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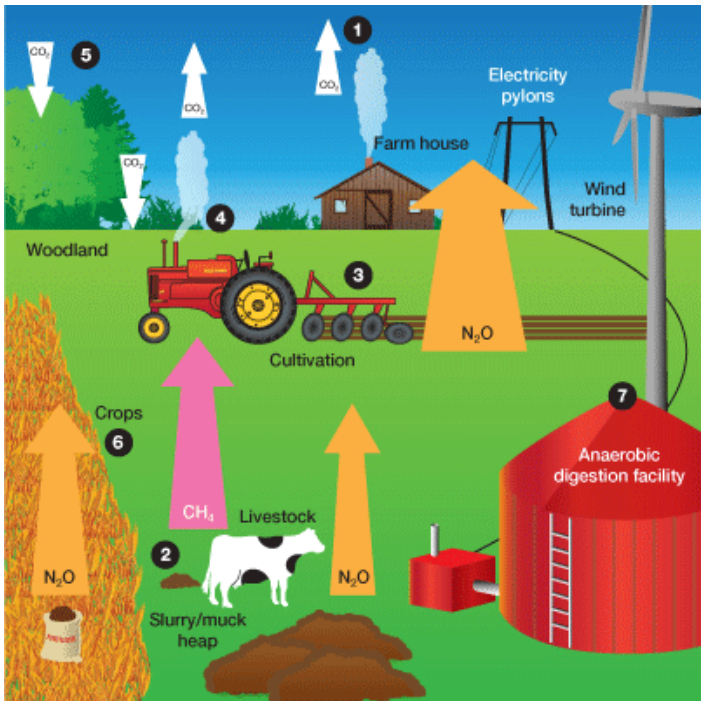
Market and non-market based strategies to reduce Greenhouse Gas Emissions on Irish Farms



Key external stakeholders:

Policy Makers, Food Companies and Agricultural interest groups

Practical implications for stakeholders:

To date research into GHG emissions from Irish agriculture has focused on two main themes (i) projecting future emission levels and (ii) devising abatement strategies at the farm level. This project will link these two areas of research and increase our level of understanding on the most cost efficient means of reducing GHG emissions.

Main results:

The project has produced projections of emission at the farm level, for various farm enterprises. These farm level projections have facilitated the estimation of the cost-benefit of adopting various abatement strategies. These projections are then aggregated to estimate the ability of the abatement strategies to allow us to meet potential future emissions limits for the sector. One of the more innovative aspects of the project includes an analysis of the impact of market based mechanisms, tradable emissions permits and emission charges, in reducing emissions from agriculture. This project constitutes the first such analysis with Irish farm level data.

Opportunity / Benefit:

The project results will be of interest to policy makers in the main, since it offers the capacity to contrast the abatement potential and associated costs of market based and non-market (technical) abatement strategies.

Collaborating Institutions:

University College Dublin (UCD)
University of Missouri, Columbia, Missouri, USA

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Teagasc project team: Trevor Donnellan
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External collaborators: Michael Wallace, UCD
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1. Project background:

Previously it has been not been possible to model the impact the market and non market based options for reducing GHG emissions. The impact of emissions reducing scenarios on farm numbers, farm income and enterprise mix will be measured using the farm-level model.

2. Questions addressed by the project:

- What is the level of GHG emissions produced by various farm enterprises in Ireland?
- What is the marginal cost of emissions abatement on these farms?
- What is the wider economy impact of agricultural GHG emission abatement strategies?

3. The experimental studies:

A linear programming farm–level model is developed utilizing data from the Teagasc NFS and from the FAPRI-Ireland partial equilibrium agricultural model. In particular the project develops a capacity to model a market for emissions permits. This model utilizes livestock numbers as measured by the NFS along with GHG emissions coefficients to project farm-level GHG emissions from Irish agriculture under alternative scenarios. The model allows us to determine the impact of changes in enterprise on emissions at the farm level. Also it will allow us to determine the marginal cost of emissions abatement for different farm types.

The emissions reduction scenarios and the emissions abatement strategies examined will also have an impact on the local or regional economy; however the size of the impact is likely to vary considerably. This task therefore will conduct a case study to determine the impacts on the regional economy of various strategies to reduce GHG emissions.

4. Main results:

It is possible to cost different levels of emissions reductions at farm level. The least cost emission reduction strategy at farm level can be determined. The beneficial effect of a market for emissions permits over a simple emissions cap can be demonstrated.

5. Opportunity/Benefit:

The research that has been conducted is of interest to a variety of stakeholders including farmers, government authorities and other academics both nationally and internationally.

6. Dissemination:

Main publications:

Breen J., Donnellan T. & Westhoff P. 2010. EuroChoices, The Agricultural Economics Society and the European Association of Agricultural Economists, vol. 9(3), pages 24-29, December.

