

# Advice on including agriculture, fisheries and aquaculture in a UK Green Taxonomy

## Supplementary Paper:

Options for defining reductions in agricultural  
emissions for the UK Green Taxonomy

October 2024





## Introduction

The Land, Nature, and Adapted Systems Advisory Group (LNAS hereinafter) and the Green Finance Institute (GFI) have developed recommendations for defining agricultural emissions reduction targets for His Majesty's Government (HMG) as part of its UK Green Taxonomy advice. These recommendations aim to support the development of technical screening criteria (TSC) that ensure that UK agricultural activities align with a 1.5°C target. This supplementary paper is intended to complement the recommended agricultural TSC and the methodological report.<sup>1,2</sup>

LNAS agreed that a UK farm manager or business owner seeking alignment with the UK Green Taxonomy will need to quantitatively demonstrate progress in reducing CO<sub>2</sub>e emissions that is sufficient for Paris alignment. The agricultural emissions reduction targets should:

- **Align with a 1.5°C target:** The reduction target should be consistent with limiting warming to 1.5°C.
- **Be relevant to the UK:** Targets should be relevant to UK farm systems and production activities and contribute to the UK's climate goals.
- **Include cradle to farm-gate emissions:** The scope should encompass upstream emissions from fertiliser<sup>3</sup> and livestock feed production.<sup>4</sup>
- **Incentivise on-farm carbon sequestration:** Promote practices such as restoring drained peatlands and integrating agroforestry.
- **Recognise early adopters:** Acknowledge farms that have already made substantial emissions reductions or on-farm carbon sequestration.

This paper explores various approaches that the GFI and LNAS have analysed and developed, presenting two primary options for HMG to consider when establishing a UK Green Taxonomy for agriculture.

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<sup>1</sup> GFI, LNAS (2024) [Part A: Methodological report](#)

<sup>2</sup> GFI, LNAS (2024) [Part B: Technical Annex – Technical Screening Criteria](#)

<sup>3</sup> Inorganic (or synthetic) fertiliser production emissions are attributed to the energy requirements and use of natural gas in the production process along with the production of nitric acid (as a stage to producing ammonium nitrate) and the leakage of N<sub>2</sub>O.

<sup>4</sup> Feed production emissions are attributed to soil management, land-use change (LUC), and fertiliser production, as well as electricity use during drying and processing.



# Options for defining reductions in agricultural emissions

LNAS and the GFI analysed various trajectories for setting credible agricultural emissions reduction targets (see section “Analysis of the trajectory options”). Based on this analysis, LNAS presents two options for HMG to consider: (1) adopt the Science Based Targets Initiative’s Forest, Land, and Agriculture (FLAG) guidance<sup>5</sup> and tool,<sup>6</sup> or (2) develop a bespoke UK model.

LNAS recommends a combination of both approaches – adopting SBTi-FLAG as an immediate measure while exploring a UK-specific model as a long-term goal.

## **Option 1: HMG requires that UK farm managers or owners set targets through the SBTi-FLAG tool for taxonomy alignment**

The SBTi-FLAG guidance<sup>7</sup> and tool<sup>8</sup> provides a framework for setting reduction targets that are aligned with the Paris Agreement. The SBTi-FLAG tool, developed with IPCC resources, includes both upstream and on-farm emissions and considers biogenic carbon removals on agricultural land.

### **Advantages:**

- It provides a scientifically credible 1.5°C reduction target.
- Individual farm businesses can set bespoke reduction targets based on their inputted baseline emissions.
- It is widely recognised and can serve as a benchmark for alignment across the agriculture sector.
- Carbon accounting tools commonly used by UK farmers, such as the Farm Carbon Toolkit<sup>9</sup> and Agrecalc,<sup>10</sup> aim to achieve full alignment, or are already aligned, with SBTi-FLAG.

### **Limitations:**

- Includes some global abatement measures that are not applicable to UK farms (e.g. rice paddy management, reforestation).
- Targets are set against a baseline, which may disadvantage early adopter farms that have already made significant emissions reductions. However, the tool allows for a baseline entry that reflects historical emissions data.

