Green Party submission to the Department of Agriculture, Food and the Marine’s consultation on the potential for greenhouse gas (GHG) mitigation within the agriculture and forestry sectors.
Dublin, 23 March 2015

Introduction

The Green Party welcomes the 2015 public consultation on the potential for greenhouse gas (GHG) mitigation within the agriculture and forestry sectors initiated by the Department of Agriculture, Food and the Marine. We agree wholeheartedly with the discussion document’s leading statement:

“**It is not acceptable to sacrifice the future to the needs of the present by producing food in a way that degrades our soil and water, destroys our biodiversity and exacerbates climate change.**”

The challenge of achieving this is particularly relevant in Ireland where currently 32% of the country’s GHG emissions arise from agricultural activity (Duffy et al., 2014). While we welcome the publication of DAFM’s discussion document, it fails to deliver on its overarching vision to reduce the impacts of Irish agriculture on climate change because the effects of proposed mitigation measures are compromised/negated by the agricultural intensification currently underway in Ireland. We highlight five main areas for consideration in the sectoral plans for GHG reductions from agriculture below. These include:

1. The need for defined emission reduction metrics
2. The inherent conflict between climate mitigation and adaptation strategies and the principles of Food Harvest 2020
3. The need to allow direct comparison with similar agricultural production systems outside of Ireland
4. More ambitious and immediate development of the forestry sector based on the principle of Sustainable Forest Management (European Commission, 2003)
5. The inclusion of additional alternative agricultural approaches known to reduce GHG emissions and environmental impacts

1. A need for defined emission reduction metrics

The DAFM discussion document sets forth several ways in which GHG emissions from agriculture may be reduced. However, with the exception of forestry, where forested land area covered is set to increase from 10.7% to 18% by 2046, the document fails to identify any formal metrics of emissions reductions. Previous work by Teagasc has already established the many potential ways in which GHG emissions could be reduced in the agricultural sector. The DAFM document establishing the sectoral plan for GHG emissions reductions from agriculture and forestry must now go beyond simply reiterating how emissions can be reduced and propose how DAFM plans to achieve real emission reductions.

At a minimum, the Green Party holds that DAFM should propose quantitative emission reduction metrics (as well as an interim assessment tool that will report on the progress) for the four agricultural/forestry/other land use (AFOLU) activities that contribute the most to
national GHG emissions. The primary AFOLU activities contributing to GHG emissions in Ireland include:

a. **Emissions from soil** - The EPA estimated 6.7 million tonnes of carbon dioxide equivalent (CO$_2$eq) was produced from Irish soils in 2012 (Duffy et al., 2014), accounting for 37% of total agricultural emissions in that year. Agricultural land must be managed appropriately to limit its impact on climate while increasing production yields. Quantifiable reductions in GHG emissions from the application of organic or synthetic fertilisers should therefore be included in any strategy. Precision agriculture is one tool that could be used to achieve such reductions while maintaining maximum crop yields and economic return.

b. **Emissions from livestock manure management** - Livestock manure storage and treatment under certain conditions (i.e. temperature, type and storage duration) generates the production of methane (CH$_4$) and nitrous oxide (N$_2$O). Manure management resulted in over 2.2 million tonnes of CO$_2$eq and 464,031 tonnes CO$_2$eq from CH$_4$ and N$_2$O, respectively in 2012. Therefore, quantifiable objectives to reduce the emissions from manure management should be included in sectoral plans to reduce GHG emissions from agriculture. Optimising the methods in which livestock manure is managed is one way to reduce GHG emissions from this activity. Capturing CH$_4$ produced from anaerobic digestion and using it as biogas for energy production may be another strategy for reducing GHG emissions while also reducing the dependency on, and associated cost of, fossil fuels.

