

DÁIL ÉIREANN

AN COMHCHOISTE UM CHOMHSHAOL AGUS GHNÍOMHÚ AR SON NA HAERÁIDE

JOINT COMMITTEE ON ENVIRONMENT AND CLIMATE ACTION

Dé Máirt, 15 Meitheamh 2021

Tuesday, 15 June 2021

Tháinig an Comhchoiste le chéile ag 12.30 p.m.

The Joint Committee met at 12.30 p.m.

Comhaltaí a bhí i láthair/Members present:

| Teachtaí Dála/Deputies | Seanadóirí/Senators |
|-------------------------|---------------------|
| Richard Bruton, | Alice-Mary Higgins, |
| Réada Cronin, | Pauline O'Reilly. |
| Alan Farrell, | |
| Darren O'Rourke, | |
| Christopher O'Sullivan, | |
| Bríd Smith, | |
| Jennifer Whitmore. | |

Teachta/Deputy Brian Leddin sa Chathaoir/in the Chair.

Reduction of Carbon Emissions of 51% by 2030: Discussion (Resumed)

Chairman: Apologies have been received from Deputy Devlin. On behalf of the committee, I welcome Professor Alan Matthews of Trinity College Dublin and Ms Sadhbh O'Neill of the Stop Climate Chaos coalition. They are very welcome to today's meeting and I thank them for coming before us to share their expertise.

On privilege, I remind witnesses of the long-standing parliamentary practice that they should not criticise or make charges against any person or entity by name or in such a way as to make him, her or it identifiable, or otherwise engage in speech that might be regarded as damaging to the good name of the person or entity. Therefore, if a witness's statements are potentially defamatory in relation to an identifiable person or entity, the witness will be directed to discontinue his or her remarks. It is imperative that witnesses comply with any such direction. For witnesses who are attending remotely, outside the Leinster House campus, there are some limitations to parliamentary privilege. As such, they may not benefit from the same level of immunity from legal proceedings as a witness who is physically present does.

Members are reminded of the long-standing parliamentary practice to the effect that they should not comment on, criticise or make charges against a person outside of the Houses, or an official, either by name or in such a way as to make him or her identifiable. I also remind members that they are only allowed to participate in this meeting if they are physically located on the Leinster House complex. In this regard, I ask all members, prior to making their contribution to the meeting, to confirm they are on the grounds of the Leinster House campus.

For those watching this meeting online, Oireachtas Members and witnesses are accessing this meeting remotely. Only I, as Chair, and the necessary staff essential to the running of the meeting are physically present in the committee room. Due to these circumstances, as well as the large number of people attending the meeting remotely, I ask that everyone bear with us, should any technical issues arise.

I invite Professor Matthews to make his opening statement.

Professor Alan Matthews: I thank the Chair and members of the committee for the opportunity to speak to them today about the challenges facing the agricultural sector as the country charts a course to meet its very ambitious target to reduce overall emissions by 51% by 2030 compared with 2018. My focus, as an economist interested in agricultural policy, is how to incentivise the changes that will be necessary to meet this target. We are all aware that agricultural emissions make up 35% of total territorial emissions, excluding emissions from the land use, land-use change, and forestry, LULUCF, sector. Agricultural emissions were 21.2 million tonnes of carbon dioxide equivalent, MtCO₂e, in 2019, which is the latest year for which we have data, compared with 19.3 MtCO₂e in 1990 and the low point of 18.5 MtCO₂e in 2011. The Environmental Protection Agency, EPA, expects emissions to further increase by 2.5% by 2030 compared with 2019 levels if we continue with existing measures. Agricultural emissions are going in the wrong direction.

At the same time, there are significant net emissions from the LULUCF sector, mainly from drained organic soils and wetlands, of around 8 MtCO₂e, only partially offset by net removals by the forest sector and harvested wood products of 4.5 MtCO₂e. Agricultural emissions consist almost entirely of methane and nitrous oxide, driven mainly by ruminant animal numbers, manure management and the use of chemical nitrogen. There are some technical and

management solutions available and in use that can help to reduce use of chemical nitrogen and emissions of nitrous oxide, but their uptake needs to be greatly accelerated. At this point in time, there are few technical or management options available to farmers to reduce methane emissions, which implies that a reduction in animal numbers will be necessary to meet the 51% target. This can be achieved by incentivising farmers to switch grassland to alternative land uses, or by encouraging more extensive systems of production on remaining grassland.

When designing its strategy to reduce greenhouse gas emissions, the Climate Action and Low Carbon Development (Amendment) Bill 2021 requires that the Government take account of the special economic and social role of agriculture, including with regard to the distinct characteristics of biogenic methane. Methane is a powerful greenhouse gas and its concentration in the atmosphere must be reduced if we are to achieve the Paris Agreement's temperature targets. However, it does not have to be reduced to zero. Rising methane emissions add significantly to global warming. By 2019, methane emissions in Ireland had risen by 17% from their lowest recent point in 2011. Continued emissions of methane at a broadly stable level of around 3% reduction per decade would not add to global warming, although they would sustain warming that has already occurred. Sustained reductions in methane emissions reverse global warming and effectively cool the planet from existing levels, so reducing methane emissions represents an important mitigation opportunity.

Against this background, I have three messages for the committee. First, we need to invest in measuring and monitoring farm level emissions and removals. All farmers need to know what their greenhouse gas emissions are and how these are affected when they change their farm output and farming practices. Every member of this committee will be aware that if something cannot be measured, it cannot be improved. Second, we need to catch up and invest properly in innovation that addresses the climate challenge in agriculture. Members do not need to be reminded of the billions of euro being invested in the development of alternative proteins by private equity funds at the present time.

We need to focus innovation in three directions. Our efforts to improve the sustainability of ruminant grass-based agriculture are puny by comparison and relatively recent. There is great potential in learning how to manage microbes in the rumen, in manure and in the soil to minimise emissions. Second, we must invest much more in nature-based solutions to understand the contribution our soils, wetlands and peatlands as well as agroforestry, hedgerows and forests can make to offset agricultural emissions. We have to invest much more in potential alternative land uses that are suited to Irish agri-ecological conditions and attractive to farmers. Existing efforts looking at the potential for renewable energy and biomass, as well as conventional and unconventional land uses, have to be stepped up.

Third, measurement and innovation alone will not get us to where we need to be unless we incentivise action across tens of thousands of farms. This will only happen if we put a price on emissions and removals and pay for performance. We know that farmers respond to incentives. The European Commission in its farm to fork strategy has introduced the idea of carbon farming as a new business model for farmers. The intention is to create direct incentives for land managers and farmers to increase and protect carbon sinks in the land sector. A similar model should also be applied to agricultural emissions consisting of methane and nitrous oxide.

Considerable funding can be made available for climate action through the new Common Agricultural Policy, CAP, strategic plan, and the Government has earmarked a further €1.5 billion in proceeds from the carbon tax to encourage and incentivise farmers to farm in a greener and more sustainable way. Previous agri-environment climate schemes such as the green, low-

carbon, agri-environment scheme, GLAS, may have had benefits for biodiversity, but have had no impact on emissions reduction. We also need innovation in policy design. We must have measures that explicitly focus on reducing the absolute level of net emissions, accompanied by reduction targets, not the rather diffuse measures that have characterised climate action in agriculture to date. One could imagine, for example, inviting bids, using a reverse auction process, from groups of farmers who commit to reducing emissions below a baseline level, whether through stock reduction, nature-based offsets or changes in land use. Once farm-level greenhouse gas budgets are rolled out to most farms, one could envisage introducing a cap-and-trade system where an overall emissions ceiling would be set for Irish agriculture and farms could trade emissions permits among themselves. Perverse subsidies such as the VAT exemption for fertilisers and the double income tax relief on the use of agricultural diesel should be removed and the savings recycled to promote more climate-friendly farming.

To incentivise agriculture to step up and address the climate crisis requires new and innovative approaches. Business as usual is no longer an option. I look forward to any questions that members of the committee may have.

Chairman: Thank you, Professor Matthews. I now call Ms O'Neill to make her opening statement.

Ms Sadhbh O'Neill: I thank the committee for the invitation to address it today. I am the policy co-ordinator of Stop Climate Chaos, which is an advocacy coalition for faster and fairer climate action. We represent faith-based, development, environmental, social justice and community organisations throughout Ireland. We welcome the initiative of the committee to discuss the role of agriculture in climate action. As Professor Matthews highlighted, agriculture is responsible for 35% of Ireland's annual greenhouse gas emissions and is the largest sectoral contributor to Ireland's overall climate impact.

