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

Contact:
Trevor Donnellan  Email: trevor.donnellan@teagasc.ie.

http://www.teagasc.ie/publications/
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:


7. Compiled by: James Breen & Trevor Donnellan