



Paper of

Prof. Alan Matthews

Professor Emeritus of European Agricultural Policy, TCD

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If Ireland was a leader in tackling climate change what would Agriculture / Land Use Policy look like in Ireland?

Alan Matthews
Professor Emeritus of European Agricultural Policy
Trinity College, Dublin

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Introduction

The National Policy Position on climate policy in Ireland sets a long-term vision of low-carbon transition based on two elements. One is an aggregate reduction in carbon dioxide (CO₂) emissions of at least 80% (compared to 1990 levels) by 2050 across the electricity generation, built environment and transport sectors; and in parallel, **an approach to carbon neutrality in the agriculture and land-use sector**, including forestry, **which does not compromise capacity for sustainable food production.**

The idea that Ireland could become a world leader in the production, management and marketing of low-carbon, high-quality sustainable food was first put forward by NESC in its major report on climate change in 2012.¹ It suggested that “This can be achieved by adopting carbon neutrality as a point on the horizon for the country and the industry to work towards”. The NESC report went on to acknowledge that “In further contrast with much climate analysis we are comfortable in acknowledging that neither we nor the actors in the sector know how Irish agriculture and land use will achieve carbon neutrality”. Other relevant work includes an important Teagasc report in 2013 “Carbon neutrality as a horizon point for Irish agriculture”² and the joint report of the Irish Institute for European Affairs/Royal Dublin Society on climate-smart agriculture.³

The rationale for the idea of carbon neutrality in the agriculture and land use sector is that this is the only sector where, as well as producing emissions, it is possible to remove carbon from the atmosphere through photosynthesis and lock it away in long-term storage, either in above-ground vegetation such as forests, trees and other woody material, or below ground by enhancing soil carbon reserves, a process known as **carbon sequestration**. For example, Irish forests remove approximately 3.6 million tonnes of carbon dioxide from the atmosphere per year.⁴

¹ National Economic and Social Council, 2012, [Ireland and the Climate Change Challenge: Connecting ‘how much’ to ‘how to’](#), Main Report, Dublin.

² Teagasc, 2013, [Carbon neutrality as a horizon point for Irish agriculture: A qualitative appraisal of potential pathways to 2050](#), Carlow.

³ IIEA/RDS, 2016. [A Climate-Smart Pathway for Irish Agricultural Development: Exploring the Leadership Opportunity](#), Climate Smart Leadership Forum, Dublin.

⁴ Coillte Submission to Forest Service, ‘[Consultation paper Forestry Programme 2014 – 2020 summary of proposed measures March 2014 draft proposals](#)’, 2014.

How to define carbon neutrality?

Although an approach to carbon neutrality in the agriculture and land use sector is the National Policy Position, there has been no attempt yet to give a formal definition of what this means. Let me give two illustrations.

There are limits to the equivalence of emitting one molecule of a greenhouse gas through, for example, applying manure or fertiliser to soil, and sequestering a molecule of carbon in forests or soil. One issue is the **degree of permanence of the sequestration activity**. Increased carbon stored in soils can be quickly lost if the land is ploughed or there is a forest fire.

There are also physical limits on the amount of additional carbon that can be absorbed in soils or forests, a process called **saturation**. When we plant a new forest and young trees are growing, they suck carbon out of the air. But once the forest reaches maturity, the additional carbon absorbed approaches zero. Some observers therefore argue that carbon sequestration activities should be discounted to take into account their greater uncertainty and impermanence.

Carbon neutrality in the agriculture and land use sector could also be defined in a broader framework **by taking into account the contribution of farmers in reducing emissions in other sectors through the production of renewable energy and the replacement of energy-intensive construction materials with harvested wood products**.

Farmers have the potential to produce energy in a number of ways – biogas through anaerobic digestion of manure, food wastes and even grass silage; biomass through energy crops or energy plantations, first-generation biofuels through the processing of cereals, oilseeds or sugarbeet or second-generation biofuels through the processing of agricultural wastes; and solar energy through using their land for solar panels. Currently, any emissions reductions through the use of renewable energies or harvested wood products are credited to the Energy and Buildings sectors under the UNFCCC reporting format.