c. **Emissions from enteric fermentation** - Enteric fermentation from the digestive systems of ruminant animals releases CH$_4$ into the atmosphere. Enteric fermentation was responsible for 49% of the agri-emissions in 2012 with 92% of it coming from cattle (Duffy et al., 2014). Sectoral plans to reduce GHG emissions from Irish agriculture should include quantifiable reductions in the emissions from enteric fermentation. For example, dairy cattle in Ireland produced 113 kg CH$_4$ per animal in 2012 while in New Zealand, where similar livestock production systems are applied, dairy cattle produce 80 kg CH$_4$ per animal the same year. According to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 4 (Paustian et al., 2006), this is because in New Zealand (i) animal diet has higher digestible energy content for dairy (78%) than Ireland (75%) which practically results in less waste production and (ii) dairy cattle have a much lower average animal body weight (458 kg vs. 535 kg in Ireland), thus having a lower energy requirement (Duffy et al., 2014 and New Zealand Ministry for the Environment, 2014). Teagasc’s Marginal Abatement Cost Curve confirms that adjustments in feed quality and animal genetics are the most cost effective options for GHG emissions from agriculture (Schulte et al., 2012). DAFM should act on this evidence base by applying it to real emission reductions from enteric fermentation.

d. **Emissions from land use change** - The EPA report that 144,220 ha of land converted to cropland has resulted in 377,750 tonnes of net CO$_2$ emissions since 1990 (Duffy et al., 2014). Research has shown that land use change for agriculture results in significant GHG emissions (Burney et al., 2010). Therefore, the Green Party uphold
that mitigation actions must be taken within the land use sector. The value of wetlands and peatlands, in terms of their carbon sequestration potential, has been acknowledged in national policy (Department for Agriculture, Food and the Marine, 2014). Renou-Wilson et al. (2011) underline that peatlands are the most important long-term carbon reservoirs in Ireland, containing 1.5 Gt of carbon at present. Anthropogenic drainage and disturbance of peat is the driver for soil carbon to be released into the atmosphere. Total emissions from peat, including from combustion and other uses, are over 9 Mt/year (Renou-Wilson et al., 2011). The rewetting of peatlands has been identified as highly cost-effective emissions abatement. Therefore, a ban on the extraction of peat and drainage of peat soils for agriculture or forestry, the rewetting of degraded peatlands and the conservation of existing peatlands are measures that need to be undertaken immediately and would have a significant and quantifiable effect on GHG emission reductions.

2. The inherent conflict between climate mitigation and adaptation plans and Food Harvest 2020

The DAFM discussion document recognises the importance of climate change mitigation, but also states that environmental and climate impacts should be limited without compromising food production. Food production industry targets are set in FH2020, which has been estimated to increase GHG agri-emissions by 9% for the period 2013-2020 (Department of Agriculture, Food and the Marine, 2015). The rise in GHG emissions from agriculture confirms the finding from numerous Irish organisations (e.g. Environmental Pillar, An Taisce) that the Environmental Impact Assessment of FH2020 stating that the impacts on our waters, biodiversity, soils and climate will be "slight" or "negligible" is not credible. Therefore, the Green Party attests that the discussion document contradicts itself by basing GHG emission reduction plans on FH2020 food production targets.

Intensification of agriculture within FH2020 will lead to exploitation of land and natural resources for the sake of the short-term goals of higher production at the expense of long-term environmental, climatic and social considerations. Intensification means use of higher amount of inputs (i.e. fertilisers, number of animals), which leads to higher GHG emissions. If we accept that sustainability requires an equivalent beneficial return to the environment, the term “sustainable intensification of agriculture” simply cannot realise such environmental benefits. Furthermore, we remind DAFM that Food Harvest 2020 is an industry guidance document rather than a policy fixed by national legislation or European Directive, and the Green Party, therefore, advises that DAFM not build their GHG emission mitigation policy around FH2020 but instead employ mechanisms that will increase the efficiency and value of Irish agricultural production.

