

## Nourish Scotland evidence on

# Climate Change (Emissions Reduction Targets) (Scotland) Bill – Stage 1



## For the Environment, Climate Change, and Land Reform Committee

August 2018

### About Nourish Scotland

Nourish Scotland is an NGO campaigning on food justice issues in Scotland. We believe tasty and nutritious food should be accessible to everyone, be sustainable, and be produced, processed, sold and served in a way that values and respects workers. We campaign for solutions that work across the board: we take a systems approach toward food and health, poverty, fairness, workers' rights, rural economy, environment, climate change, land use, and waste.

Nourish is a member of the Stop Climate Chaos Scotland coalition and Scottish Environment LINK, and endorses the detailed evidence provided by these coalitions. The position in this submission is our own.

### Summary

The Bill in its current form fails to meet Scotland's international obligations under the Paris Agreement. Nourish Scotland calls for targets that reflect our moral duty and capacity to mitigate climate change: targets of at least 80% reduction in emissions by 2030 and net-zero emissions by 2040.

Nourish also calls for a package of measures to drive a just transition in agriculture and ensure a coherent approach across agricultural, land use, and forestry policies:

- Duty for all agriculture and rural policies to contribute to mitigating climate change and meeting Scotland's emissions reduction targets.
- Duty to produce a nitrogen balance sheet and statutory targets for nitrogen efficiency improvements
- Statutory targets for land in organic management
- Statutory targets for agroforestry
- Statutory cap on methane emissions and long-term reduction targets
- A coherent policy framework that joins up agriculture, land use, and forestry
- Duty to report on consumption emissions

### Full response

The Bill as published by the Scottish Government does not contain the ambition or action required to deliver the Paris Agreement. According to the Fairshares analysis, the UK should be aiming for reductions of between 65% and 75% by 2025 and 76% and 86% by 2030.<sup>1</sup> We therefore urge the Scottish Parliament to raise the targets to at least 80% emissions reductions by 2030 and net-zero emissions by 2040. Instead of a linear, gradual

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<sup>1</sup> <http://www.climatefairshares.org> and <https://www.foe.co.uk/sites/default/files/downloads/uks-fair-share-emissions-cuts-76425.pdf>.

approach to emission reductions, we need to put the focus of climate action on the next 5-10 years. These targets would ensure that Scotland meets its moral duty and remains a true leader in climate change action.

## **Farming and land use are key to Scotland's climate leadership**

Urgent action in the agriculture and land use sectors is critical for the success of a net-zero target for Scotland, but is lacking from current policies. This Bill should therefore include a package of actions that will set Scotland on the right path over the next 5-10 years. These sectors have the potential not only to reduce current levels of greenhouse gas emissions, but also to sequester significant amounts of carbon. Although we will continue to emit some methane and nitrous oxide in agriculture as these gases are produced by biological and chemical processes inherent to food production, there is significant scope for reductions in emissions and offsetting of what remains through sequestration in soils and forests.

Greenhouse gas emissions from agriculture have not been tackled as efficiently as in other sectors, and have only gone down marginally in the last decade. Agriculture is now the second largest emitting sector in Scotland, responsible for 26% of emissions. Yet, the Scottish Government's Climate Change Plan only proposes a 9% reduction in emissions from agriculture by 2032 and a weak package of non-compulsory measures. Voluntary measures have shown their limitations<sup>2</sup>, it is now time for higher ambition in agriculture and land use so that these sectors can contribute a fair share of efforts towards Scotland becoming a net-zero economy.

This ambition can only be achieved through a **coherent approach** to land use, agricultural, and forestry policies in which climate change mitigation is a key priority. A **just transition** is needed in agriculture, with adequate advice and support for farmers, crofters, and land managers, alongside compulsory measures and statutory targets to ensure a level-playing field and to set a clear long-term direction. Finally, climate mitigation measures taken by farmers, crofters, and land managers should be adequately recorded, through **better emissions accounting** in the agriculture sector. Nourish would recommend a modernisation of the inventory to better reflect the complexity of land-based emissions and sequestration; close dialogue with the UKCCC to improve how different greenhouse gases are recorded is also important.

Failure is not an option. Scotland's tourism and food and drink are fast growing sectors, but their success is closely tied to our continued reputation as a green and clean country. A net-zero emissions target by 2040, matched by equally ambitious action in the agriculture and land use sectors, would ensure our prestige as a climate world-leader and a land of food and drink continues to underpin profitable industries that are vital to our rural and wider economy.