Conversely, energy used in agriculture, either for transport or heating buildings or running pumps, or for the manufacture of inputs such as fertiliser, is currently not counted as part of Agriculture, Forestry and Other Land Use emissions. It is important to encourage the production of renewable energies as part of our climate strategy, but we should note that these savings do not offset emissions in the same way as carbon sequestration does. **In any event, if the term is to be used as a policy objective, it needs to be defined.**

Is an approach to carbon neutrality taking a leadership position?

The short answer is yes, provided it is recognised that it is important to work on both sides of the balance sheet at the same time. It is not possible, given current knowledge, to reduce emissions from agricultural production to zero. Thus, it makes sense to incentivise carbon sequestration to offset these emissions. However, with current knowledge, it is likely that only a small part of agricultural greenhouse gas emissions will be offset by

carbon sequestration in grasslands and forestry in the coming decades, thus leaving an ‘emissions gap’⁵. The Teagasc study on pathways to carbon neutrality by 2050 estimated an emissions gap of (22 Mt emissions – 9 Mt sequestration) = 13 Mt CO₂eq net emissions by 2030 (65% of agricultural emissions), rising to 16-17 Mt CO₂eq net emissions by 2050 (75% of ag emissions) (Teagasc, 2013). Maintaining additional carbon sequestration over time becomes difficult due to saturation in existing land uses and limits on further land use change. Thus, **we cannot rely on sequestration offsets alone, it is also necessary to work to reduce emissions from agricultural production.**

First priority – reduce emissions through increased efficiency

This insight focuses attention on the second element in the National Policy Position regarding agriculture which is the phrase that the approach to carbon neutrality “should not compromise capacity for sustainable food production”.

Given that we need to look at the opportunities for reducing emissions from agricultural production, the first set of measures should always be to try to improve emissions efficiency by lowering emissions per unit of output. This parallels the search for improved energy efficiencies in the energy sector – energy not used means emissions not produced. Improving emissions efficiency, or reducing the emissions intensity, of agricultural production is often associated with reduced costs of production and increased profitability, and thus there is a positive outcome for farmers as a result. There are a number of grant and knowledge-transfer schemes operating in Ireland which seek to improve the emissions efficiency of production.

However, the Environment Protection Agency (EPA) projections of emissions from agriculture to 2035 show that agricultural emissions will flat-line but not decrease.⁶ Improvements in emissions efficiency lead to reductions in production costs, and thus they increase the profitability and attractiveness of increasing production. There is a reduction in emissions per unit of production, but overall production may increase offsetting some of this reduction – what we call the **rebound** effect. There are strong market forces at work which are encouraging an increase in production in any case, especially in the dairy sector. What does climate leadership mean in the context of increasing production? Would climate change leadership justify imposing restrictions on agricultural production in order to reduce emissions?

Putting incentives in place so agriculture makes its appropriate contribution

There are strongly-held and opposing views on this question. One view is that “climate policy must not hinder emission efficient food produced in Ireland”. This view emphasises the fact that Ireland produces beef and dairy products with a low carbon footprint for these products. If Ireland did not produce this milk and beef, production would take place

⁵ Source: [DAFM Discussion document on mitigation potential in Irish AFOLU sector](#), 2015.

⁶ EPA, 2017. [Ireland's Greenhouse Gas Emissions Projections 2016-2035](#), Dublin.

in other countries that have higher emissions intensity than does Ireland, leading to an overall increase in global emissions. The implication is that, apart from pursuing options to reduce emissions intensity that are anyway profitable or at least cost-neutral for farmers, agriculture cannot be asked to do more to reduce emissions.

The other view, expressed in many of the submissions received by the Citizens' Assembly, is that "Since agriculture is a main emitter of greenhouse gasses, it is essential not to expand the national herd". Others go further and suggest significant land use changes, for example, through an expansion in arable and horticultural production or through greater afforestation. The implication is that expansion in livestock production should be stopped, and reversed, at any price.

