An Tionól Saoránach The Citizens' Assembly

Paper of

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delivered to

The Citizens' Assembly

on

04 November 2017

Current Agriculture/ Land Use Policy in Ireland

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The Profile of Irish Agriculture

The agri-food and drink sector accounts for 7.6% of Irelands economy-wide GVA, 10.7% of Ireland's exports and 8.4% of total employment (DAFM, 2015). In 2016, Gross Agricultural Output (GAO) was valued at €6.92 billion with Irish agri-food and drink exports increased by an estimated 2% to approximately €11.15 bn. Irish agriculture is dominated by pastoral livestock-based systems, with beef and dairy accounting for 38.8% and 29.5% of GAO respectively. In total the sector comprises 7.2 million bovines and 5.5 million sheep grazing 3.6 million hectares of managed grassland and 0.5 million hectares of rough-grazing. This represents 91% of UAA with 9% allocated to tillage.

Growth of Agriculture Production

In 2010, during the recession, Food Harvest 2020 (FH2020) a strategy to chart the direction of agri-food, forestry and fisheries for the next decade, was developed. It envisaged increasing the value of primary output of the agriculture, fisheries and forestry sector by €1.5 billion; a 33% increase compared to the 2007-2009 average. Improving the value added in the sector by €3 billion. Achieving an export target of €12 billion for the sector which is a 42% increase compared to the 2007-2009 average, Increasing milk production by 50% and adding 20% to the value of the beef sector.

Foodwise 2025: The Food Harvest development plan has been further extended under the Food Wise 2025 Strategy, which envisages a further increase in dairy production as well as significant expansion of the arable, pig, poultry and forestry sectors. The principal targets include a) increasing the value of agri-food exports by 85% to €19 billion, b) increasing value added in the agri-food, fisheries and wood products sector by 70% to in excess of €13 billion, c) increasing the value of Primary Production by 65% to almost €10 billion and d) creating an additional 23,000 direct jobs in the agri-food sector all along the supply chain from primary production to high valued added product development.

However, this expansion will have to be carried out whilst maintaining environmental sustainability. Indeed, the strategy has adopted as a guiding principle that "… environmental protection and economic competiveness will be considered as equal and complementary, one will not be achieved at the expense of the other." Sustainability is understood to encompass economic, social and environmental attributes and the subsequent strategic environmental assessment of FW 2025 proposed the need for a Sustainable Growth Strategy (SGS).

So are these ambitious targets being met. The value of agri-food exports increased by about 2% in 2016 to reach €12.2bn, marking growth of over 56% since 2009, already meeting FH2020 targets. Similarly dairy production has increased to 6,395 million litres representing a 26% increase since 2009. Indeed independent analysis by the European Commission in their latest medium term Agricultural Outlook has projected that between 2016 and 2026, Ireland is expected to show the highest percentage growth in milk production in the EU, with predicted growth of 41%,

The Challenges

Economic Sustainability: While dairy and tillage farms are, on average, profitable (with 40% and 80% of income derived from subsidies), sheep and beef rearing are on average, loss making. Average farm income ranges from 52,500 euro for dairy farms to 12,516 for beef farms.

Gaseous Emissions: Agriculture comprises one third of GHG emissions (proportionately the highest in Europe) and virtually all of ammonia emissions. Methane from cattle and sheep burping (called enteric fermentation) and manures comprise 66% of agri-emissions, with the rest arising as nitrous oxide from fertilisers, slurry application and animal excretion onto soil (EPA 2016, see Figure 1). Emissions peaked in 1998 prior to reform of the Common Agricultural Policy (CAP) and subsequently reduced to 2011 (due to reduced sheep numbers and fertiliser use). Unlike GHG, ammonia is principally an air quality issue. It is a gas produced mainly from cattle, pig and poultry manure stores and during the field application of slurry.