### **Recommendation:**

This option is suggested as a least-regrets approach, offering a pre-made tool to set a target that can be used immediately, while exploring UK-specific adjustments for the long-term.

## **Option 2: HMG develops a bespoke UK model to set reduction targets**

This option would involve the development of a bespoke emissions reduction model tailored to the UK’s agricultural context, using IPCC Shared Socioeconomic Pathway (SSP)<sup>11</sup> and Integrated Assessment Modelling Consortium (IAMC) Databases. A bespoke UK model would exclude non-relevant global abatement measures (e.g. abatement potential from rice paddy management).

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<sup>5</sup> [SBTi-FLAG guidance](#)

<sup>6</sup> [SBTi-FLAG Target Setting Tool](#)

<sup>7</sup> [SBTi-FLAG guidance](#)

<sup>8</sup> [SBTi-FLAG Target Setting Tool](#)

<sup>9</sup> Farm Carbon Toolkit: [The Farm Carbon Calculator](#)

<sup>10</sup> Agrecalc (2024) [Agrecalc welcomes the DEFRA Harmonisation report](#)

<sup>11</sup> Rogelj et al. (2018) Scenarios towards limiting global mean temperature increase below 1.5 °C: [Up-to-date assessment of 1.5 °C scenarios under the five different shared socio-economic pathways \(SSPs\)](#)

**Advantages:**

- Potential to exclude non-relevant global abatement measure, to offer a more accurate representation of UK abatement potential.

**Limitations:**

- Developing a bespoke model would require significant resources from HMG for data acquisition and modelling capacity, likely delaying implementation.

**Recommendation:**

HMG could consider developing a bespoke UK model as a long-term goal while adopting SBTi-FLAG as an interim approach.

**Conclusion:**

LNAS recommends that, in the short term, HMG adopt the SBTi-FLAG tool to set emissions reduction targets for agriculture in a UK Green Taxonomy. While, in the long-term, HMG could explore the development of a bespoke UK model.

**LNAS recommends that HMG consult on the use of SBTi-FLAG sector targets and commodity pathways for use in the UK Green Taxonomy, in any forthcoming UK Green Taxonomy consultation and explore approaches to demonstrate alignment for farm managers who have already made substantial progress in emissions reductions or on-farm carbon sequestration.**

## Analysis of the trajectory options

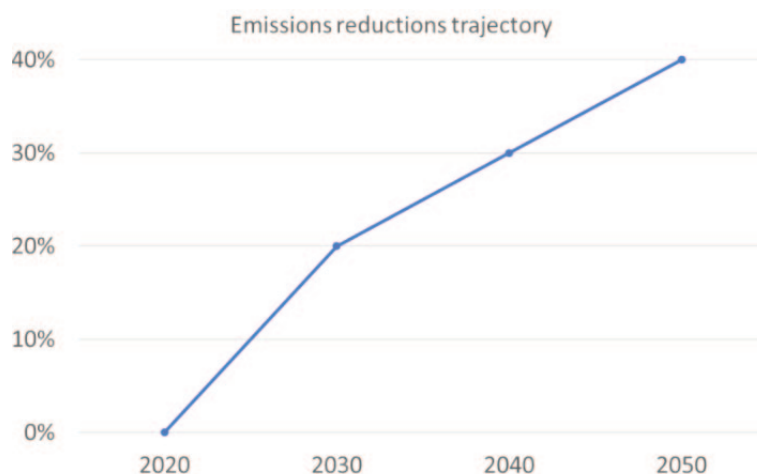
The following provides an evaluation of the emission reduction target options analysed and/or developed by LNAS and the GFI to set credible emissions reduction targets for the UK Green Taxonomy. The evaluation considers alignment with the 1.5°C target, relevance to UK farm systems and the inclusion of cradle to farm-gate emissions.