These opposing positions are a good example of the trade-offs which you, as the Citizens' Assembly, have to consider. On the one hand, agricultural production underpins livelihoods on thousands of farm holdings across the country. Ireland is good at growing grass, and because of our climate and farm sizes, farmers find it difficult to grow arable crops and vegetables profitably except in selected areas. Climate change might lead to better conditions for crop production in coming decades, but in the meantime livestock production is the only way of converting grass to a human food source.

My own view to sort through these dilemmas is that climate leadership should not privilege agricultural emissions by exempting them from the disciplines that apply to all other sectors. But nor should it penalise agricultural emissions unnecessarily where it is clear that the economic value added per unit of emissions in agricultural activity is higher than the economic value added per unit of emissions in some other sector. In that case, the sensible approach would be to make the emissions reduction in the most cost-effective way by reducing the activity where there is the lowest economic cost of doing so.

The problem is that the costs caused by the greenhouse gas emissions associated with agricultural production are not taken into account by farmers when deciding how much to produce, and this is wrong.

The most practical way to do this would be to ensure that there is a tax on carbon emissions which is the same across the whole economy.⁷ Conversely, if an activity is sequestering carbon, we should encourage it through an equivalent subsidy. The milk produced by dairy farmers, for example, is used to make products which are highly valued, such as butter, cheeses and infant formula. But to produce this milk also incurs costs, such as the fertiliser, the animal feed, the veterinary medicines and the milking parlour. Irish dairy farmers will only produce milk if the value of what they produce exceeds these costs, including a return on their land and labour.

⁷ The main greenhouse gas (GHG) emissions from agriculture are methane and nitrous oxide which can be expressed in carbon equivalents. In this paper, I use a carbon tax as a short-hand for a tax on all greenhouse gases. A carbon tax is one way of making visible to farmers and decision-makers that there is a cost to emitting greenhouse gases. There are other ways of achieving the same aim, including cap-and-trade systems and even regulation. This paper does not discuss the relative merits of different approaches. The key message is that the cost of emitting greenhouse gases must be made visible and taken into account in decision-making.

Climate leadership should start by sending a signal to farmers (not only farmers, of course, but all those whose activities lead to GHG emissions) that, in planning on what to produce and how much, they must take their greenhouse gas emissions into account. Not just in a book-keeping sense, as part of a carbon audit, but in a real and tangible way which will influence the decisions that they take.

A carbon tax signal has another great advantage. It would not only lead to a structure of agricultural production that would take account of our objective to reduce emissions. **It would also provide an incentive to farmers and to research institutes to improve efficiencies** (by using less nitrogenous fertiliser, for example) and to come up with land use options that are less carbon-intensive.

This is not a question of penalising agriculture or farmers. Ireland is currently one of a minority of countries that has introduced a carbon tax. The carbon tax currently only covers emissions from the use of energy products outside the Emissions Trading Scheme (ETS), while emissions inside the ETS require the purchase of a permit or allowance. If agricultural emissions are subject to a looser discipline than emissions in other sectors, the costs of making the transition to a low-carbon society will be even higher for these other sectors.

If Ireland fails to meet its EU targets in the non-ETS sector, then it will have to purchase allowances from other countries inside the EU. **If agriculture does not face the same discipline as every other sector, then the taxpayer will end up paying for the further expansion of agricultural production by having to purchase the additional allowances that it needs.** This would effectively represent a further subsidy to agricultural production, and ultimately could be challenged under EU state aid rules.

It is not only a question of efficiency, but also of fairness, that the same rules should apply across-the-board.

Of course, the use of the pricing principle should work both ways. **Farmers and land managers who find ways of sequestering additional carbon on their land should be rewarded for this.** At present, forestry planting is heavily supported, through both a planting grant which covers the cost of planting, an annual premium for 15 years which covers the loss of income from alternative uses of the land, and the ability to sell the final timber crop free of tax. I would not advocate further subsidy for the forestry sector, although we should consider restructuring the annual premium as a carbon sequestration payment, to make clear we are properly valuing this service. This could also open the way to incentivising Coillte which is currently excluded from receiving premium payments under EU state aid rules.

