supporting policy formation, national inventories & natural capital preservation
- Develop farmer and stakeholder decision support tools (e.g. Soil Navigator)



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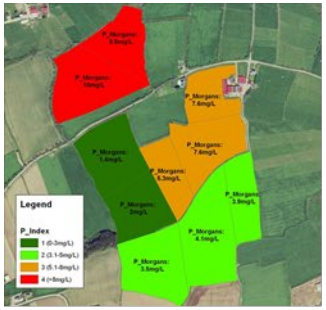
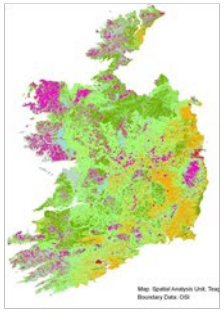
Recent activity/Output Highlights

- Development of nutrient management planning online and its adoption nationally for reporting and advise.
- Revised national N_2O emission factors for fertiliser and extra led to a reduction of 0.75 MT CO_{2eq} and has provided mitigation options in the national inventory.
- Completion of the Soil Information System for Ireland version 1.
- Highlighted the impact of sediment on freshwater ecology, identifying riverbanks and beds as a main source of sediment in certain catchments.
- Improved soil pH can result in a significant increase in soil P levels and contribute to enhanced grassland yields.
- Developed a refined national map of high nature value farmland to aid biodiversity protection and enhancement.





Recent Research Impact Highlights

- Provided the scientific justification for reduced national ammonia targets based on biophysical limitations
- Publication of the marginal abatement cost curves for greenhouse gases and ammonia. These identified a large range of measures for agriculture to reduce or offset emissions.
- Provided the scientific basis for extended deadlines to improve water quality based on lag time
- Scientific support for the 3rd the Nitrates Directive National Action Programme review led to a number of major changes being made to the regulations and renewal of the derogation.
- Liming campaign led to an increase from 37 to 45% of farms having optimal soil pH.
- Highlighted the importance of multispecies swards for yield and nitrogen use efficiency