The EPA stated in its most recent emission projection reports that emissions from the sector are increasing and that they are driven by increasing dairy cattle numbers and associated nitrogen inputs. The dairy sector currently contributes half of all of Ireland's agricultural greenhouse gas emissions and has been driving the increase in agricultural emissions in recent years. Recent Central Statistics Office, CSO, data show that there was a 41% increase in the number of dairy cows between 2010 and 2019, making Ireland an outlier in comparison to other EU member states. We find it worrying to note that the Teagasc dairy strategy to 2027 envisages yet further growth in herd numbers, a goal that is totally incompatible with climate policy. If current projections for the sector are realised in terms of animal numbers and milk and beef output, there will be an inevitable increase in absolute greenhouse gas emissions, regardless of whether on-farm efficiencies are implemented.

On-farm efficiency measures do not in themselves reduce total climate impacts. Total absolute emissions of greenhouse gases and nitrate-ammonia impacts must be reduced, which is almost impossible to envisage without a reduction in livestock numbers. However, reliance on the uptake of voluntary efficiency measures that were drawn up by Teagasc and in the more recent Ag Climatise roadmap, which was published by the Department of Agriculture, Food and the Marine at the end of 2020, fails to adequately address the underlying drivers of emissions: cattle numbers and nitrogen inputs in the form of fertilisers and animal feed. The Ag Climatise roadmap is not consistent with the programme for Government commitment to reduce emissions by on average 7% per annum or 51% by 2030, as the strategy assumes a stabilisation as opposed to an absolute reduction of methane emissions by 2030.

Climate action policies for the agricultural sector have to date been based on assumptions about farmers' responses to theoretical cost savings from voluntary mitigation and efficiency measures, as promoted by Teagasc. However, even if fully implemented, these measures will not address the multiple environmental impacts of the sector, nor can they be scaled up quickly enough to deliver the required emissions reductions in a timely fashion. This approach does not consider the effect of policies to expand agricultural output or consider rebound and interaction effects, and is thus somewhat skewed towards business as usual. Without an overarching mitigation policy, measures are merely cost savings for farming that rebound to increase emissions, as we have seen over the past decade. Moreover, the focus on cost efficiency falsely assumes that if farms are efficient in the sense of maximising outputs per unit of input in the form of feed and fertiliser, they are environmentally sustainable. In fact, the only important measure of climate and air pollution action is absolute, instead of relative, annual emissions as reported in the national inventory of greenhouse gas emissions that is published annually by the EPA. Therefore, efficiency measures in the absence of legally binding targets or a cap are a distraction. Agricultural emissions of methane, nitrous oxide and ammonia have been increasing steadily since 2011 due to dairy expansion and greatly increased nitrogen inputs, with only a minimal reduction in beef cattle numbers.

Requiring herd reductions from beef farmers will not by itself address the water and biodiversity impacts from the dairy sector that we highlighted in our report, jointly published with the environmental pillar and the Sustainable Water Network, SWAN. We concluded that these reductions could even lead to rebound effects as more land becomes available for silage production for dairy cows. The Climate Change Advisory Council undertook a special review of agriculture, forestry and land use in 2019, but assumed in its scenarios that no herd reductions would take place in the dairy sector. Thus it ignored the growing ecological burden of intensive dairy farming in many areas of the country. Farmers must be supported with policies that provide both stable incomes through diversification and that facilitate reduced stocking rates with decreased inputs.

Without substantial and sustained reductions in agricultural methane over the next decade, it will not be possible to meet current national and EU climate targets. It is not expected that agricultural emissions should fall as fast as emissions in other sectors of the economy over the next decade. It is expected, however, that there must be substantial year-on-year reductions in absolute emissions from agriculture. For the Government to allow one economic sector in society, a sector that represents one third of Ireland's emissions, to simply continue business as usual and to insist that the rest of the economy reduce its emissions by two thirds to achieve the overall target for 2030 is highly unfair and impractical. Dr. Paul Deane of University College Cork, UCC, has estimated that if agriculture only achieved 10% emissions reductions, the buildings, energy and transport sectors would have to do more than 70%. Steadily and permanently reducing agricultural methane in the near term, with annual reductions in the order of 3% to 5% from 2022 to 2030, will be necessary to limit overshoot of Ireland's national "fair share" of the remaining global carbon budget that is aligned with meeting the Paris Agreement commitments.

Policies that support carbon sequestration, although highly important for carbon storage in trees, soils, hedgerows and wetlands, are neither reliable nor permanent methods to offset greenhouse gas emissions from agriculture or fossil fuel combustion. Furthermore, biomethane production at a large scale involves risks, uncertainties and high costs.

Changing the types and quantities of foods we consume could also have a significant im-

pact on emission reductions. Shifting diets in line with health recommendations would have the positive benefit of reducing greenhouse gas emissions and freeing up land for other uses. However, it needs to be acknowledged that while there is potential for emissions reductions from a shift towards plant-based diets among Irish consumers, a reduction in the consumption of animal-sourced food in Ireland is unlikely to have a significant impact on Ireland's total agricultural greenhouse gas emissions. This is because most agricultural commodities are produced for export markets. For this reason, the Government, in its approach to agriculture and food production, must address the total impacts of all food production in Ireland on a territorial basis regardless of where the food is eventually consumed.

We have a series of recommendations in our report and I will highlight a few of them here for the committee. The first is that we recommend that the Government needs to publish a revised roadmap for agricultural emissions reductions that sets out a timescale to achieve, at a minimum, compliance with EU and national law. We recommend that the Government put in place a declining cap on total national reactive nitrogen and phosphorus usage; consult with stakeholders and implement measures based on international best practice to limit and reverse recent expansion in the dairy sector to bring sectoral greenhouse gas emissions back to 2011 levels by 2025 or as soon as feasible thereafter, with immediate priority given to farms in sensitive catchment areas; and put in place compensatory measures to facilitate and incentivise herd reductions and diversification in the beef suckler and finishing sectors.

I thank the committee for the invitation and look forward to taking any questions.

Chairman: I thank Ms O'Neill. I will invite questions from members. Some have indicated already. Please note this meeting is confined to a maximum of two hours. I propose that each member be given two minutes to address his or her questions to the witnesses in order to ensure that all members get an opportunity to pose their questions. If we have time, we will go for a second or, indeed, third round. Is that agreed? Agreed. The first Deputy indicating is Deputy Alan Farrell.

Deputy Alan Farrell: I can confirm I am in Leinster House. Although, as I said earlier, I will have to leave to attend the convention centre at some point during the course of the meeting, I will tune in remotely.

I thank both of the witnesses for their comprehensive opening statements. I really appreciate it. As a complete novice to the agricultural sector with the exception of perhaps a little knowledge of horticulture, I find it useful to have expert witnesses before us to tease out this area, which, of course, is crucially important in terms of our climate action targets.

I will start with a couple of questions for Professor Matthews, if that is okay. I have a couple of queries on his interpretation of some of the figures produced by the EPA. The EPA is producing a report in two weeks' time and its representatives will come before us the day after, which is very welcome in terms of teasing out. The EPA expects emissions to further increase by 2.5% under a within-existing-measures scenario by 2030. I wanted to query what exactly "within existing measures" means? Are we talking about the stated strategies and policies of the likes of Teagasc and others or are we talking about not doing anything in terms of climate action steps?

Professor Alan Matthews: I thank Deputy Farrell. The EPA, as the Deputy points out, makes projections each year. For agriculture, these are based primarily on projections from Teagasc. They are done using two scenarios. The first scenario is with existing measures and the second is where they take into account the potential of additional measures. My understand-

ing of the scenario with additional measures is that these simply include measures that have already been announced by the Government and do not take into account anything which may be under consideration but would have already been announced and implemented.

Deputy Alan Farrell: I thank Professor Matthews for that clarity. I think that is helpful for all of us. I suppose all is not lost then necessarily in terms of-----

(Interruptions).

Deputy Alan Farrell: Sorry, Senator Higgins, you might want to mute.

Senator Alice-Mary Higgins: Apologies.

Deputy Alan Farrell: No problem.

From my perspective, we are not at the start of this process. We are getting into the meat of it and now it is time for the sector to respond appropriately to the measures that Government is proposing to introduce, including targets. I wanted to also briefly touch upon whether, as a professor of European agricultural policy, Professor Matthews would accept as factual or otherwise the statement that Ireland has a unique agricultural sector in the context of targets and whether that statement holds any water in his opinion.

Professor Alan Matthews: The statement is valid. There is no other European member state where agriculture has such a high share of the emissions in the national profile, at 35%. On a global level, you are looking maybe at New Zealand as a country with a similar agricultural profile but very different in other respects. There is a much greater reliance there on forestry offsets.

At a more regional level, there are some other comparable countries. Scotland, for example, would not be that far away from Ireland in terms of its share of agricultural emissions and clearly so would the North of Ireland, but at a member state level, we face a fairly unique challenge in terms of agriculture.

Deputy Alan Farrell: My final question for Professor Matthews is a simple question to pose but, perhaps, not so much to answer. Does Professor Matthews believe it is possible for us to reach the targets that are being set within the sector by 2030?