## **Comments on agricultural greenhouse gas emissions**

While we may not know all the solutions to achieve net-zero emissions today, there is a lot we know farming can do but is not doing, and must do urgently in order to meet our international and national climate change obligations.

**Methane** (44% of farming emissions) is emitted by livestock. Breeding, animal feed, animal health and manure management can all reduce methane emissions per unit of output, and there may be scope to increase methane oxidation<sup>3</sup>, but this is still an underdeveloped area

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<sup>2</sup> <https://www.theccc.org.uk/wp-content/uploads/2017/09/Reducing-emissions-in-Scotland-2017-Progress-Report-CCC.pdf>

<sup>3</sup> "Soils contain populations of methanotrophic bacteria that can oxidise methane, by a process known as 'high affinity oxidation'. These bacteria consume methane that is in low concentrations, close to that of the atmosphere. The bacteria favour upland soils, in particular forest soils. (...) Exposure of soils to high ammonium concentrations leads to a loss of methanotrophic bacteria and a subsequent reduction in the rate of methane

of scientific knowledge. Remaining methane emissions can also be offset through carbon sinks: for example 2 acres of woodland can offset the CO<sub>2</sub>e emissions of one dairy cow<sup>4</sup>.

**Nitrous oxide** (29%) is emitted by agricultural soils, especially those rich in nitrogen. These emissions can be reduced by using less or no chemical fertilisers, applying fertiliser to fields through precision techniques; getting the soil pH right; managing manure and slurry better; using clovers in grass mixes; and intercropping. The need for chemical fertilisers can be reduced by improving our circular economy of nutrients (animal manures, compost, and digestate from food waste, upscaling our anaerobic digestion capacity).

**Carbon dioxide's** main sources (27%) in agriculture are from the use of fossil fuels in powering farm machinery and from the manufacture of chemical fertilisers (which accounts for around 5% of global energy use). These sources can be entirely mitigated through a shift to clean energy sources. Furthermore, farmers and land managers can become net producers of renewable energy.

**Soil carbon sequestration** is a critical strategy for climate change mitigation and much under invested in. Since the industrial revolution, the way we've managed our soils has released almost as much CO<sub>2</sub> into the atmosphere as all the burning of fossil fuels<sup>5</sup>, with 25-75% of the original soil carbon lost. A recent study of Scotland's soils<sup>6</sup> suggests soil carbon levels have been stable over recent decades, but with many soils containing less than 3% carbon there is room to restore earlier losses. Land managers and owners should be incentivised to use their land to sequester important amounts of carbon dioxide by building up organic matter in soils and adopting agroforestry practices at a large scale.

Other countries have shown leadership on this front, and Scotland should urgently increase efforts. France, for example, launched the '4 per 1000' initiative<sup>7</sup> launched at COP21, which highlights the role of agricultural soils in mitigating climate change and recommends practices such as agroecology and agroforestry. Increasing the amount of carbon matter in soils by 0.4% per year could stabilise concentration of CO<sub>2</sub> in the atmosphere. Around 40 countries have signed up to the initiative, but Scotland is not amongst them. In Austria, the humus building project run by Ecoregion Kaindorf rewards farmers who verifiably increase soil carbon through a voluntary carbon trading scheme. 200 farmers currently take part, and improved management practices have resulted not only in extra income but also in higher yields.<sup>8</sup>

**None of the measures listed above are currently compulsory nor sufficiently promoted or incentivised.**

## **Action on agriculture and land use in the Climate Change Bill**

The asks below outline key measures which need to be adopted now to take us on the right pathway over the next ten years towards net-zero emissions by 2040.

### **1. Duty for all agriculture and rural policies to contribute to mitigating climate change and meeting Scotland's emissions reduction targets.**

Agricultural policy has done too little to date to advise and support farmers in developing and implementing plans for climate change mitigation and adaptation. The Land Rights and Responsibility Statement highlights Scotland's land owners' duty to be good stewards of our

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oxidation. The use of artificial fertilisers containing ammonia is therefore detrimental to the removal of methane."  
<http://www.eci.ox.ac.uk/research/energy/downloads/methaneuk/chapter02.pdf>

<sup>4</sup> Own calculation based on

[https://www.forestry.gov.uk/pdf/6\\_planting\\_more\\_trees.pdf/\\$file/6\\_planting\\_more\\_trees.pdf](https://www.forestry.gov.uk/pdf/6_planting_more_trees.pdf/$file/6_planting_more_trees.pdf)