Under EU rules at present, there are limits on the extent to which removal units created by carbon sequestration from Land Use, Land Use Change and Forestry (LULUCF) activities can be used to offset emissions when measuring a country's progress to its national target. This restriction is imposed partly to avoid reducing the incentive to invest in the all-important energy transition, but also because of the current uncertainties around the

measurement of carbon sequestration. If Ireland through its climate leadership activities could show that it had developed robust systems of measurement, it would be in a strong position to argue for these restrictions to be lifted over time.

Objections to the carbon tax approach

There are two objections to this proposal which you should consider. The first is that **there would be considerable practical difficulties in applying a carbon price signal, either a tax or subsidy, in agricultural production.** Agricultural and forestry production are biological processes. Emissions from production can vary due to different weather conditions, soil conditions, animal types and the timing of farm practices. Direct measurement of emissions or sequestration on a per animal or per field basis is currently not possible. There could be high transactions and monitoring costs to doing this. It would be necessary to start with some rather simple approximations where there is a clear relationship between particular farm practices or inputs and emissions. It would be part of Ireland's bid for climate leadership to investigate and research how these problems could be addressed.⁸

The second objection is that **including agricultural production in Ireland within a carbon taxation scheme would make it uncompetitive relative to producers in other countries.** This would encourage production to move to other countries either inside or outside the EU that are potentially less carbon efficient – **the phenomenon of carbon leakage.**

Carbon leakage is a serious issue, because if production moves to countries that are less carbon-efficient, then total global emissions rise. But we should also be aware that if no-one made the first move we would never have phased out the use of dangerous pesticides in our food supply, or raised animal welfare standards in livestock husbandry. It is perfectly sensible to make these changes on a phased basis, but the role of leadership is to point the way, knowing that other countries will be willing and able to follow. We should also take note of the evidence that, at least with respect to beef production, grass-based systems do not necessarily have a lower carbon footprint than alternative grain-based systems (though they still score more highly on other indicators such as biodiversity and animal welfare).⁹ The presumption that global emissions would rise depends on which country would produce the extra beef and under what conditions.

The ultimate solution to this issue is international coordination of climate policies. This is of course the purpose of the Paris Agreement which, under its regular stock-taking exercises, foresees a gradual raising of climate ambition by all countries over time. It would also be important to work within the framework of the European Union for a common approach on this issue to minimise competitive distortions.

⁸ Another aspect of these practical problems is that the measurement systems must be sufficiently robust to enable Ireland to be able to properly account for emissions reductions and sequestration when returning our annual greenhouse gas inventories to the EU and the UNFCCC. These inventories are audited in a process of peer review, and we would have to be able to demonstrate that the emissions reductions claimed had actually occurred.

⁹ Garnett, T. and Godde, C., 2017. [Grazed and confused: Ruminating on cattle, grazing systems, methane, nitrous oxide, the soil carbon sequestration question – and what it all means for greenhouse gas emissions](#), Food and Climate Research Network, UK.

It will take time for these initiatives to come to fruition. In the meantime, the income position of farmers in Ireland could be safeguarded by recycling the carbon tax payment by farmers on emitting activities back to farmers either to promote more carbon-efficient land uses or as a flat-rate payment per hectare. This would maintain the signalling effect of the carbon tax to encourage farmers to consider lower-emission land uses while avoiding increasing the overall burden of taxation on the sector.

What would a sustainable agriculture look like?

I call this approach to climate policy in agriculture **true-cost accounting** because its role is to make the costs of GHG emissions and the benefits of carbon sequestration visible to farmers and consumers. It is clear that Irish land use would change if the full climate costs and benefits were reflected in farmers' decision-making. We would see a reduction in carbon-emitting activities, and an expansion in activities that were less carbon-intensive or that helped to sequester carbon. **It is important to emphasise that there will be opportunities as well as difficulties in moving in a more sustainable direction.**

There would likely be an expansion in the area under forestry, in line with national government targets over many decades. However, while the government planting target (now fulfilled only by private forestry) is to plant 15,000 hectares per year, in actual practice planting rates are far below this, currently around 6,500 ha per annum, despite the very generous incentives.¹⁰ One of the difficulties is that competing uses of land do not bear the true cost of their production activities.