**Table 1:** Summary table of the options analysed for setting emission reduction targets

LNAS requirements	EU's Technical Expert Group Pathway	GFI developed based on WWF/IPCC	GFI developed based on CCC's carbon budget	SBTi-FLAG
Aligned with 1.5°C	No (2°C)	Yes (1.5°C)	Partially	Yes (1.5°C)
Relevant to the UK	No (global target)	No (global target)	Yes (UK-specific)	No (global target)
Includes cradle to farm-gate emissions	Only non-CO <sub>2</sub> emissions	Yes	Only non-CO <sub>2</sub> emissions	Yes
Includes on-farm carbon sequestration	No	Yes	No	Yes
Recognises early adopters	No	No	No	Potentially

## The EU's Technical Expert Group (TEG): Global 2°C target

The EU TEG developed a trajectory targeting a 20% reduction in agricultural non-CO<sub>2</sub> emissions by 2030 and a 40% reduction by 2050, based on Wollenberg et al. (2016).<sup>12</sup> This pathway focused exclusively on non-CO<sub>2</sub> emissions from agriculture (e.g. methane from enteric fermentation and nitrous oxide from fertilisers). Wollenberg suggests a preliminary global goal by 2030 to stay within the 2 °C limit is 0.92–1.37 GtCO<sub>2</sub>e yr<sup>-1</sup> or about 1 GtCO<sub>2</sub>e yr<sup>-1</sup>.<sup>13</sup>



**Figure 1:** GHG emissions (gCO<sub>2</sub>e) reduction trajectory taken from the EU TEG Technical Annex report (2020)<sup>14</sup>

### Advantages:

- Provides a clear, percentage-based reduction trajectory, which is straightforward to interpret.

### Limitations:

- Targets are aligned with a global 2°C pathway.
- Targets an overall global reduction, not individual farm businesses.
- The pathway does not include the abatement potential from on farm-carbon sequestration or for reducing emissions from upstream activities.

LNAS agreed to not adopt the EU TEG pathway due to the lower ambition 2°C target and exclusion of up-stream emissions associated with fertiliser and feed.

## 1.5°C trajectory adapted from IPPC resources

The WWF (2022)<sup>15</sup> developed food system GHG emission trajectories for 1.5°C based on Roe et al. (2019). Full detail on this research can be found in Annex 1. Reduction targets, derived from the median values in Roe et al. (2019), account for the deforestation which is attributed to agriculture, only.<sup>16</sup> Table 2 presents these GHG reduction targets (GtCO<sub>2</sub>e yr<sup>-1</sup>) by category.

<sup>12</sup> Wollenberg et al. (2016) [Reducing emissions from agriculture to meet the 2 °C target](#)

<sup>13</sup> However, Wollenberg argues that a more comprehensive target for the 2°C limit should be developed to include soil carbon and wider agriculture-related mitigation options.

<sup>14</sup> [https://finance.ec.europa.eu/system/files/2020-03/200309-sustainable-finance-teg-final-report-taxonomy-annexes\\_en.pdf](https://finance.ec.europa.eu/system/files/2020-03/200309-sustainable-finance-teg-final-report-taxonomy-annexes_en.pdf)

<sup>15</sup> [DEFORESTATION AND CONVERSION FREE COMMODITIES ARE CRITICAL FOR A 1.5 °C PATHWAY](#)