Professor Alan Matthews: Once the Government receives advice from the Climate Change Advisory Council on the overall carbon budget, it will be up to the Government to set sectoral targets. Obviously, we do not yet have a sectoral target for agriculture.

My sense is that there are measures that have not yet been adopted. As I say, the two main gases that we are talking about when we talk about agricultural emissions are methane and nitrous oxide. Certainly, on the nitrous oxide side, there are measures available but they are not being taken up and adopted to the extent necessary. This is where I suggest that the committee perhaps should look at a little bit at what is necessary to incentivise the change there to encourage greater adoption.

In the short term to 2030, reducing methane emissions is really around animal numbers. Clearly, per animal, dairy cows have a larger emissions footprint than beef animals and that is important to take into account. We know that many dairy farmers benefit, from, for example, nitrates regulation derogation, and there is potential there. The nitrates derogations are there to protect water quality but there is potential there to integrate. We need to look at this issue in

a more holistic way to integrate the protection of water with climate action. There is potential there to ask dairy farmers to do more, if one likes, in terms of reducing absolute emissions. I absolutely agree with the emphasis that Ms O'Neill put on that aspect. There is potential to move. The question is one of incentivising the sector to make those changes.

Deputy Alan Farrell: I thank Professor Matthews. I am way over time. I have other questions for Ms O'Neill but perhaps I will come back on the second round.

Chairman: I thank Deputy Farrell and Professor Matthews. Ms O'Neill, did you wish to comment on those questions? They were not directed to you but I will afford you the opportunity to come in if you wish.

Ms Sadhbh O'Neill: I thank Deputy Farrell. They are excellent questions.

In terms of Ireland's emissions profile, clearly, unlike other EU member states, we have a much higher share of agricultural emissions than we do of industrial emissions, for example. Our emissions profile is somewhat different but not so markedly different from countries such as Denmark, for example. Interestingly, over the past two decades, the Danish Government has been much more proactive in regulating nitrogen pollution and phosphorus pollution. We have heard about similar examples from the Netherlands. Over recent decades, it has reduced ammonia and nitrogen emissions by between 15% and 20%. Interestingly, this is below what is economically optimal for farmers to utilise on their land. The Netherlands set targets to double organic production by 2020. I am not sure whether it actually reached that target. Essentially, it has reduced total nitrogen input since 1990 by 50%. By comparison, Ireland's nitrogen inputs declined by 20% to 2011 and started to increase again following the abolition of the milk quota.

The reason I give this example is to highlight the influence of policy. Where we have a strong regulatory regime, it is perfectly possible to get these numbers under control but in Ireland we have experienced a much more *laissez-faire* approach to agricultural output. Not only has it been *laissez-faire* but it has been positively promoted in terms of increasing output under the Food Wise and Food Harvest agrifood strategies. What we have seen in terms of the increase in agricultural emissions is directly related to policies in Ireland and decisions not to regulate emissions where they could have been regulated.

Senator Alice-Mary Higgins: I want to begin where the witnesses previously finished, which was with regard to the nitrates directive. I agree with Ms O'Neill, who stated that ultimately the emissions are the key measure and we should begin with them. The nitrates directive was mentioned as an opportunity. As I understand it, the fourth programme is due to expire at the end of this year. Is this the moment for Ireland to stop seeking the derogation it has been seeking in respect of the nitrates directive? Do we need to move away from derogations in respect of this? It looks as though we have six or seven months to plan for a different approach.

Professor Matthews mentioned that we still have perverse incentives to use fertilisers with nitrates. There are natural sources of nitrates and there are chemical nitrates. If we were to take very strong action on chemical nitrates, they would seem to be the lower hanging of what are difficult fruit as we look to address natural nitrates.

With regard to methane, I was a little concerned that Professor Matthews mentioned the idea that it does not contribute long-term to global warming because it has an incredible impact for a period of ten to 12 years. That is how long it stays. This is the ten to 12 year period that is our focus, the period until 2030. In this context, how imperative is it that we do not increase

methane and that we actively reduce it? It is eating into the window we have. Some of the longer term changes we might make on climate change may have effect in 20 or 30 years' time but right now we need to look to what we can do in the short term. In that context, what measures should there be to pause expansion? Aside from incentivising reduction, which I know is difficult, what measures should there be on pausing expansion of the herd?

The idea of incentives was mentioned. I agree that incentives are the key but I am a little concerned about the idea of the cap-and-trade scheme, as mentioned, and overall emissions. I am concerned it could end up effectively favouring larger agricultural corporations and those that are capital rich. This is the danger when we have carbon as a commodity and as an input that people can afford to have in certain contexts. It could, in fact, lead to further inequality in the farming sector. In this context, I would appreciate thoughts on how we can have incentives that are about carbon reduction or sequestration but also dovetail with some of the elements that were in the GLAS scheme on good agricultural practice and biodiversity to ensure that we do not talk in units but reward ecological care or guardianship, which I know is something many farmers care about.

Ms O'Neill mentioned the idea of more stringent reductions being made later. If we do not take action in the next five to ten years, how much will it intensify the potential shock to farming at a later point when we have to take more stringent and urgent action? There is also the impact of climate change on farming, given the fodder crisis, and the negative impacts of not acting.

Ms Sadhbh O'Neill: I thank Senator Higgins, who has asked about the nitrates directive and what would be required of us later if we do not take action immediately. On the nitrates directive, I refer the Senator to the section in the joint report by the Environmental Pillar, SWAN and Stop Climate Chaos in which we address the multiple drivers and threats to the environment that emanate from the agricultural sector. We have a whole section devoted to the issue of water quality.

If abandoning the derogation will bring us closer to achieving the objectives of the water framework directive, that is what should be done but it should be a decision taken quite carefully. My understanding, and I am not an expert in water quality, is that derogation farms are, in some sense, more closely supervised than non-derogation farms. There would be some benefit to the current system if it delivered improvements in water quality. Unfortunately, as we have seen from EPA reports, this is not happening due to a variety of factors. We can see from the water quality data that the concentration of water pollution and deteriorating water quality happens in those areas where more intensive dairy farming takes place. I suggest the Senator makes enquiries of SWAN and the EPA on what the best approach is on the derogation. What is most important is that we achieve the objectives of the water framework directive, which is to improve all water body qualities and to achieve good water quality status in all of them. The trends in Ireland are the reverse, unfortunately.

With regard to the question of stringent reductions, Deputy Alan Farrell, or perhaps it was Professor Matthews, mentioned New Zealand. It is interesting to note the Climate Change Commission in New Zealand has just published its report to the government there, setting out its proposed carbon budgets for three periods until 2035, not unlike the periods the climate Bill in Ireland is considering. What it suggests is that methane emissions need to be reduced quite urgently, by 8% by 2025 and by 17% by 2035. It is interesting the focus is on near-term action because it recognised exactly this point and the cooling effect of methane reductions. It also acknowledged that it foresees a reduction in agricultural production - it has come out with

this quite explicitly - and that there might need to be a reduction of dairy cattle in particular by 8% by 2030. If we are using New Zealand as an example of a country similar to Ireland with a similar emissions profile and similar pressures, we need to be heading in a direction that is similar to this.

Professor Alan Matthews: To take up a couple of the points made by Senator Higgins, my main concern about the nitrates directive is that we should make use of it to address climate action as well as the water issue. We should think climate when we look at the revision. It is essentially a stocking rate limitation, and then the derogation allows farmers to exceed it but there are obligations required. It is a commercially valuable derogation. It allows more intensive production and, therefore, dairy farmers who avail of the derogation should be asked to do more in respect of climate and water.

I agree with Senator Higgins regarding the methane issue. I hope she picked up the point that methane reductions are also a very important mitigation opportunity in the near term. I agree with her on that point. I did not put in the cap and trade idea as something which would be immediately applicable. More direct instruments are available to us, such as the CAP and the funding from the carbon tax revenue, that we could use to incentivise change. However, the key point is to think about what incentivising change means. At the moment, we pay farmers to produce food. We pay them for food and, therefore, not surprisingly, that is what they concentrate on doing and they do it very well.

However, no value is given to the other, negative, outputs, such as water pollution or climate pollution in the form of greenhouse gas emissions. Unless we somehow find a way to put a value on those elements, and it could be a price or a subsidy, which encourages farmers to think about the implications of producing these by-products along with food production there is no reason for farmers to take them into account. Some of these by-products can be positive, such as biodiversity, which we pay farmers to deliver, but some of them are negative externalities. There is no incentive now for farmers to take those negative externalities into account. That is the message I would like to get across. The instruments to achieve that goal are, of course, something that we can discuss later.

The Senator rightly highlighted the issue of the impact of policies on the distribution of incomes and farm sizes. My point in that regard is that perhaps we must think about different policies for different objectives. To the extent that putting a price on emissions is the right way to go, that may result in some tendencies we do not like. Therefore, we may need a different instrument to try to address this point. We should not try to do everything through the climate action instrument that we choose.