It has become obvious that FH2020 is not environmentally or economically sustainable: the target of a 50% increase in dairy production does not guarantee profit returns to small family farms. A future drop in milk yields could increase profits for the processing industry but lower profits to the farming community despite increasing in production levels. Price fluctuations for milk and meat make it difficult for small farmers to invest the capital needed to deliver the projected increase in milk output. The government promotion of doubling dairy production, before we secured international markets in which to sell the produce, has
resulted in questionable public health practices (i.e. production of infant formula designed to replace maternal milk). Therefore, we urge for a food policy reform (within Food Harvest 2025) where the central focus should be value-based instead of volume-based of production targets and we reiterate that sectoral GHG emissions reductions plans from agriculture should not be based on an industry guidance document such as FH2020.

3. The need to allow direct comparison with agricultural production systems outside of Ireland

The unit “kg of GHG emissions per kg of production” is very useful in comparisons that aim to identify mitigation options through the examination of similar systems. Within the EU, there is little resemblance to the Irish grass-fed grazing model, and the more industrialised systems of Central Europe emit more by definition. On the other hand, a straight comparison between similar systems (i.e. Ireland and New Zealand) would result in valid conclusions about mitigation options within the system (see paragraph ‘emissions from enteric fermentation’ above).

The approach of measuring emissions per unit of production distracts us from the actual amount of emissions produced within a system and it should only be used for the specific reason of comparing rather than as an indicator of sustainability.

4. More ambitious growth in the forestry sector

The Green Party Forest Policy (2012) advocates for a graduated adoption to Close-to-Nature Continuous Cover permanent forestry silvicultural systems and management (without clear-felling). Continuous Cover Forestry (CCF) management is particularly important and suited to an economy that recognises the cost of carbon.

- The first obvious advantage in relation to carbon accounting is that continuous cover forests have higher stocking rates than age class forestry (>250 m³/ha). With reduced management costs focused on harvesting at thinning time only, and not at clearfell and replant, the cost per tonne of CO₂eq is lower than in age-class forestry.

- Carbon levels are maintained in continuous cover forests with only increments in wood (carbon) being removed at thinning intervention at prescribed thinning cycles.

- Carbon storage with continuous cover forestry, due to improved soil penetration and soil nutrient cycling, is higher than compared with rotation on equivalent sites.

- Following natural systems rather than human intervention, costs and carbon emissions for e.g. site preparation, are reduced.

- Continuous cover forestry results in generally larger stems harvested to higher end products. Products created from larger stems are generally more durable timber products, resulting in long term storage of carbon rather than short term storage from products from smaller stems, e.g. pulp, paper and board products associated with rotation in clearfell forestry.
The Teagasc report on the carbon neutrality horizon for agriculture (Schulte et al., 2013) states that forest carbon sequestration has the potential to vastly contribute to reaching the carbon neutrality target for agriculture by 2050. However, they underline that this opportunity will be lost if we do not (i) adopt higher afforestation rates, (ii) establish incentives for farm afforestation and (iii) develop carbon stocks, in forest biomass and soils, immediately.

Nevertheless, the national afforestation rates have been reduced from 25,000 ha in 1995 to 8,000 ha in 2012 (Schulte et al., 2013) with underfunding of the forestry sector to be an additional obstacle. We highlight the need of the active contribution of Coillte in expanding the national forest cover.

In the Forestry Programme 2014-2020, farm afforestation competes unfavourably with well-established farm practices and therefore, we suggest that the recognition and inclusion of the carbon sequestration economic value of the afforested area should be examined (Department of Agriculture, Food and the Marine, 2014). Broadly applied farm afforestation measures need to be undertaken as soon as possible in order to stop afforestation of marginal land, which results in significant amounts of carbon releasing simultaneously and is associated with multiple impacts on biodiversity and soil and water quality.