<sup>5</sup> <https://www.nature.com/articles/s41598-017-15794-8#Fig1>

<sup>6</sup> <http://iopscience.iop.org/article/10.1088/1755-1315/25/1/012016/meta>

<sup>7</sup> <https://www.4p1000.org/>

<sup>8</sup> [www.oekoregion-kaindorf.at](http://www.oekoregion-kaindorf.at)

natural resources<sup>9</sup>, but this is insufficiently implemented and enforced. As we design our farming and rural policies for post-Brexit, we must ensure they contribute to the delivery of Scotland's ambitious climate change targets. This is all the more important as official figures show that still half of farmers do not think it important to consider GHGs when making farm business decisions<sup>10</sup>. Meanwhile, in a recent public survey 77% of respondents said they would like to see farm support be conditional to land managers showing that they are supporting wildlife and are reducing climate impacts<sup>11</sup>.

To urgently improve knowledge about climate change mitigation measures in the agricultural sector, the Climate Change Bill should place a duty on all publicly funded advisory services and educational institutions to prioritise education in, and dissemination of, best practice in climate mitigation and carbon sequestration through agriculture.

To ensure the majority of farmers adopt best practice, the Climate Change Bill should place a duty on the Scottish Government to publish an environmental and climate change impact assessment for its agricultural and rural policy, and demonstrate how its farming support system is supporting the objectives of this Bill.

## **2. Duty to produce a nitrogen balance sheet and statutory targets for nitrogen efficiency improvements**

Reactive nitrogen is highly volatile, and pollutes our environment in many different ways, as ammonia, nitrogen oxides, nitrates, and nitrous oxide. Nitrous oxide accounted for 6.6% of Scotland's gross greenhouse gas emissions in 2016, a share which is increasing year on year as other emissions are cut rapidly.<sup>12</sup> This pollution can be mitigated by using fertiliser more efficiently, cutting losses to the natural environment, and recycling nutrients better<sup>13</sup>. Understanding how nitrogen reacts and moves in our environment is a prerequisite for effective action to reduce nitrous oxide emissions.

The Climate Change Plan published in February 2018 sets the policy outcome that "Emissions from nitrogen fertiliser will have fallen through a combination of improved understanding, efficient application and improved soil condition", with the following policy to achieve this goal: "Work with the agriculture and science sectors regarding the feasibility and development of a SMART (specific, measurable, achievable, relevant and time bound) target for reducing Scotland's emissions from nitrogen fertiliser." While this is welcome, the lack of a clear timeline for action and of details on the level of ambition are of concern.

The Climate Change Bill should set a duty on the Scottish Government to regularly commission and publish nitrogen balance sheets, with the first one published no later than 2020. Iterations of the balance sheets should match climate change reports of policy and proposals cycles.

This Bill should also set a duty on the Scottish Government to set a pathway, including binding targets and policy measures, for how nitrogen use efficiency will be improved in

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<sup>9</sup> The 4<sup>th</sup> principle of the Scottish Land Rights and Responsibilities Statement states: "Acting as the stewards of Scotland's land resource for future generations they contribute to sustainable growth and a modern, successful country." <http://www.gov.scot/Resource/0052/00525166.pdf>

<sup>10</sup>

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/666073/agriculture-8edition-8dec17.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/666073/agriculture-8edition-8dec17.pdf)

<sup>11</sup> <http://www.scotlink.org/public-documents/77-of-scots-want-farming-to-deliver-for-our-environment-and-climate-poll-suggests/>

<sup>12</sup> Scottish Government: Scottish Greenhouse Gas Emissions 2015 <https://www.gov.scot/Resource/0052/00520839.pdf> & 2016 <http://www.gov.scot/Resource/0053/00536542.pdf>

<sup>13</sup> A nitrogen budget for Scotland, Nourish Scotland briefing <http://www.nourishscotland.org/wp-content/uploads/2017/03/A-Nitrogen-Budget-for-Scotland-Nourish-Scotland-briefing.pdf>

Scotland. This pathway should be published no later than one year after the publication of the first nitrogen balance sheet, and reviewed with each iteration of the balance sheet.

### **3. Statutory targets for land in organic management**

Boosting the organic farming sector is a proven effective mitigation strategy for agriculture. Research consistently demonstrates that organic farming uses less energy and delivers lower greenhouse gas emissions per unit of area and in some cases per unit of product.<sup>14</sup> In addition, organic management typically leads to higher soil carbon sequestration<sup>15</sup>. Nourish presented more detailed evidence in our submission to the Rural Economy and Connectivity Committee on the draft Climate Change Plan in 2017<sup>16</sup>.