Chairman: I thank Professor Matthews. I call Deputy Christopher O’Sullivan.

Deputy Christopher O’Sullivan: There is much talk about business as usual, but we all know that business as usual will get us nowhere. Farmers took to the streets in protest recently, mostly out of fear of CAP reform but also because of a fear that certain climate obligations will impact them. Having spoken to and liaised with farmers, they know that business as usual will not suffice and that change is coming. Farmers just want to ensure that change is done in a way that will allow farming to remain viable and ensure that there is a future for young farmers as well. That is fair enough. These sessions will be really helpful in trying to get to the bottom of those aspects.

I have four quick questions and they are all for Professor Matthews, simply because these

are the issues he touched on. He spoke about the need to invest in measuring and monitoring greenhouse gas emissions and removals. If we are talking about severe emissions targets for the agricultural sector, do we not then have to invest in such monitoring and the scientific aspects in that regard first? I refer to finding out where scientific knowledge stands regarding the removal of greenhouse gases and nature-based solutions before imposing very severe budgets. Would it be fair to state that because the science in this context is not as advanced as it may be in areas such as energy and transport that there is an argument to be made for agriculture to be given specific treatment? I pose that as a question and not as an answer. That brings me to my second question regarding nature-based solutions and carbon capture, specifically in the form of hedgerows and mixed-species swards as opposed to monocultures. Where does science research stand on that approach now? I refer in particular to the carbon capture element. The science concerning biodiversity is very good, as Professor Matthews said. However, is there established scientific research to suggest that it is possible to bring about real carbon capture and removal in that regard?

Turning to reform of the CAP, and payments under Pillar 1, some 25% to 30% of the funding will go to eco-schemes. I am coming at this aspect from an environmental and biodiversity perspective and in that context it sounds great. It has been suggested, though, that those payments would be less than those that will be available for just undertaking production. Surely that situation should be flipped and there should be more of a payment to incentivise and encourage those eco-schemes. I would like to hear the witness's opinion on that aspect, because at the moment it is looking like there will be less of a payment for the land which will be put into eco-schemes. Finally, I would like a comment on anaerobic digestion. For whatever reason, it is something that we do not hear enough about. I visited an anaerobic digester recently in my constituency in Cork South West and such a process makes sense to me. Waste from farming, from piggeries and from dairy farms, went into that anaerobic digester and it is possible to power a small village as a result. In addition, the manure which is leftover after anaerobic digestion has fewer emissions than the unprocessed manure spread on a farm. I ask Professor Matthews for his comments in that regard.

Professor Alan Matthews: I thank the Deputy. On the issue of measurement and whether that makes a case for delaying action, I certainly do not think so.

Deputy Christopher O'Sullivan: I would not say delaying action, but a certain treatment.

Professor Alan Matthews: We clearly have some levers we know we can pull. The issue here is that we want to ensure that farmers get credit in the national inventories where they make changes to their farming practices. We can measure animal numbers and tonnes of fertiliser spread relatively easily. It is more difficult, however, to capture changes in practices. I refer to examples such as whether tillage farmers have a cover crop in the winter, what they do with their crop residues, whether they leave them in the field or remove them, and if slurry tanks are covered, which serves to reduce emissions of ammonium greenhouse gases. We need much more information in that regard. However, I do not think that we need to wait for that kind of information in order to incentivise some of the required changes.

Turning to nature-based solutions, it is important to emphasise that the land sector - the so-called land use, land-use change and forestry, LULUCF sector, which is different from the agriculture emissions that we also referred to - is a net emitter in Ireland. The land sector in Ireland is not a sink for a net removal of carbon because we have been draining our organic soils for decades and the result is that they are now emitting a great deal of the carbon that they originally contained. Therefore, re-wetting some of those soils is certainly something which was

included in the Ag-Climatise plan and we must emphasise that aspect more. It is not a silver bullet by any manner or means, however. Ms O'Neill alluded to issues regarding the verification of emissions, the carbon that might be sequestered, the permanence of that sequestration. Ultimately, we reach a sort of satiation level. It is, though, a lever which is available to us in the period up to 2030 and we certainly should make use of it. In overall terms, therefore, land is actually a net emitter in Ireland and that is another aspect where we differ from most other EU member states. On the CAP and eco-schemes, I will ask the Deputy to come back to me if I have not fully understood the question. It is clear that farmers receive a basic income support payment at the moment. On top of that, they get a greening payment. That payment will disappear but, depending on the outcome of negotiations, somewhere between 25% and 30% of the Pillar 1 direct payments will be allocated to eco-schemes. That is potentially quite a significant step. It depends, of course, on how our strategic plan decides to use that funding but it is a considerable addition to the agri-environment climate funding we already have in Pillar 2. The issue is to ensure that we make better use of that funding in terms of climate action, biodiversity protection, habitat creation and so on than we have done with the schemes to date. I see it as a positive step and an additional lever we can use to incentivise climate action.

On anaerobic digestion, I agree with the Deputy that it seems a potentially attractive solution for some types of emissions. My understanding is that it is still an expensive solution, particularly if we just look at it in terms of the cost per emissions reduced. It may not necessarily suit the small-scale structure of Irish farms. One hears, for example, about the very large dairy units in California and that is one of the main ways in which they have succeeded in reducing their methane emissions but it will not necessarily apply in an Irish circumstance. We must try to invest in scaling down this technology so that it can be used. I am not sure it will ever be viable to use the technology at an individual farm level in an Irish context but perhaps we can use it as a part of co-operative or community-based solutions where a group of farmers might come together and agree to supply such a small-scale digester. That is a part of the innovation programme that is necessary.

Ms Sadhbh O'Neill: I would like to come in on Deputy O'Sullivan's question. It might be helpful to make a distinction between sequestration and offsetting. When we discuss sequestration, we are talking about the ability of land, trees, soils, hedgerows and plants to absorb carbon from the atmosphere. As Professor Matthews highlighted, that is difficult to measure because it changes over time and is affected by weather patterns, climate change and drought. If trees are chopped down, they are clearly not sequestering carbon any more. Given that land use is subject to so much change over time, it is difficult to say that when trees, for example, sequester a tonne of carbon, it is permanently offsetting a tonne of fossil carbon that is released into the atmosphere. For that reason, quite a number of scientists and environmental non-governmental organisations, NGOs, recommend we do not use land-based sequestration to offset any fossil carbon.

In addition to that, we have a problem in Ireland because, as Professor Matthews highlighted, we are releasing more carbon than we are sequestering. Some of the anxieties the Deputy is describing he hears from farmers is around a misunderstanding of that reality. It is not, in fact, the case that they are sitting on carbon treasure. The reality is that we are releasing millions of tonnes of carbon from drained soils, bogs and also from a certain amount of deforestation that takes place.

The issue is that sequestration policies are beneficial for biodiversity and soil health but are very limited in what they can do for climate mitigation in the short term. Given the length of

time that carbon dioxide stays in the atmosphere, it is vital that we take measures to drastically cut emissions from fossil carbon and, at the same time, protect the carbon sinks that we already have in our soils and forests.

Hedgerows and carbon stocks are only roughly estimated. It is very difficult to calculate them with any degree of accuracy. We do not have the tools yet to do that. Of course, as I say, one would need to be measuring it on an ongoing basis because it is subject to change all the time. What information is there is already included in the Environmental Protection Agency, EPA, reports. These values, it claims, are subject to a high degree of uncertainty. The EPA also highlights that total hedgerow length has decreased over the past few years in Ireland and there is a widely reported increase in hedgerow cutting, suggesting that there is a net loss of carbon from hedgerows.

In addition to that, the EPA has reminded us time and again that we can only take credit for any changes in land use. The existing store of carbon is not what farmers will be able to use to establish any credits, if you like, against their emissions. They would have to increase the sequestration, afforestation and so on for that to be counted in any sense. It is important that we distinguish between sequestration and the measures we take to draw down more carbon by protecting soils, planting more hedgerows and engaging in more forestry.

When it comes to offsetting, we need to be clear that land-based offsets do not reduce emissions. The problem is establishing permanence and additionality. There is a lack of measurement tools to capture the changes over time. The offsetting programmes we have seen emerging around the country through the voluntary carbon markets often use inappropriate metrics based on carbon intensity and not absolute emissions.

I will also highlight the fact that if there is a mechanism to establish carbon trading schemes within farms, there would need to be corresponding adjustments to the national inventory to reflect the fact that the credits are now being sold to somebody else, perhaps a company. They would have to be added back to the national inventory, if that makes sense. This is the subject of current discussions under the UN convention on Article 6 of the Paris Agreement. It is highly complicated and will not be a quick fix for Ireland's agricultural challenges.