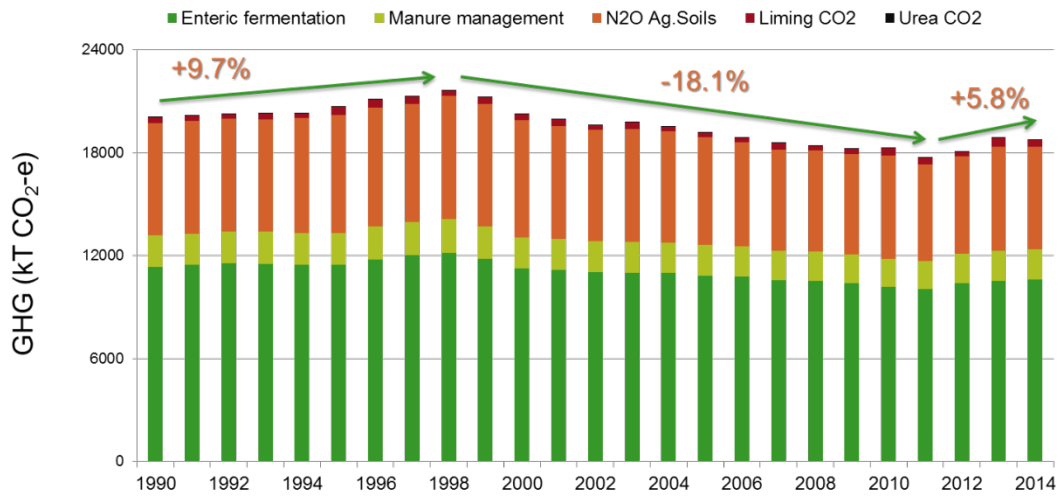

Figure 1: Irish Agricultural Emissions Profile

In addition, the EPA has identified agriculture and waste water discharges as the primary sources of nutrients in rivers and the main cause of water pollution (algal blooms etc). Needless to say, increases in agricultural output will create challenges for the sector, particularly in terms of addressing national and EU environmental targets. These targets include a 30% reduction in GHG by 2030, a 5% reduction in ammonia from 2030, improving water quality and halting biodiversity decline.

Comparisons of the carbon footprint of international livestock production by the Food and Agricultural Organisation of the United Nations (FAO) and the EU Joint Research Council have demonstrated that the carbon footprint of dairy and beef production was the lowest in temperate grass-based systems, with the footprint of Irish produce amongst the lowest in Europe. In addition, a study by the European Parliament has shown Irish agriculture to have amongst the lowest N surplus in Europe. Teagasc data showed that that the carbon and nitrogen footprint of Irish produce has been reduced by c. 15%-25% since 1990 and National Farm Survey data has revealed that there is a link between economic efficiency with N efficiency, with the top third of economic performers having the highest milk/beef production per kilo N surplus.

Water Quality: There is a significant reduction in nitrogen and phosphorus concentrations in rivers nationally since the commencement of the Water Framework Directive monitoring programme in 2006. However, a small number of monitoring stations indicate increasing trends in nitrogen, and including Bandon, Blackwater, Boyne, Nore, Slaney and Tolka estuaries. Less than 1% of stations showed evidence of strongly increasing phosphorus concentrations mainly close to wastewater treatment plant discharges (EPA 2017).

The ecological status of waterways is defined as the number of fish, macroinvertebrates such as pearl mussel, etc. in that watercourse and is sensitive to oxygen levels, acidity, sedimentation, etc. On a national scale 1,227 river water bodies remained stable with no ecological status change when the 2007–2009 and 2010–2015 periods were compared. A total of 418 river water bodies exhibited an improvement in ecological status, while 499 river water bodies declined in status between the survey periods (EPA 2017).

Environmental Policy: EU Directives & National Legislation

Climate Policy

Current and future EU Climate targets pose considerable challenges for Irish agriculture. Under the current EU 2020 Climate and Energy Package and associated Effort Sharing Decision (Decision No. 406/2009/EU), Ireland was given a 20% reduction target for the period 2013-2020 relative to a baseline year of 2005. This was the largest national reduction target (along with Denmark) and was based on a GDP *per capita* basis. Importantly, offsetting emissions via carbon (C) sequestration (locking carbon in trees and soils) was not allowed, due to the perceived uncertainty surrounding land carbon sequestration potential.

Subsequently, at a global level, the Paris Agreement aims to tackle 95% of global emissions through 188 Nationally Determined Contributions (NDCs) which will increase in ambition over time. Ireland's contribution to the Paris Agreement (to 2030) will be via the NDC proposed by the EU on behalf of its Member States. This is a binding EU target of an overall EU reduction of at least 40% in greenhouse gas emissions by 2030 compared to 1990 levels. A proposal on national contributions, the Effort Sharing Regulation (ESR), was published by the European Commission in July 2016. The ESR proposal suggests a 39% GHG reduction target for Ireland, based on GDP per capita, for the period 2021 to 2030. This target has been adjusted downward for cost-effectiveness by 9% to give a headline target of 30%. In addition, Ireland has been offered flexible mechanisms, with 4% of the target achievable through the purchase of carbon credits and 5.6% achieved via offsetting emissions by sequestering CO_2 in woody perennial biomass and soils through land use management and land-use change (Figure 2). The government have now launched the National Mitigation Plan in response with a long-term aim of achieving carbon neutrality

Figure 2: National targets for EU member states with flexibilities under the 2030 Effort Sharing Proposals.

Air Quality Policy

Ireland's target for ammonia emissions is legislated under the current National Emissions Ceilings Directive and is a 0.5% reduction on 2005 levels by 2020. Under the amended National Emissions Ceilings Directive (NECD) of the Clean Air Package (Dec 2013), the Commission initially proposed a reduction for Ireland of 10% to 98.8 kilotonnes ammonia. This was later amended by EU Directive 2016/2284 to a 5% reduction in ammonia to 104 kilotonnes. In the context of the proposed 2030 NECD targets, cost-effective abatement of ammonia will be vital to maintaining this strategic vision. The National Clean Air Strategy maps out Irelands strategy for reducing air pollution.