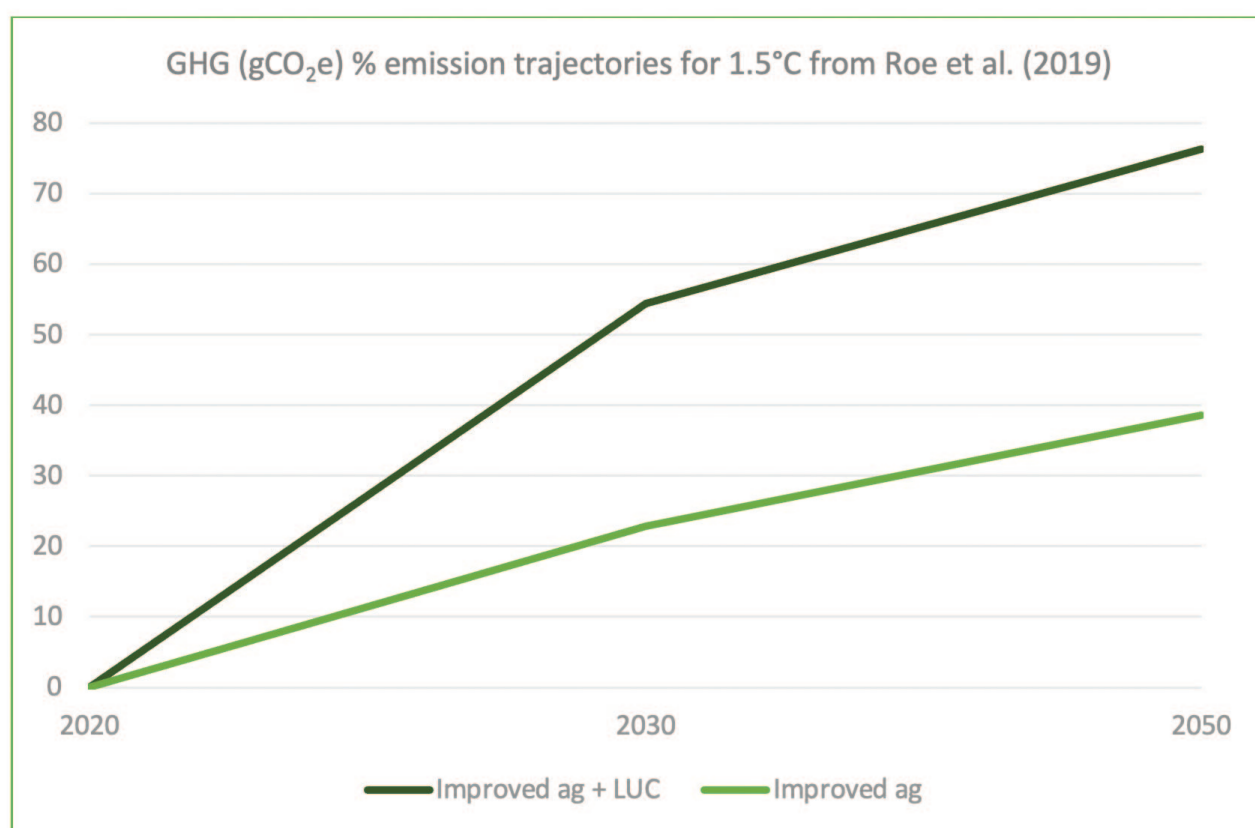
<sup>16</sup> The land-use change (LUC) emissions account for FAO Global Forest Resources Assessment (FRA) (2020) findings that 88% of total deforestation stems from agriculture. <https://www.fao.org/forest-resources-assessment/en/>.

**Table 2:** Food system GHG emission trajectories for 1.5°C, grouped by category. Adapted from the WWF (2022). All units in GtCO<sub>2</sub>e yr<sup>-1</sup>.

Emissions Category	2020	2030	2050
Agriculture non-CO <sub>2</sub> <sup>17</sup>	7	5.4	4.3
LUC: Conversion and degradation <sup>18</sup>	4.4	-0.2	-1.7
LUC: Ag. land sequestration <sup>19</sup>		-1.8	-2.7
Energy, industry, and waste <sup>20</sup>	11.4	5.2	2.6

Based on the reduction targets, the GFI developed percentage emissions reduction trajectories, illustrated in Figure 2 below. This includes both an agricultural non-CO<sub>2</sub> emission (“improved ag”), as per the EU TEG trajectory, and a new trajectory (“improved ag + LUC”). Targets for “Energy, industry, and waste emissions” are excluded from these trajectories as most of these emissions are from post farm-gate fossil fuel sources (i.e. downstream).

**Figure 2:** GHG emissions (gCO<sub>2</sub>e) reduction trajectory for 1.5°C produced the figures in Table 2.



<sup>17</sup> Emissions from livestock (enteric fermentation and manure), agricultural soils (synthetic fertiliser and manure application, and crop residues), agricultural biomass burning, and rice cultivation.