Deputy Richard Bruton: I thank both of guests for their presentations. I wish to ask about the progress that has been made by other EU member states. I see that overall agricultural emissions among the EU 28 were static over the period from 2005 to 2016. That suggests there is not much innovation going on in the rest of Europe. What does that mean for us? We know Europe is making progress, but not in agriculture.

I have an allied question for Professor Matthews. I ask him to clarify exactly what he is saying about what we need to do on methane. Perhaps I mistook it, but I took him to say that if we were to reduce methane by 3% per decade, we would stabilise the contribution of methane. As I understood, if we want to cool, we must reduce by more than 3% per annum. That is not a very ambitious target over a ten-year period and people have been talking about far higher targets. Can the professor clarify that?

The key issue I want to raise is what scale of change is possible in farming. Professor Matthews in particular, with his knowledge of a farming background, is best qualified to answer that. What is practical for us to expect the agricultural sector to achieve, given all the structural issues we know about it?

My next question relates to carbon farming. I am sympathetic to the suggestion Professor Matthews is making that we pay farmers to farm carbon. It then seemed that Ms O'Neill was pulling the mat from under that idea by saying sequestration cannot be used in that way. If we want farmers to do things such as re-wetting soil, planting forests or whatever, we cannot expect them to deliver the 3.5 million tonnes by which Professor Matthews is saying our land use is in arrears and only then start paying them. That is just not practical politics. As the Kerryman would say, you cannot start from there. If we buy into carbon farming, which is a good idea, what policy tools would we put in place to implement it? Farmers should be able to say that in ten years' time, they will be generating X from carbon farming and Y from their livestock, dairy or crops and then, with those two sources of income, they could have a viable family farm. Those are my questions.

Professor Alan Matthews: They are excellent questions. The Deputy is quite right about the trend in EU emissions. After an early fall in emissions after 1990, European emissions from agriculture have been more or less stable over the past two decades. That also has to do with incentives. As we are all aware, agriculture is covered in the so-called effort sharing sector. The EU climate architecture distinguishes between the energy sector and large industries, which are covered by the European emissions trading scheme, and the effort sharing sector, which includes buildings, transport, small industry, waste and agriculture. The land use sector also has its own set of rules and targets. As agricultural emissions are relatively small across the European Union as a whole - they are only 10% of total emissions - countries could effectively ignore the requirement to reduce agricultural emissions because they could achieve the effort sharing targets by reducing emissions from transport and buildings and so on. That helps explain why we have not seen more reductions at the European level. Apart from one or two countries, such as Denmark, there has not been that pressure to reduce agricultural emissions, although that is certainly going to happen now with the more ambitious EU targets for 2030.

I thank the Deputy for giving me an opportunity to explain the methane question. We need to reduce methane. In Ireland, methane makes up a significant proportion of our national greenhouse gas profile. Yes, methane has to be reduced. Otherwise we simply will not meet our 51% reduction target by 2030. One should remember that methane emissions from Irish agriculture have increased by 17% since 2011, so we have been increasing. However, if we had a stable level of methane emissions, in broad terms, then reducing methane below that stable level would contribute to cooling. It would have the same effect as carbon sequestration from a climate point of view. It would help pull warming gases out of the atmosphere. I will come to the point about carbon farming in a moment. We are proposing to pay farmers to sequester carbon in soils and wetlands. My argument is that, by applying that to agricultural methane, there is a case to be made for paying farmers to reduce those emissions rather than regulating or penalising that reduction. That is the way I would draw a line from the particular characteristics of methane to its policy implications. I ask the Deputy to please come back to me if I have not been clear.

As regards what scale of change is possible, significant land use changes such as shifting from agriculture to forestry or significantly ramping up renewable energy crops and so on will take time. We need to start now because in many cases the benefits will accrue to us after 2030, rather than in the immediate future. We need to start taking action now. In terms of livestock numbers, I see potential for quite rapid change because on many farms, the income from livestock farming comes almost entirely from transfers under the CAP. It is possible to safeguard farm incomes or even increase them by also paying, through eco-schemes, for biodiversity benefits, water quality benefits and so on. It is possible to maintain farm incomes and yet at the

same time reduce livestock numbers, if we take into account that there are negative externalities that are not currently being priced adequately into the equation, if at all. I see potential for quite rapid change there.

On carbon farming, I am aware of the reservations environmental NGOs have about using carbon sequestration to offset fossil fuel emissions and seeing those as a one-to-one relationship. I am less concerned about that issue in the Irish context because our 51% reduction target is so ambitious that we will be doing everything we can to reduce fossil fuel emissions and that will not be sufficient to get us to 51%, so we also need to make use of the potential for carbon sequestration over this period. It is worth drawing the committee's attention to the fact that in the recently adopted European climate law, which enshrines the net-zero target for the European Union by 2050 into law, that target is a net one, as is the target of a 55% overall reduction by 2030 compared to 1990. The Commission is going to do two things that will have a bearing on the credibility of these removals. Later this year it will be bringing forward a communication on how carbon farming might operate in practice and it will also bring out a regulation looking at the framework for how credits from carbon farming could be used in the overall accounting framework to address the real danger of double-counting, to which Ms O'Neill has alerted us. These developments at European level have great relevance for us here in Ireland and we need to keep an eye on them.

Ms Sadhbh O'Neill: I will briefly respond to the challenge from Deputy Bruton on carbon farming. I was being critical of carbon offsetting. Conceptually, we need to be extremely careful about how we deploy that concept and ensure that schemes we put together or claims we make stand up scientifically. The idea of carbon farming is that it is more of a mechanism to measure the emissions and removals in a very site-specific way. The same challenges are going to arise in respect of measurement and verification. I am not saying that we should not explore it. We need to have this information for our own reporting purposes. However, it seems to me that we still sometimes neglect the low-hanging fruit, which is addressing the bulging livestock herd numbers. That could be a much cheaper than some of the other measures proposed. Setting up any kind of carbon trading scheme is extremely expensive. It is very expensive to set something up that can be rigorous and verifiable with regard to an international or even voluntary carbon standard.

We could be looking at the elephant in the room instead, which is the forestry sector. We have a very low level of forest cover in Ireland and very little in the way of agroforestry. There is great potential for farmers to engage in more sustainable approaches to forestry and afforestation than we have seen in the past few decades. This will be particularly important because a lot of what commercial forestry we do have will become ready for harvest in the middle of the 2020s, which suggests that there may be a loss of carbon during that period. We need to greatly ramp up our rates of afforestation but also to use this as an opportunity to enhance biodiversity and nature-based solutions rather than undermining them with the monoculture approach, which has unfortunately been detrimental to water quality and biodiversity in many places. The climate action plan recommended a target of 6,500 ha of planting by 2025 but it does not look likely that this will be achieved. That will have an impact on our inventory and our emissions reporting. From a policy point of view, we should focus on areas in which we can make the quickest and cheapest gains that are sustainable. This is definitely an area at which the committee could look in the future.

Deputy Réada Cronin: I thank our guests very much for their presentations. Professor Matthews has pointed to the reimagining of our agriculture industry as opposed to mere

management of the new regulations. I believe he is looking at a new departure for agricultural incentives. As he points out, they are critical. Does he believe that the State is giving enough attention to this reimagining and to assisting our farmers not only in reaching targets but in adopting a new approach? What does he have to say about the need for direct measures as opposed to the diffuse approach we have? Does he see an appetite in the Department of Agriculture, Food and the Marine to direct our farmers in these measures in a clear way and to adopt a curative approach to emissions as opposed to telling them they will just have to take their medicine and accept that this is what has been meted out by the Paris Agreement?

I also have a general question for Ms O'Neill. Part of the success of Stop Climate Chaos relies on its narrative or message and the way it is delivered. Does she believe we should move away from talking about degrees and emissions and towards showing what the new *status quo* resulting from increased emissions will look like locally in our communities as well as across the world? Does she believe enough assistance is being given to farmers with regard to diversification? Does she believe there is the courage to confront the need for transformation as opposed to just tweaking things? I have more questions so I will be putting my hand up for the next round as well.

Professor Alan Matthews: Is enough attention being given to a new approach? To answer the question, I will refer to my initial statement on the need for much greater investment in innovation. I might differ with Ms O'Neill a little bit insofar as I do not see us moving fully away from grass-based livestock production in Ireland. This is largely our comparative advantage. We can tweak that a little bit and we can clearly change land use. I want to see much more effort put into finding ways to reduce the absolute emissions from animal farming. There are really quite exciting opportunities, partly because there has been so little effort put into this in the past. Most agriculture research has focused on improving productivity and efficiency and on getting more output per unit of input. We have very little understanding of the microbes in the rumen or of the behaviour of microbes in soils and manure, for example. We see potential for different feed additives that can reduce methane emissions quite significantly. These will become available within the EU but, initially at least, will only be of interest with regard to indoor livestock, animals that are fed indoors rather than out on pasture like the majority of such animals in Ireland. We need to invest a lot more in trying to enlarge the portfolio of tools and measures available to farmers to reduce their absolute emissions. Having said that, changes in land use will also be important. Are we doing enough to re-envisage that? Again, I suggest that we need to invest much more in conventional opportunities and, perhaps, in some unconventional opportunities. For example, there is some pilot work under way with regard to using grass for grass protein and that may have potential in the future.