Breen J., Donnellan T., Hennessy T., Wallace M. and Westhoff P. (2010). A Comparison of the Marginal Cost of Greenhouse Gas Emissions Abatement on Irish Farms. Rural Economy Working Paper Series, Teagasc.

Breen J., Donnellan T., Hennessy T., Wallace M. and Westhoff P. (2010). Estimating the Marginal Cost of Greenhouse Gas Emissions Abatement for Irish Agriculture. Rural Economy Working Paper Series, Teagasc.B

Breen J., Donnellan T., Hennessy T., Wallace M. and Westhoff P. (2010). Simulating a Market for Tradable Greenhouse Gas Emissions Permits in Irish Agriculture. Rural Economy Working Paper Series, Teagasc.

Breen J., Donnellan T. and Wallace M. (2010). Cutting Irish Agricultures Greenhouse Gas Emissions: A

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Carrot and Stick Approach. Rural Economy Working Paper Series, Teagasc

Breen J., Donnellan T. and Johnson T. (2011). Economic Impact of a Greenhouse Gas Emissions Policy for Agriculture on the Border, Midlands and Western Region of Ireland. Rural Economy Working Paper Series, Teagasc

Breen J. and Donnellan T. (2009). A Review of Alternative Technical and Policy-based Greenhouse Gas Emissions Abatement Strategies in the context of Irish Agriculture Rural Economy Working Paper Series 09-WP-RE-16

Breen, J., T. Donnellan and T. Johnson (2011) Regional economic implications of cutting GHG emissions from Irish Agriculture. Paper presented at the Agricultural Economics Society 85th Annual Conference Warwick University UK April 18th and 19th.

Breen J., Donnellan T. and Wallace M. (2010) Cutting Irish Agricultures Greenhouse Gas Emissions: A Carrot and Stick Approach. Paper presented at the Agricultural Economics Society 85th Annual Conference Edinburgh University March 30th-31st.

Breen, J. P., Donnellan, T. and Wallace, M. (2010) Estimating the marginal cost of greenhouse gas emissions abatement using Irish farm-level data Joint meeting of the British Society of Animal Science and the Agricultural Research Forum, Belfast, 13th – 14th April 2010.

Breen, J. P., Donnellan, T. and Wallace, M. (2010) Measuring the Impact of Alternative Greenhouse Gas Emissions Policies on Irish Farmers A Climate for Change, Dublin, 24th – 25th June 2010.

Breen, J. P., Clancy, D., Donnellan, T. and Hanrahan, K. (2010) Cost Implications of a Carbon Tax on Fuel Used in Agricultural Production in Ireland A Climate for Change, Dublin, 24th – 25th June 2010.

Breen, J. P., Donnellan, T., Hennessy, T., Wallace, M. and Westhoff. P., (2010) Comparison of the Marginal Abatement Cost for Greenhouse Gas Emissions across Irish Farms 1st Annual Conference of the Irish Environmental Economist's Network, Athenry 2nd September 2010

Breen, J. P., Clancy, D., Donnellan, T. and Hanrahan, K. (2010) Estimating the impact of the carbon tax on Irish agriculture and the ability of farmers to adjust their production activities in response 1st Annual Conference of the Irish Environmental Economist's Network, Athenry 2nd September 2010

Breen, J. P., and Donnellan, T. (2009) "Simulating a market for greenhouse gas emissions permits amongst Irish farmers" Agricultural Research Forum, Tullamore, Ireland, March 12th 2009

Breen, J. P., Donnellan, T. and Hanrahan, K. (2009) "Greenhouses gas reduction targets: An economic assessment of the challenges for Irish agriculture" Agricultural Research Forum, Tullamore, Ireland, March 12th 2009

Breen, J. P., and Donnellan, T. (2009) "Estimating The Marginal Costs Of Greenhouse Gas Emissions Abatement Using Irish Farm-Level Data" Agricultural Economics Society, Dublin, Ireland, March 31st 2009

Breen, J. P., and Donnellan, T. (2009) A Review of Alternative Technical and Policy-based Greenhouse Gas Emissions Abatement Strategies in the context of Irish Agriculture Rural Economy Research Centre, Working Paper Series, Athenry, Ireland, 2009. 09-WP-RE-16.

Breen, J. P. (2008) Controlling Greenhouse Gas Emissions by means of Tradable Emissions Permits and the Implications for Irish Farmers 107th EAAE Seminar "Modelling Agricultural and Rural Development Policies" Sevilla, January 29th – February 1st, 2008

Breen, J. P. (2008) Simulating A Market for Tradable Greenhouse Gas Emissions Permits Amongst Irish Farmers Agricultural Economics Society 82nd Annual Conference Cirencester 31st March to 2nd April 2008

7. Compiled by: James Breen & Trevor Donnellan

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