Requirements & Solutions

Land-Use Decision Support

The European Council's Conclusions on the Climate and Energy Framework 2030 (European Council, 2014) and the recent proposals by the European Commission, which allow for flexibility in using the land use sector to offset national emissions using carbon sequestration in forests and soils (European Commission, 2016) for the period 2020 to 2030. Carbon sequestration is the process whereby CO_2 is removed by plants during photosynthesis and locked in wood and soils. This means that there is an urgent need to develop decision-support tools to assist policy makers, farmers and land-owners with the optimisation of land management and land-use. Any Land–use Strategy should include a framework for managing land and soils that optimises production, carbon sequestration, water quality and biodiversity. Highly productive lighter soils should be prioritised to stay in production, enhanced grassland sequestration via optimal management should be promoted, carbon in peat soils should be maintained and where appropriate C emissions where peatland have been drained for farming or extraction should be reduced by re-wetting (Schulte et al. 2016, O'Sullivan et al. 2016). Also, in order to maximise the use of sinks in offsetting emissions a cap on the use of C sequestration would have to be removed from future post 2030 EU legislation as there is capacity beyond the current limit to sequester or reduce losses of CO_2. Several initiatives funded by both EPA and the Department of Agriculture, Food and the Marine have begun which will develop analyses and decision-support tools to assess the impact of policy on functional land use.

Current Government Measures

All farms in receipt of the single farm payment are expected to maintain Good Agricultural Environmental Conditions. This includes:

- Establishment of buffer strips along watercourses (fenced off unfarmed land to create a buffer between farmland and rivers, etc).
- Protection of ground water against pollution.
- Minimum plant cover to protect soils as bare soil can be eroded and lose soil carbon.
- Minimum land management reflecting site specific conditions to limit erosion.
- Maintenance of soil organic matter through appropriate practices.
- Retention of landscape features - minimum level of maintenance.

In addition, extra schemes are available to enhance sustainable production. These include the Green, Low Carbon Agri-Environmental Scheme (GLAS) which has a number of measures available to preserve traditional hay meadows and low-input pastures and maintain high nature value habitats. Practices such as minimum tillage for croplands help maintain soil

carbon and a range of measures such as field margins, hedgerows and buffer strips are available to increase carbon sinks and maintain water status and the landscape.

Current Initiatives & Future Requirements

Teagasc co-ordinates a consortium of researchers, students and professionals working collaboratively to develop verified strategies to decrease greenhouse gas emissions from Irish agriculture. The Department of Agriculture, Food and the Marine has funded the Agricultural Greenhouse Gas Initiative for Ireland – AGRI-I was launched in January 2012. AGRI-I aims to align research activities and provide added value to agricultural GHG monitoring and mitigation in Ireland. Teagasc Johnstown Castle coordinated the consortium bringing together expertise from across the island of Ireland. It focusses on GHG and ammonia measurement and modelling, spatial analysis and policy development and economic analysis.

The Agricultural Catchments Programme, which there will be a field trip to on Tuesday, is a Research and Knowledge Transfer Platform for understanding nutrient flows through catchments, developing mitigation strategies and verification of current measures.

In terms of reducing methane, the main options lie in improved production per animal. This will mean that less animals are required for a given level of production. Measures include improved dairy and beef genetics, optimised liveweight gain, extended grazing and improved animal health (dairy, beef and sheep). In addition, adding chemicals to bovine and pig slurry can drastically reduce methane from housing and manure storage.

Much of the answer to reducing these losses lie in terms of improving farm nutrient efficiency: so if we can produce food with fewer inputs, then this reduces emissions to the water and the atmosphere and also costs to the farmer. This will be achieved through adoption of measures such novel fertilsers, improved nutrient management planning in combination with optimal use of slurry and or alternative uses of slurry in biogas and biomethane. Other strategies can reduce greenhouse gas emissions even further. Examples include the use of wetlands to remove nutrients from water , the development of novel, low-emission fertilizers, reducing crude protein in bovine and pig diets and adding amendments to manures during storage.

As the Nitrates Action Plan, National GHG Mitigation Plan and ammonia targets require multi-year reductions in pollutants, success will be highly dependent on rates of farmer uptake. This means that the role of knowledge transfer (KT) and education will be more important than ever. Research as of itself will not lead to emissions reductions without strong linkage to advisory and education. Initiatives, such as Nutrient Management Planning online (a support tool to help farmers optimise fertiliser application based on the soil nutrients already in his/her fields), the BETTER farms programme (a programme of flagship

farms) and Carbon Navigator (a tool to allow farmers to improve their carbon footprint) will play all vital roles in getting the message out to farmers.

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