I believe the Deputy's second question was whether there is an appetite for direct measures. That may be a question for the Department itself to answer. My sense is that it is aware of the challenge and clearly it is looking for ways to use the opportunities provided by the CAP strategic plan, and I hope it will use them. This is a major opportunity to increase our focus on climate action and other environmental issues such as biodiversity. That is my answer to that question.

Ms Sadhbh O'Neill: I thank the Deputy for her interesting questions on the narrative. She is hitting on something very important. In other countries where more research has been carried out into alternative scenarios and narratives, some interesting findings have been published. For example, there is a well-known report produced in the UK by the Centre for Alternative Technology in Wales called Zero Carbon Britain, which has been updated since its first publica-

tion. This report maps out exactly what zero emissions for the UK would look like and uses that as a backcasting tool to work out what the implications are for land use. Unsurprisingly, the report found that there needs to be a shift away from livestock production, which implies a concomitant shift towards, in the main, more plant-based diets. I refer to diets that do not exclude meat entirely but which are plant-based. More land would also be devoted to the production of food for humans rather than the production of feed for agricultural livestock. Unfortunately, we do not have a similar mapping exercise available to us in Ireland which we could present to the public or to farmers to show what zero carbon looks like. Instead, the public has been confused by different numbers, metrics and ways of describing intensity and the impact of food. The reality is that 91% of our dairy and beef produce is exported. There is no sense in which Irish people feel connected to the agricultural landscape in the same way that existed in the past. It is quite detached from local food consumption. Consequently, having that national conversation is extremely important. That is where we get to sit down and talk about food production in terms of consumers, rural communities, the variety of livelihoods that depend on farming, land management and the future of farming so farm viability is guaranteed into the future, which was exactly the Deputy's point.

Other countries in Europe, to a certain extent, have started to outsource their dairy and beef production to countries like Ireland that, on the one hand, can perhaps claim to be doing it more efficiently, according to certain metrics, but at the same time, that means the countries in question can regulate their agricultural emissions more easily. The question for Ireland is, do we want to bear that pollution burden on behalf of countries that are consuming our products? The Irish public has not been given an opportunity to answer that question.

The Deputy's second question, which was also very interesting and relevant, was about how to support farmers with diversification and whether there is enough courage in the system to take the measures necessary. The Deputy is hitting exactly on a core issue, which is that the farm advisory services and research services provided by Teagasc have been skewed in favour of what we call the business as usual, the livestock model and increasing production efficiency, as Professor Matthews said. It is very influenced by the interests of the dairy and beef industries and, unfortunately, there has been much less attention and effort put into diversification in respect of research or working with the many farmers who are actually engaged in these practices. They feel very detached from Teagasc, do not feel supported and do not feel the research is supporting their efforts to manage their land according to agroecological or regenerative farming principles. The few agencies and research centres engaged in that kind of thing are tiny in comparison to where they should be.

We should be world leaders in regenerative agriculture but the courage is lacking. We need to instigate a review of Teagasc, just as we might review other public bodies from time to time to ensure their mandate, the composition of their boards and the level of expertise available to them are appropriate for the public services those bodies are required to provide. That includes bringing on board more ecological expertise into the agronomic and agricultural sciences, because if those disciplines are so detached from each other, it is no wonder we have seen the agricultural pressures on the environment we have experienced.

Deputy Jennifer Whitmore: I have a very quick point, which follows on from what Deputy Cronin's comments. I met some farmers from Wicklow during the farm protests on Friday. It is becoming clear to me that the policy drivers of the State, over many years, have forced or encouraged farmers down this very industrial and intensive path. Farmers are very good at doing their job. If you give them a job to do, they will do it. They have done exactly what the

State has required of them. Now, the State is going to require a different approach. The farmers to whom I have been talking know there are changes to be made, but how we get there is what is important. They do not want to be left behind, naturally enough. No one wants to be left behind. If they were tasked with looking after our environment and biodiversity and with storing carbon, they would do that very well. The question really comes down to whether those policy drivers are there, to which Ms O'Neill referred in her previous answer.

One of the key things I have looked at is the concept of just transition, not the narrow union focus as initially played out but a just transition that applies to our farmers as well. They are a key part of this but it is not something we are seeing discussed in relation to our agricultural communities. Is that a big gap? What are the risks of farmers not identifying with that just transition concept or the Government not applying it? Do the witnesses believe it is actually happening?

Chairman: Was that question directed at Ms O'Neill?

Deputy Jennifer Whitmore: I would be interested in the comments of both witnesses, if possible.

Ms Sadhbh O'Neill: I thank Deputy Whitmore for an excellent question. I will highlight the fact that in 2019, the Climate Change Advisory Council produced a special report on agriculture, which is a really excellent read. It discusses many of the issues regarding metrics, details and the drivers eloquently, clearly and succinctly. It identified five key drivers for emissions in Ireland. It is worth recapping them, namely, an increase in global demand for dairy and beef products; abolition of the milk quota; the agrifood strategies, Food Harvest 2020 and Food Wise 2025; beef sector supports such as the beef environmental efficiency programme-suckler, BEEP-S, mechanisms; and target agriculture modernisation schemes, TAMS, that is, support for capital investment, which has greatly encouraged dairy intensification.

If we are going to do anything about mitigation, we need to first of all look at what is driving the problem. This is clearly the place to start. We cannot do much about global demand except possibly divesting ourselves of the responsibility of producing food to feed the world, because that is a nonsense. We should not have to do that. We should also recognise that, globally speaking, the focus on beef and dairy is driving species to extinction. It is using far too much land and is not going to support the nutritional needs of a growing world population. Ireland should not be jumping on this bandwagon in a desire to support our farmers. We have to provide an alternative model consistent with meeting the human development needs of a growing population.

The milk quota was a major driver in Ireland but, unlike other EU countries, we used it as an opportunity to expand dairy production. We did not need to do that because the trends were moving in a positive direction prior to this and emissions from agriculture were coming down steadily until 2011, when they started to increase again. The first port of call is to make sure that any future agrifood strategy, and comments for a current draft of a strategic environmental assessment are closing today, has to be consistent with meeting our climate and biodiversity obligations by 2030. If we pass or adopt another agrifood strategy that even suggests a modest decrease in methane emissions, we will be failing. That is a failure. It is a recipe for disaster and we will be asking ourselves again in five years' time, how did it happen and how did it come about that agricultural emissions are going up?

If we want to communicate to farmers what a just transition looks like, the first thing we

need to do is get our house in order on the policy side. We need to provide an articulated, clear, policy framework that is consistent between the Department of the Agriculture, Food and the Marine and the climate action agenda. The regulatory context in which that is going to unfold, if the climate Bill is passed, will be extremely tight. There will be consequences if emissions targets are not met. We need to have a look at those supports, whether they are fossil fuel subsidies or any form of subsidy that is giving the wrong incentive, whether in the beef sector or in dairy capital investment programmes. They need to be looked at again. We need to stop incentivising the bad and to start incentivising the good, including eco-schemes and providing additional supports where that is appropriate.

We need to do something on the market side, because if food prices do not reflect the environmental costs, we are on a hiding to nothing and farmers will wonder why they are being asked to do something that is completely uneconomic. We need to address the bigger picture of market failure. The role of intermediaries, like supermarkets, is critically important in Ireland because supermarkets and wholesalers have a very strong level of control over the standards of food production from their suppliers. I do not know if that adequately addresses the Deputy's question, but if there is any further detail I will be happy to provide it.

Deputy Jennifer Whitmore: I thank Ms O'Neill. Is it a concern for her that the just transition principles were not included in the climate Bill we are debating tomorrow?

Ms Sadhbh O'Neill: The climate Bill has been through some very detailed scrutiny by the committee by way of the pre-legislative scrutiny and the recommendations that the committee made on just transition should have been included in this version of the Bill. It is a weakness but, on the other hand, the principle of a just transition is at least mentioned in the Bill. It is not well articulated but my understanding is that it certainly does not hamper any efforts by a Government or Minister to ensure that there is some level of distributive justice and stakeholder dialogue throughout the process. It is ultimately a political decision and it is the degree to which that decision is embraced in the Bill or at a political level by the Government. Certainly, we would support a much stronger wording.

Professor Alan Matthews: Although I agree that policy has been an important driver of agricultural developments, it is important to remind the committee that in looking at the sectoral breakdown of Irish agriculture, dairying is probably the only profitable sector of Irish agriculture when we strip out the subsidy transfers from the Common Agricultural Policy, CAP. Market forces have largely driven the expansion of dairying once the milk quota was removed and that is important to bear in mind.