<sup>18</sup> Net emissions from agriculturally driven land-use change. Includes conversion of forests, peatlands, coastal areas, and grassland to crop or pasture, as well as peat emissions on agricultural land, and re-growth on managed lands.

<sup>19</sup> Carbon stock enhancement on agricultural lands through agricultural soil carbon or vegetation (i.e. agroforestry).

<sup>20</sup> Downstream emissions (energy use, transport, industrial processes, packaging, retail, consumption, and waste management) as well as on-farm emissions from fossil fuel sources (e.g., diesel and electricity use). Most of these emissions are post-farm-gate fossil fuel sources (e.g., diesel and electricity use).

**Advantages:**

- Provides a 1.5°C aligned pathway that is scientifically robust.
- Includes a comprehensive scope of agricultural mitigation options, covering net emissions from agriculturally driven land-use change and carbon stock enhancement on agricultural lands.

**Limitations:**

- Includes some global abatement measures that are not applicable to UK farms (e.g. rice paddy management).
- Targets an overall global reduction, not individual farm businesses.

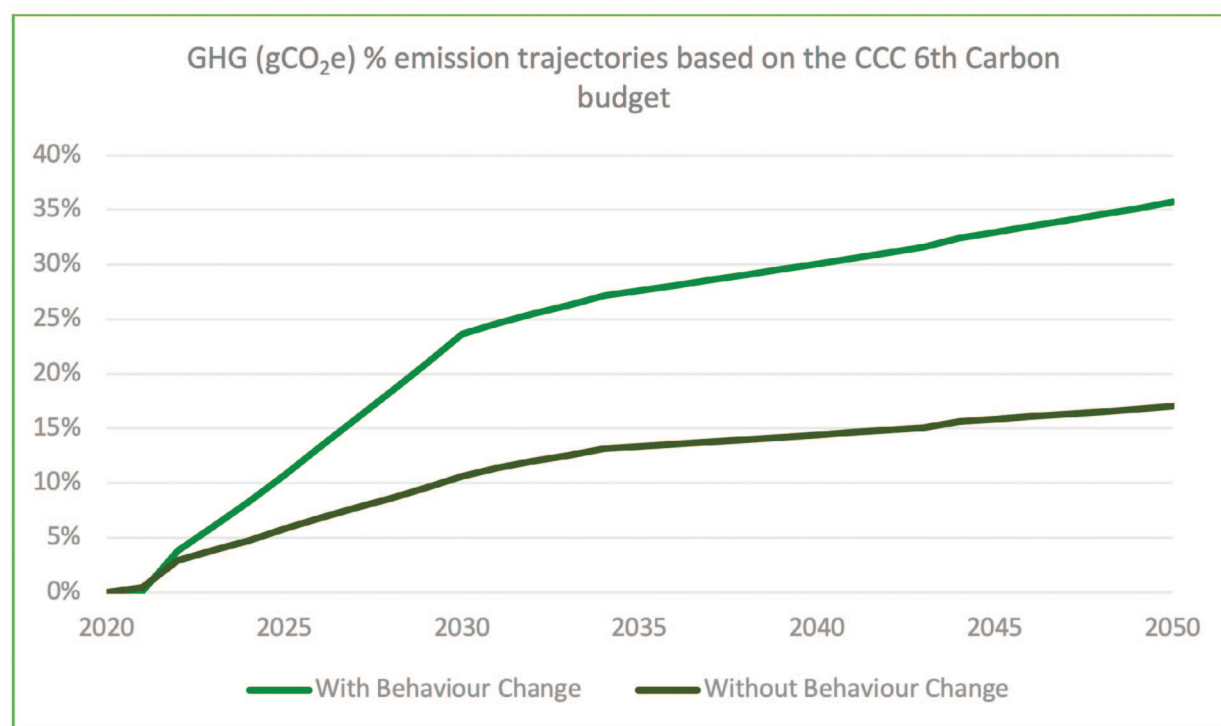
LNAS therefore agreed to explore a UK specific trajectory utilising the carbon budgets recommended by the Committee on Climate Change (CCC) for the UK to reach net zero.