Irish forests consist of 52.5% Sitka spruce which is a non-native tree species cultivated for the production of MDF wood. However, research has shown that some broadleaved species present a better carbon storing potential (Coillte, n.d. and Henry, n.d.). Therefore, we suggest the proportional increase of broadleaved tree species in the total forest cover within the Forestry Programme 2014-2020, including both afforestation and reforestation.

The DAFM discussion document states: "Policies aimed at promoting renewable energy (in the form of heat and electricity) from biomass will create a market for thinning and residues (both in-forest and from sawmilling)." Removal of in forest residues may lead to less carbon stored in the soil, therefore we propose that relevant impact assessment should be undertaken to estimate if the climate change mitigation potential is larger from biofuel usage or from soil carbon in forest residues.

We welcome the agroforestry promotion project incorporated in the Forestry Programme 2014-2020 and we urge a broader, more effective growth of this sector as a carbon sink to offset unavoidable GHG emissions from agriculture. Agroforestry allows trees to coexist with crops and livestock in a mixed system that ensures the welfare of all the sub-systems and is also recognised as a climate change mitigation option under the Kyoto protocol (Schoene and Netto, 2005). Research has shown that temperate silvopastoral systems (integrated trees and pasture) have the potential to accumulate more carbon than forests and pastures separately (Sharrow and Ismail, 2004). France is a successful case study where the environmental and economic benefits from integrating forest plantations in agricultural systems have been recognised. Farmers were reluctant to convert to this kind of forestry for fear of tax implications and loss of CAP subsidies. Therefore, the French Government have legally acknowledged agroforestry plantations as agricultural assets, which, as such, are

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1 Varying definitions of soils are used for different purposes. For the purposes of climate protection it is essential that afforestation only occurs on soils whose soil carbon stock will be maintained in the medium and long term following afforestation considered over a series of harvesting/replanting cycles.
eligible for payments under the French CAP.\textsuperscript{2} Such a model should be considered in Ireland to encourage adoption of agroforestry schemes.

5. Inclusion of alternative agricultural approaches

Global food production and security reports agree that the amount of food currently produced in the world is more than enough to feed the increasing population (Kijne Jacob W., 2003, Hobbs Jeremy, 2009, World Food Programme, 2015). The reason high food insecurity is still broadly detected worldwide, particularly in developing countries, is primarily due to lack of access to land and markets, and the increasing and highly volatile price of food. The key to a sustainable and healthy future is not over-production, resulting in wasted food and very low prices for producers, but the adoption of smart agricultural practices with local focus. A local focus would minimise the carbon footprint from agriculture (see suggested alternatives below), reduce CO\textsubscript{2} emissions from transport and processing, and reduce associated public health issues due to less food processing. In support of such a concept, the “Hungry for Land” 2014 report analyses how small farmers (92.3\% of all farmers globally), who produce and sell locally, feed the world’s population while holding only 24.7\% of the total agricultural land worldwide (GRAIN, 2014). On the other hand, the impact on food security of large, corporate producers who apply intensified systems is minimal (because of reasons related to access and price as referred to above).

Extending the above points, and taking into account that specialist beef production and large-scale intensification of the dairy industry are not environmentally or economically sustainable practices in Ireland, the Green Party suggest investment in alternatives that can guarantee farming incomes while being beneficial for the environment as detailed below.

Local co-operative model: The promotion of a local co-operative model should be incorporated into national food policy. This model would connect production levels with intensity of demand; farmers would benefit from higher wholesale prices; and community bonds that will help the transition to an environmentally and socially healthy future would be strengthened.

Combined systems: Research has shown that combining beef and milk production, instead of holding specialist systems, has the potential to reduce GHG emissions from cattle because of the reduction in the number of animals used (Courtney, 2013 and Henriksson, 2014). Combined systems should be encouraged in Irish agricultural policy and associated sectoral plans for GHG emission reductions.