True cost accounting would mean that there would be **a further reduction in suckler cow numbers**. Beef producers currently benefit from the high protection imposed on meat imports from outside the EU – on some cuts of meat the level of tariffs can be as high as 60%.

Yet despite this high level of border protection, Irish cattle farmers generally do not make money from producing beef. Teagasc National Farm Survey figures consistently show that the income on cattle farms comes almost entirely from payments under the Common Agricultural Policy (CAP), either in the form of the Basic/Greening Payment, payments to farmers in marginal farming areas under the Areas of Natural Constraints Scheme, and payments as a result of enrolment in agri-environment schemes.

These CAP payments are not specifically linked to cattle production. In most cases, farmers would be entitled to receive these payments even if they ceased cattle production. Reducing cattle numbers on these farms would not reduce farmers' income, although there would be lower throughput for the meat factories.

True cost accounting would indeed raise the costs of production in farming, because the cost of greenhouse gas emissions would be explicitly accounted for. There will be political resistance to this. Thus, **research and innovation to devise technologies and practices**

¹⁰ DAFM, 2014. [Forests, Products and People: Ireland's forest policy, a renewed vision](#), Dublin.

which can help to reduce emissions at lower costs must be strongly encouraged, also through international collaboration. Making visible the carbon costs and benefits of farming would be a powerful incentive for this research. Ireland is already working with international partners through bodies like the [Global Research Alliance on Agricultural Greenhouse Gases](#).

Reduced profitability of conventional farm enterprises would lower land prices, and this is the incentive for farmers to seek out alternative opportunities. It is not possible to predict how farmers will decide to use their land, this will depend on their ingenuity and the success of research in redesigning farming systems and in developing new uses for land. But it is likely that there will be **greater emphasis on forestry, greater emphasis on energy crops and anaerobic digestion including in some areas the use of grass silage for energy rather than livestock production, and changes in livestock systems themselves**.

Concluding remarks

I should point out that no country in the world has yet adopted the steps that I am advocating. Where countries have sought to reduce agricultural emissions, this has always been on the basis of voluntary action by farmers, encouraged and incentivised by subsidies.

New Zealand, some years ago, passed legislation to include agriculture in its national emissions cap-and-trade scheme. This idea was dropped in 2012 before it took effect when the then Government indicated “biological emissions from agriculture will only incur surrender obligations if there are technologies available to reduce these emissions and our international competitors are taking sufficient action on their emissions”.¹¹ More recently, the new NZ government under PM Jacinta Ardern has promised to reform the cap-and-trade scheme to include agriculture again.¹²

Subsidies have a role to play in incentivising start-ups and in helping to overcome barriers to adoption in the early stages of a technology. **The difficulty with relying only on subsidies to achieve our emission reduction targets in agriculture is that they have to be paid by somebody**, either by electricity and heat users in the form of higher prices for renewable energy or by the general taxpayer, in competition with all of the other demands on government expenditure for healthcare, education, pensions and infrastructure.

At a global level, **meeting the climate mitigation challenge will require action on food demand patterns**, including reduced levels of food waste and shifts towards less meat-intensive diets in developed countries. These actions, important though they are, are less helpful in meeting targets in an Irish context because of the strongly export-oriented nature of our agriculture. However, true cost accounting, by reflecting the appropriate cost of carbon-intensive foods to the consumer, would be consistent with the changes that are needed at a global level.

¹¹ NZ Ministry for the Environment, ‘[Legislative changes to the New Zealand Emissions Trading Scheme – 2012](#)’.

¹² <http://www.climatechangenews.com/2017/10/20/jacinda-ardern-commits-new-zealand-zero-carbon-2050/>.

Irish farming in the next few years will face particular challenges. There is uncertainty over future market prices, particularly in the light of possible new EU free trade agreements with third countries, there may be less support from the CAP budget, and farming will be particularly hard hit by the UK's decision to leave the EU with the possible erection of trade barriers on agro-food trade with the UK. It will be important that any measures that are taken to assist the farming community to meet these challenges should be consistent with our longer-term climate commitments.

What I am suggesting today is radical. It would be climate leadership. But it is up to you to decide whether you think it is the direction we should go.