My objective is not so much to target beef and dairy, which, as I said, will be the mainstay of Irish agricultural production for quite some time, but rather to target the emissions in the climate sense and the negative impacts on water quality and biodiversity. We need to send signals to farmers that they cannot just produce food and ignore the environmental impacts. If we could try to integrate these environmental damages into farmers' decision-making, we would move quite a long way towards a more sustainable animal sector. It is, of course, the case that elsewhere in Europe, much animal production is based on cereals that could be used for human food production but that is not fundamentally the case in Ireland. We are using grass which we would not be able to consume ourselves.

My view would be to emphasise the need to address the negative outcomes and to put a price on these as some kind of signal to farmers that they need to take these into account. They cannot exceed the environmental boundaries that are real, and the herd numbers will have to

reduce in order to achieve that. The focus should not be on the herd numbers themselves. It should be on preventing the environmental damage that arises from that.

In terms of the just transition, which is obviously a hugely important issue, I would point out that there are very significant supports that go to agriculture which are not necessarily targeted in the most sensible and effective manner. Why do farmers in certain parts of country get much more per hectare than farmers in other parts? Linking payments much more to the environmental services that particular farms provide should be a principle guiding, in particular, the way in which we use our CAP funds in the coming period.

Deputy Jennifer Whitmore: I thank Professor Matthews.

Chairman: I thank Professor Matthews and Deputy Whitmore. I call Senator Pauline O'Reilly.

Senator Pauline O'Reilly: I thank both of our guests. We often speak about bringing farmers with us and the practicalities of moving agriculture to where we need to go. They both outlined that it is our largest emitter. To what extent does it do a disservice to rural Ireland and farmers to not be honest about the survival of rural Ireland based on the agricultural practices, either that we have now or that we are moving to? I am thinking in terms of water quality and flooding. I would like to hear from both witnesses what the impact of not changing our agricultural patterns would be on rural Ireland and the sustainability of farm incomes over time if we look at changes in European funding over time. Small farmers, in particular, feel they get a raw deal. Coming from the west of Ireland, that is what I hear. It is a very different story from that of the large dairy farmers that is coming to my door. The witnesses might speak about that.

The witnesses, and particularly for Ms O'Neill, have been critical of existing agricultural policies. I would like to hear from both of them about the importance of moving the climate Bill on and the part to be played by the climate advisory council in shifting policy in Ireland. That is important and it can get lost in the conversation that policies need to change but there needs to be an imperative in order to do that. They might comment on that.

A question Ms O'Neill addressed to an extent is whether it might the lack of mapping that we have in the country that is creating the difficulty. It becomes quite difficult to have a vision without that map where one has the map before, one has the map after and we can all buy-in to it. Without that vision, it can be quite difficult.

There has been a good bit of conversation about offsetting. My understanding of what the witnesses are saying is that it is not really to do with offsetting. It is to do with the fact that if we shift to a different land use, that naturally brings emissions down. There are different practices. It is not only about offsetting carbon but about the fact that one also has a reduction in particular types of farming that create those emissions. I am particularly interested in forestry and the part it can play. Do the witnesses have any figures on the impact on emissions? If we have X amount of coverage, what does that look like? We have had this discussion at a previous committee meeting but I would like to hear, in particular from Professor Matthews, about the economics of support for farmers and Ireland. Those are a few of initial questions.

Chairman: I will call Professor Matthews first on this occasion.

Professor Alan Matthews: These are terrific questions. On the question of Senator Pauline O'Reilly's worries about the impact on rural Ireland, if we look at the overall figures, first of all, in nominal terms, I agree that if we have inflation the real value of the CAP has been reduced.

If we look at the budget for Ireland for the CAP in the current seven-year period from 2021 to 2027, in nominal terms it has been maintained - in fact, even slightly increased. There is the same level of funding. If we add to that the €1.5 billion the programme for Government indicated will be made available, in addition to the carbon tax revenue, it seems funding should not be the issue. It is a question of making the right use of it and making sure that we target that funding in a way that rewards farmers for those practices that are benefiting society. It also sends a signal that there are by-products - we are talking here about greenhouse emissions - which we need to reduce. It seems to me that it is a question of targeting the payments but, overall, the payments will be maintained in their value. I very much agree with the Senator on the importance of the Climate Change Advisory Council. I had the privilege of being a member of it in its first term. It has a valuable role to play as an independent source of expertise, both advising the Government but also holding the Government to account where targets are not being met. I am sure the current council will continue to fulfil that role. Establishing the council was an important step for Ireland. We were one of the early movers in that. We see a similar body now being proposed as part of the European climate law at European level and other member states are introducing such councils, which are important.

On the forestry side, I must admit I am not an expert on forestry. It is clear, and Ms O'Neill already highlighted this, that planting rates have fallen quite dramatically. The rotation period, particularly in the commercial forestry species such as spruce and pine, is relatively short. We had significant planting ten or 20 years ago. Those forests are now coming to maturity. They will be cut but we are not replacing those at a sufficient rate. The deforestation that will occur over the coming ten years will exacerbate the problem that our land sector is a net emitter rather than a net source.

How does one reverse that? There are significant financial incentives in place. I understand there are some real problems in terms of licensing. There may be others here who are more familiar with this. As I said, this is not an area in which I am fully expert, so I will stop at this point.

Chairman: I thank Professor Matthews and call on Ms O'Neill.

Ms Sadhbh O'Neill: I thank Senator O'Reilly for the question. I will try to be as brief as possible. First, I agree with the Senator that we need to be honest with farmers about the challenges posed by climate action and the biodiversity crisis that we are experiencing in Ireland. We will have to take a close look at our land management practices and make some tough decisions. While I support the principle of a just transition, it is unfortunate that measures that have been designed to support farm incomes have maintained the situation as it is in relation to the beef herd sector for so long. The lesson should be learned that while politicians want to step in and rescue a sector that is undergoing a financial crisis, we must not create a legacy effect or an incumbency that generates more problems in the future with which we must deal. What we can learn from other countries that have done this kind of thing successfully is first to connect producers and consumers. The reality is that we are exporting commodities and we are importing food that we eat. We should look to scenarios where there is much more localised food production. That will involve greater use of horticulture and tillage. It is important to highlight that Teagasc, in its outlook report for 2021, estimates that there will be further decline in the tillage area by 2030. It estimates a drop of another 14%, on top of the decreases that have already taken place.

The current trend is all moving in the wrong direction. We are neither growing the food we need to consume, nor what consumers want to buy. However, there is potential to embrace

those kinds of shortened supply chains, to increase the net benefit for farmers and producers directly. Obviously, it increases Ireland's food security if we produce more of our own food rather than importing it.

The Senator's second question was on the climate Bill. I agree that the climate Bill is important because of the tight governance structures contained within it. No matter what concerns various groups, including even ourselves, have about the weaknesses in the language, and certain things that are not mentioned at all, the important thing is the mechanism by which the Climate Change Advisory Council now has the authority to propose a carbon budget. That carbon budget is going to embrace the emissions economy-wide. It is going to have to be consistent with the target of 51%. It will at least have to pay heed to Ireland's commitments under the Paris Agreement. That is ultimately what should drive climate policy: an awareness and appreciation of the global catastrophe that awaits us if we do not take urgent action to reduce emissions and to halt the loss in biodiversity.

I am not an expert in biodiversity, but my colleagues are always keen to highlight to me the potential for various farm practices to improve biodiversity. At the moment, the areas the Senator describes in the west of Ireland, where there is much high-nature value farming, are in decline because of all of these economic pressures. Therefore, we need to make sure that the measures we take to support farmers in transitioning and diversifying continue to support high-nature value farming in those areas.

It is important that the Bill moves swiftly into law, because it will dictate the carbon budgets that are due to come from the Climate Change Advisory Council, the Department and the Minister and then back to the Oireachtas, in the coming months. Therefore, if the Bill is not enacted, that process and timeline will falter. That will lead to yet further delays. As the Senator knows, we have been delaying and delaying in Ireland on climate action for far too long already.

On the Senator's final question about forestry, I do not have precise numbers for her. However, suffice to say, unfortunately, the forestry sector is also in crisis. Commercial forestry has hit many roadblocks in the licensing process. On the biodiversity side, we have seen major impacts to water quality and biodiversity from the type of commercial forestry planted heretofore. I am a member of the forestry working group. There is a number of different workstreams addressing different parts of the Jo O'Hara report into the Mackinnon report. I am optimistic that it will at least attempt to reconcile the multiple objectives for the sector. However, it remains to be seen whether it can get a new strategy out in time to reverse this pattern of farmers losing interest in forestry, and in less commercial forestry, which is important for timbering construction, as well as for sequestration.