The land area under organic management in Scotland has been declining for the past 8 years consecutively, coming down to only 2.2% in 2016.<sup>17</sup> Scotland is thereby lagging behind the rest of the UK (2,9%) and Europe, with the EU average increasing by 21% between 2011-2015 to over 6% of agricultural land currently.<sup>18</sup> In addition to demonstrated environmental benefits, organic farming brings multiple economic co-benefits, from rural employment and higher farm margins, to tourism and export markets opportunities. Given the importance of European markets for Scottish agricultural exports, we cannot afford to lag behind in the environmental standards of food production; the Scottish organic sector needs an urgent boost. Demand for organic food is high and rising, and not met by Scottish production.

The Climate Change Bill should therefore set an ambitious statutory target for land under organic management. We recommend a target for 20% of region 1 land<sup>19</sup> to be under organic management by 2030

### **4. Statutory target for agroforestry**

“Agroforestry systems can provide multiple benefits, including diversification of farm income, shelter for livestock, fuelwood, carbon sequestration, nutrient management, reductions in soil erosion and leaching, biodiversity enhancement, and amenity value.”<sup>20</sup> Agroforestry systems produce up to 30% additional biomass per hectare<sup>21</sup> – and thus have a potential to increase carbon sequestration by comparison with conventional pasture and cropping systems. At a UK level, the UK Committee on Climate Change estimates that a reduction of 0.16 MtCO<sub>2</sub>e can be delivered by 2030 by establishing agroforestry on 0.6% of the agricultural land area<sup>22</sup>.

The 2018 Climate Change Plan recognises the potential for agroforestry to contribute to carbon sequestration on agricultural land, and commits to the following policy “Explore with the farming and forestry sectors how best to increase planting of trees and hedgerows which optimise carbon sequestration, including the role of agroforestry.” Again, while the intention is positive, the lack of timed and measurable ambition is disappointing.

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<sup>14</sup> Lynch, D. et al The Carbon and Global Warming Potential Impacts of Organic Farming: Does It Have a Significant Role in an Energy Constrained World? *Sustainability* 2011, 3, 322-362; doi:10.3390/su3020322

<sup>15</sup> Gattinger, A. et al <http://www.pnas.org/content/109/44/18226>

<sup>16</sup> <http://www.nourishscotland.org/wp-content/uploads/2017/12/Nourish-evidence-to-REC-Climate-Change-Plan.pdf>

<sup>17</sup> Organic Farming in Scotland, 2016 Statistics, May 18, 2017, <http://www.gov.scot/stats/bulletins/01278>

<sup>18</sup> [http://ec.europa.eu/eurostat/statistics-explained/index.php/Organic\\_farming\\_statistics](http://ec.europa.eu/eurostat/statistics-explained/index.php/Organic_farming_statistics)

<sup>19</sup> Region 1 land covers 1.8 million hectares in Scotland and is better quality, productive agricultural land typically used for arable cropping, temporary grass and permanent grass  
<https://www.gov.scot/Resource/0045/00456286.pdf>

<sup>20</sup> [https://www.climatexchange.org.uk/media/2020/cxc-woodlands\\_agroforestry\\_policy\\_brief.pdf](https://www.climatexchange.org.uk/media/2020/cxc-woodlands_agroforestry_policy_brief.pdf)

<sup>21</sup> [http://www.nuffieldinternational.org/rep\\_pdf/1341272658Stephen-Briggs-2011-report.pdf](http://www.nuffieldinternational.org/rep_pdf/1341272658Stephen-Briggs-2011-report.pdf)

<sup>22</sup> <https://www.theccc.org.uk/wp-content/uploads/2017/06/2017-Report-to-Parliament-Meeting-Carbon-Budgets-Closing-the-policy-gap.pdf>

Agroforestry at scale could make a significant contribution to meet our ambitious planting targets and would increase the sequestration of carbon necessary to achieve net-zero emissions.

The Climate Change Bill should therefore set a statutory target for on-farm afforestation so that 5% of Scottish agricultural land is managed as agroforestry by 2030.

## **5. Statutory cap on methane emissions and long-term reduction targets**

Livestock farming emitted 4.4 MtCO<sub>2</sub>e of methane in 2016, 8.5% of Scotland's gross emissions. However, even with the latest inventory revision, figures are approximate, and more accurate accounting is needed in order to inform mitigation strategies and reflect progress made by farmers. Methane measurement on farm should become more precise and reflect on-farm management practices, not just animal numbers and weight.