## Trajectory aligned with the CCC recommended carbon budgets for UK agriculture.

The GFI developed a reduction pathway aligned with the Committee on Climate Change (CCC) sixth carbon budget for UK agriculture<sup>21</sup> using CCC data,<sup>22</sup> targeting a 35% reduction in agricultural non-CO<sub>2</sub> emissions and CO<sub>2</sub> emissions from machinery by 2050. For comparison, a trajectory without behaviour change (reduced food waste and diet change) is also shown to demonstrate the relatively large abatement that the CCC attribute to behaviour change.

Annex 2 provides the modelled abatement measures for methane and nitrous oxide reductions.

**Figure 3:** GFI developed GHG emissions (gCO<sub>2</sub>e) reduction trajectory from the CCC's Sixth Carbon Budget – Dataset (Version 2 – December 2021)<sup>23</sup>



<sup>21</sup> The CCC (2020) [The Sixth Carbon Budget Agriculture and land use, land use change and forestry](#)

<sup>22</sup> The CCC Sixth Carbon Budget (2021) - [Supporting information, charts and data: Dataset \(Version 2\)](#)

<sup>23</sup> The CCC Sixth Carbon Budget (2021) - [Supporting information, charts and data: Dataset \(Version 2\)](#)

The abatement savings from land-use, land use change, and forestry (LULUCF) sources and sinks, categorised as “forestry” and “peat” in the CCC dataset, are not disaggregated by agricultural and non-agricultural land. As a result, these savings cannot be modelled into the trajectory.

**Advantages:**

- Tailored specifically for UK agriculture, making it relevant to national climate goals.
- Includes a detailed list of abatement measures that reflect the – CCC recommended – technical and economic realities of UK farms.

**Limitations:**

- Focuses almost exclusively on non-CO<sub>2</sub> emissions and does not cover upstream emissions from fertiliser, feed production or emissions from agriculturally driven land-use change.
- Upstream emissions are commonly embedded in accounting tools and emission factors associated with land management, such as the Farm Carbon Toolkit and Agrecalc, which could make it challenging for UK farmers to disaggregate emission sources.
- Targets the UK’s overall net-zero achievement, not individual farm businesses.
- Anaerobic digestion (AD) is included as an abatement measure, Defra and LNAS agreed that AD is not suitable for all farm types and there are risks associated with continuous feed supplementation and concerns around air and environmental quality.
- During the market workshops, investors argued that the CCC trajectory’s 35% reduction by 2050 is too low, as most agricultural targets aim for a 50% to 60% reduction by 2050.

## SBTi-FLAG tool and guidance

In 2023, the science-based targets initiative (SBTi) published their Forest, Land, and Agriculture (FLAG) guidance<sup>24</sup> and tool<sup>25</sup> for companies interested in setting science-based targets for GHG emissions related to those sectors.

The SBTi provides two approaches to FLAG target setting to enable companies to calculate GHG reduction targets in line with the Paris Agreement:

- 1. The FLAG sector pathway:** a whole sector approach covering all corporate land-related emissions and removals across agriculture and forestry. This was developed from Roe et al. (2019) in consortium with IPCC resources – see Annex 1, for further detail.
- 2. The FLAG commodity pathways:** 11 mitigation pathways based on emissions intensity reduction targets against a baseline model. The tool provides pathways, based on regional data, for beef, chicken, dairy, leather, maize, palm oil, pork, rice, soy, wheat, and timber and wood fibre. This draws on Roe et al (2019) and uses the Integrated Assessment Model (IAM) IMAGE 3.0, supplemented by additional data from FAOSTAT and other sectoral models to capture regionally specific emissions, land use changes, and mitigation potentials.