Agroecology: Agroecology could be another alternative to specialist beef production. The science of agroecology is defined as “the application of ecological concepts and principles to the design and management of sustainable food systems” (Gliessman, 2007). An agroecosystem combines the production of different crop and livestock species based on their natural interactions, with minimum dependence on external inputs. In a 2010 UN report, agroecology was identified as having the potential to (i) increase productivity through nutrient management and efficient use of natural resources, (ii) result in less economic loss than conventional farming practices (less input, increased production), (iii) mitigate climate change by increasing the soil and above-ground biomass carbon stocks and

\textsuperscript{2}http://www1.montpellier.inra.fr/safe/english/french_policies.php
(iv) present excellent climate change adaptation potential by enhancing relevant soil functions (De Schutter, 2010). Agroecology is a sustainable treatment that is easy to implement using expert guidance and can create extra income and jobs. It could be supported by EU funds, deploy training schemes and help deliver tourism development potential. It promotes economic diversification that results in increased income security and requires an array of skills that makes it attractive to all family members who can thus find employment and live within the community.

**Organic Farming:** Although organic farming is still a very small part of Irish agriculture, the EU organic market was valued at €22.2 billion in 2013 (Moore, 2015). Organic farming has great potential to grow and create employment in both retailing and local markets, as is already happening in Germany, Italy, the UK and Denmark, where the Government has recently announced a doubling of the agricultural area devoted to organic farming by 2020. The Green Party supports DAFM’s suggestions for expansion of the organic farming sector and we urge adoption of a more ambitious plan in line with EU investment in the sector.

**On-farm renewable energy generation:** Renewables on farms need focused promotion by the Government in order to be adopted by individuals. Apart from the financial motivation, training and national knowledge transfer schemes should also be introduced in an effort to combine farmers’ empirical knowledge with up-to-date research results.

**Diversified agriculture and land use:** Diversification at the farm scale can both increase resilience to climate change and assist in mitigation. The case for diversification at a national scale is very strong. Essentially current agricultural policy, as the consultation document acknowledges, consists in putting all of our eggs in one basket, that of meeting increased dairy demand. The risks in such a policy should be obvious (wasted produce, economic catastrophe if the sector collapses). A dominant dairy sector would also be heavily exposed to a bovine-related disease outbreak or food scandal.

**Conclusion**

There is no doubt that achieving GHG emission reductions from Irish agriculture is a technological and social challenge. The DAFM discussion document and associated research by Teagasc has identified numerous cost-effective ways in which this challenge can be achieved. However, sectoral GHG emission reduction plans must go beyond just reiterate what can be done and identify what will be done to reduce GHG emissions from agriculture. Most importantly, the Green Party requires that quantitative emission reduction metrics for the four agricultural/forestry/other land use (AFOLU) activities that contribute the most to national GHG emissions be included in DAFM’s sectoral GHG emission reduction plans. Specifically, GHG emission reductions goals should be defined for soil, manure management, enteric fermentation, and land use change as the largest contributors to GHG emissions in Irish agriculture.

A second critical point to the development of GHG emission reduction plans for agriculture is that such plans cannot be based on the industry guidance document, Food Harvest 2020. Sectoral plans must look well beyond 2020 and be based on national policies. Furthermore, FH2020’s aims contradict efforts to limit environmental and climate impacts. Intensification of agriculture will result in increased GHG emissions from inputs. It is essential that DAFM
build their GHG emission mitigation policy around mechanisms that will increase the efficiency and value of Irish agricultural production and not base these plans on the short-term vision of FH2020.

The Green Party believes that it is essential to express emission production in actual amounts of GHG released so as not to distract ourselves from the final aim, which is reduction of emissions. We urge sustainable management and immediate application of measures to maximise carbon sequestration rates in the forestry sector, while taking into account possible GHG emission release from afforestation of marginal land. Alternative agricultural approaches need to be considered in order to maximise the GHG mitigation potential of the sector. The adoption of incentives and the focused promotion of relevant schemes is very important in order to avoid poor implementation, as it happened with the farm afforestation plans.

References