The 2018 Climate Change Plan commits to two welcome policy outcomes with regards to methane: “reduced emissions from red meat and dairy through improved emissions intensity” and “reduced emissions from the use and storage of manure and slurry.” However, the policy proposals are vague and voluntary.

The Climate Change Bill should set a statutory cap and reduction targets for methane emissions. We recommend an absolute cap at the current level, so that future increases in red meat (including venison) and dairy production have to be achieved through greater efficiency or through reductions in other emissions (manure management, landfill, energy). This cap should be revised downwards in future climate plans as technical innovations to reduce methane (vaccination, feed additives, selective breeding) become available. This cap will help to drive innovation and best practice across the industry, and will require sector-wide measures to improve efficiency. There is scope to build on the Beef Efficiency Scheme to develop wider benchmarking and knowledge exchange along the lines of Origin Green in Ireland.

## **6. A coherent policy framework that joins up agriculture, land use, and forestry**

Agriculture, land use, and forestry are closely intertwined; actions taken in one sector influence the others, and all are critical to the success of Scotland's climate change ambitions. Soil carbon and trees are important sinks available to Scotland and span across these three sectors – yet decisions still tend to be made in silos.

Nourish recommends pulling together the agriculture and LULUCF emissions into an Agriculture, Forestry and Other Land Use category (AFOLU) as set out in the Executive Summary of the fifth IPCC report:

“Agriculture, Forestry, and Other Land Use (AFOLU) is unique among the sectors considered in this volume, since the mitigation potential is derived from both an enhancement of removals of greenhouse gases (GHG), as well as reduction of emissions through management of land and livestock (robust evidence; high agreement). The land provides food that feeds the Earth's human population of ca. 7 billion, fibre for a variety of purposes, livelihoods for billions of people worldwide, and is a critical resource for sustainable development in many regions. Agriculture is frequently central to the livelihoods of many social groups, especially in developing countries where it often accounts for a significant share of production. In addition to food and fibre, the land provides a multitude of ecosystem services; climate change mitigation is just one of many that are vital to human well-being (robust evidence; high agreement). Mitigation options in the AFOLU sector, therefore, need to be assessed, as far as possible, for their potential impact on all other services provided by land.”

It is essential as we continue the debate on how best to achieve net-zero to **consider agriculture, forestry and other land use as one system delivering multiple services.**

In this context, Nourish also support RSPB Scotland's recommendations regarding the Land Use Strategy.

Under this new coherent framework, **detailed mapping and modelling of land-based carbon sinks** is necessary to inform further actions to achieve net-zero emissions targets.

The 2018 Climate Change Plan committed to ambitious afforestation targets; however targets to increase woodland cover come across as both arbitrary and abstract in the absence of mapping at regional and national level, informed debate to show how a range of targets might be achieved, and how the costs and co-benefits would be fairly shared. The current Highland Council consultation on its Highland Forest and Woodland Strategy<sup>23</sup> shows a good example of how mapping can help inform discussions and decisions about how land is used.

The Scottish Government should be required to publish transparent modelling of different scenarios for afforestation which assess the impact on farming output, livelihoods, biodiversity and carbon sequestration over the coming decades.

## **7. Duty to report on consumption emissions**

A globally responsible approach to climate change has to tackle consumption emissions. A significant part of Scotland's consumption is responsible for a growth of emissions abroad. This would be unchallenged by policies that focus solely on domestic, production emissions.

The data shows that, while our territorial emissions have been falling, extra-territorial emissions from consumption are rising: a report by the Committee on Climate Change on consumption reporting for the UK as a whole found that the UK's carbon footprint has increased over the past two decades, and, strikingly, growth in imported emissions has more than offset reductions in production emissions.<sup>24</sup>

The Climate Change Bill should require Ministers to measure and report annually not only on Scotland's production emissions but also its consumption-based emissions. There should also be targets in the Bill for reducing consumption emissions, and strategic actions to meet these targets should be incorporated into the policy making process.

## **Contact**

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<sup>23</sup> [http://www.highland.gov.uk/download/downloads/id/891/highland\\_forest\\_and\\_woodland\\_strategy.pdf](http://www.highland.gov.uk/download/downloads/id/891/highland_forest_and_woodland_strategy.pdf)

<sup>24</sup> <https://www.theccc.org.uk/wp-content/uploads/2013/04/Reducing-carbon-footprint-report.pdf>