On the environmental and sustainability side, we need to look to trees, wood products and forestry for the multiple benefits that they can provide to biodiversity, air quality, amenity, recreation, timber products, food crops and, even, edible crops from trees. There is so much potential there. We in Ireland seem to have suffered from a lack of vision in relation to forestry for so long. Forestry is so denuded from the landscape that the public has forgotten what trees in the landscape would do for us all. Hopefully, the forest working group will address some of those issues. If the Senator requires some detailed estimates, I can try to find them for her.

Chairman: I thank Ms O'Neill and Professor Matthews for their comprehensive answers to Senator O'Reilly. I am mindful that we have just over ten minutes left. Deputies Cronin and Farrell are waiting patiently to come in for a second round. However, I have a question and I ask the witnesses to be as brief as they can be in their answers.

To an extent, every member of this committee, our guests and probably society want to protect farming. At least, we want to protect livelihoods in farming and in rural Ireland. I do not think there is too much disagreement on that. Apropos of Deputies Cronin and Whitmore's earlier questions on just transition, it seems to me that there has been a communications failure around the changes that will be required. While we want to protect livelihoods, we also accept that major changes are going to be required in agriculture. Will the witnesses comment on what a national dialogue might look like and how it could enhance consultation and communication? Ultimately, fairness is not achieved without those things. I am quite inspired by the work of Stop Climate Chaos. I direct that question to Ms O'Neill in particular. Does she have a view on what such a dialogue might look like?

My second question relates to carbon leakage. The witnesses have touched on the issue throughout our discussion but it has not been dealt with in any great detail. There is an argument that if we do not produce beef or dairy products here, then other countries with lesser environmental standards, or those that might be more willing to sacrifice ecology, will produce that food and, ultimately, we will import it. Will the witnesses comment on that? I am sorry that I must ask them to be reasonably brief. I need to go back to Deputies Cronin and Alan Farrell in the time remaining to us.

Ms Sadhbh O'Neill: In regard to just transition and dialogue, there is an important recommendation in the Ag Climatise document. It is the very last recommendation - action No. 29, if I recall correctly - and I see no reason it cannot be enacted immediately. It is a commitment to engaging in a stakeholder dialogue between scientists, representatives of the farming community and environmental interests, in conjunction with other stakeholders. This is a very welcome development because, to date, it has been very difficult for environmental interests, including environmental scientists, to get a foot in the door when it comes to the conversation about agriculture. We have been somewhat excluded and our efforts to engage have been difficult. This would be a very welcome initiative and it is entirely up to the Minister for Agriculture, Food and the Marine to get the ball rolling. I certainly think it would be a helpful initiative.

The Chairman's question about carbon leakage is one that comes up regularly. I refer to the point that is made very succinctly by the Climate Change Advisory Council in its 2019 review:

The extent to which leakage may occur is unclear and dependent on multiple factors, including international trade agreements, the carbon footprint of production in other countries and [crucially] their own commitments to emission reductions.

In the context of all countries having to step up under the Paris Agreement, it is quite difficult to estimate the extent of the problem in advance and what the effect will be if Ireland were to act a little more quickly than other countries to reduce emissions in agriculture, for example. Other countries make the same claims about their pet industries. Whether it is shoe or car manufacturing, steel or cement, every country seeks to protect its key industries. Increasingly, there is a global effort to look at particular commodities that are traded globally. I do not expect there will be any escape clause for any industry. Even the steel, cement and car industries are coming under much closer scrutiny, not just by governments and regulators but also by shareholders. I expect that will also happen in the case of agriculture.

Chairman: I thank Ms O'Neill. I invite Professor Matthews to respond briefly.

Professor Alan Matthews: I want to add something on the carbon leakage question. I agree with the comments made by Ms O'Neill. The first point I would make is that it is impor-

tant to bear in mind that we cannot assume the current situation is the appropriate counterfactual and things will continue as usual. There will be, and already is, huge pressure coming from the supply chain, that is, from the supermarkets and processors, which have taken on climate commitments themselves - in many cases, they have taken on net-zero commitments - and want to secure them through their supply chain. If we do not make the changes that are necessary, we will simply find ourselves losing out on existing markets.

The second point I would make is to stress that carbon leakage will occur. In any traded commodity, it is clear that if standards are increased in one country, some production will move offshore. The question is whether we will increase global emissions, which obviously would not be a desirable outcome of policy. This is an empirical question and my own assessment, if we could go into it, is that it is unlikely to happen. Most of the competition for Irish beef is either from the UK or other EU member states, all of which will have stricter binding targets on emissions. There is a limit to which increased production in those countries can replace any reduction in Irish output. In terms of international competition, we need to remember there is already a very high level of border protection against third-country imports. In the case of fresh and frozen beef, it is a tariff of approximately 45%, on average. There is a limited likelihood that we would see global emissions increasing. As I said, however, it is an empirical question. The claim in this regard is often made without very much evidence.

Chairman: I thank Professor Matthews. We have approximately five minutes left, in which I will take questions from Deputies Cronin and Alan Farrell, before reverting to the witnesses.

Deputy Réada Cronin: Professor Matthews touched upon the idea of a cap and trade scheme in his exchange with Senator Higgins. I missed some of what was said because somebody came into my office. Given the short deadline we have to achieve reductions, it would be risky to rely on the market to come up with a solution. The time for tinkering around the edges has long passed. I also worry about negative social outputs if we were to rely on market mechanisms, because they will benefit large farmers to the detriment of smaller farmers. The Government sometimes talks about just transition as if it is a project, but what is going on with Bord na Móna in the midlands, for instance, affects every county on the island. Will Ms O'Neill indicate whether Stop Climate Chaos has a position on the reliance on market mechanisms?

Deputy Alan Farrell: I confirm that I am in the precincts of Leinster House, although only just. My question relates to the horticulture sector, specifically peat and the fact that we are currently importing it from other jurisdictions. There has been a suggestion from the sector that a cultivation of as little as 75 acres would cater sufficiently for demand over a ten-year period. I am not aware whether either of the witnesses has any particular expertise in this area but if they do or if they have a view, I would welcome hearing it.

Chairman: I should say at this point that we generally afford guests the opportunity to follow up on the discussion with supplementary answers in writing, if they so desire. I am mindful that we are almost out of time. The witnesses may feel they have much more to say than is possible in the few minutes remaining. If they would like to follow up with further clarification or detail, we certainly would appreciate it.

Professor Alan Matthews: I will take Deputy Cronin's question on market mechanisms. The key issue here is putting a value on emissions in order that farmers take them into account in their decision-making. This is entirely a matter for policymakers to decide, but it can be done through regulation, subsidies or through taxes or levies. The appropriate choice will depend on distributional impacts, administrative feasibility and so on. Cap and trade is not something that

would potentially be available in an immediate sense. There certainly are much more direct instruments we can use. We are saying to farmers or groups of farmers that if they can show us that they can reduce their overall greenhouse gas emissions, be that nitrous oxide, methane or carbon in their soil, we are prepared to pay them to do that. That is putting a value on the action. It immediately changes the incentive structure for farmers and they will change their behaviour as a result. I do not see that as something that will necessarily work against the interests of, for example, smaller farms. It may well be that they are more attracted into such a scheme than other farms. My advice is to put a value on the emissions and farmers will respond.

Chairman: I thank Professor Matthews. Would Ms O’Neill like to comment?

Ms Sadhbh O’Neill: In our report, published jointly with the environmental pillar and Sustainable Water Network, SWAN, we recommended that the Government not support or develop any carbon market or offsetting project that uses land-based credits. The basis for that was research work done by a European NGO called Carbon Market Watch, which highlighted the points I made earlier in regard to the challenges with verification, showing additionality and proving permanence. If we cannot satisfy those criteria, it is unlikely that projects would even meet the new standards that are coming forward under the voluntary carbon market regulations that are being proposed by Mark Carney’s Taskforce on Scaling Voluntary Carbon Markets.

The reality is that we have to take action to reduce emissions and protect and restore biodiversity on our own territory in the first instance. If there are market opportunities, these mechanisms may well play a role in the future. For now, it is important we get our fossil carbon emissions down and stop releasing carbon from sinks. There is a stock of carbon in the soil, trees and hedgerows. It is urgent that we focus on what is available to us close to hand. We do not have to invent new, complicated and expensive schemes to do that. We can use our regulatory powers to set a price or to set limits on the amount of nitrogen that we are going to allow to be used in Ireland. That would have a knock-on effect on emissions downstream.

I will revert to the committee on the question on horticulture as I do not have that information with me today.

Chairman: I thank Ms O’Neill. The committee would appreciate that. I thank Professor Matthews and Ms O’Neill for engaging with us today and for the level of detail they provided, which will help us in drafting our report on this issue in the coming weeks. I thank members for engaging so diligently with the witnesses in this session.

The joint committee adjourned at 2.33 p.m. until 12.30 p.m. on Tuesday, 22 June 2021.