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<sup>24</sup> [SBTi-FLAG guidance](#)

<sup>25</sup> [SBTi- FLAG Target Setting Tool](#)



**Advantages:**

- Provides a 1.5°C aligned pathway that is scientifically robust.
- Includes a comprehensive scope of agricultural mitigation options, covering net emissions from agriculturally driven land-use change and carbon stock enhancement on agricultural lands.
- The commodity pathways capture regionally specific emissions, allowing targets to be set based on production at the regional level (Europe).
- Individual farm business can set bespoke reduction targets based on their inputted baseline.
- Food and retail organisations committed to SBTi, such as Tesco and Nestle, will now need to account for and set targets for their FLAG emissions. These companies will likely ask their upstream agriculture suppliers to report emissions aligned with SBTi-FLAG.
- Carbon accounting tools used by UK farmers, such as the Farm Carbon Toolkit<sup>26</sup> and Agrecalc<sup>27</sup> are progressing toward full alignment with SBTi-FLAG.
- The tool allows for a baseline entry that reflects historical emissions data.

**Limitations:**

- Includes some global abatement measures that are not applicable to UK farms (e.g. rice paddy management, reforestation).
- Targets are set against a baseline, which may disadvantage early movers.

## Next steps:

Based on the above analysis, LNAS recommends that HMG adopt the SBTi-FLAG tool as the preferred option for the short term, while exploring a bespoke UK model in the long term.

- HMG should consult on the use of SBTi-FLAG as part of the wider planned consultation process on the UK Green Taxonomy.
- HMG could begin scoping for the development of a bespoke UK model

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<sup>26</sup> Farm Carbon Toolkit: [The Farm Carbon Calculator](#)

<sup>27</sup> Agrecalc (2024) [Agrecalc welcomes the DEFRA Harmonisation report](#)



# Annexes

## Annex 1: Setting a 1.5°C emissions reduction target for agriculture

Roe et al<sup>28</sup> (2019) offers a robust and trusted source, as used by the IPPC, the SBTi – FLAG and WWF, for setting reduction targets for the agriculture sector. Roe et al. (2019) identified seven priority mitigation wedges, which collectively contribute to achieving a 1.5°C-aligned trajectory for the land sector. These wedges include a combination of emissions reductions and enhanced carbon sequestration across agriculture, forestry, and other land-use activities.

The study compiled all the available studies, including the relevant scenarios from the Shared Socioeconomic Pathway (SSP)<sup>29</sup> and Integrated Assessment Modelling Consortium (IAMC) Databases,<sup>30</sup> and the relevant bottom-up peer-reviewed studies, to inform an implementation road map to 2050 for land sector mitigation.

This study was derived from four complementary analyses: (1) Review of 1.5°C scenarios to assess viable emissions pathways and required mitigation across all sectors – including 1.5°C scenarios in the SSP and IAMC Databases – (2) comparative analysis of top-down modelled pathways in the land sector, (3) bottom-up assessment and synthesis of land-sector mitigation potential from peer-reviewed studies, and (4) a geographically explicit road map of priority mitigation actions to fulfil the 1.5°C land-sector transformation pathway by 2050, informed by the first three analyses.

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<sup>28</sup> Roe et al. (2019) [Contribution of the land sector to a 1.5 °C world](#)

<sup>29</sup> Rogelj et al. (2018) Scenarios towards limiting global mean temperature increase below 1.5 °C: [Up-to-date assessment of 1.5 °C scenarios under the five different shared socio-economic pathways \(SSPs\)](#)

<sup>30</sup> [IAMC 1.5 °C Scenario Explorer and Data hosted by IIASA.](#)

These priority mitigation actions are categorised into seven priority measures (wedges): (1) reducing emissions from land use change (2) improving agriculture; (3) shifting toward plant-based diets; (4) reducing food loss and waste; (5) restoring forests and wetlands; (6) improving forest management and agroforestry; and (7) enhancing soil carbon sequestration and biochar in agriculture. The below table outlines the detailed mitigation potential for each of the wedges.

**Table 3:** Priority mitigation measures (“wedges”) in 2050 Land Sector Roadmap. Adapted from Roe et al. (2019) Supplementary Information.

Mitigation wedge	Mitigation potential	Source
<b>Reduce land-use change:</b> Reduce deforestation and degradation, conversion of coastal wetlands, and peatland burning	<b>4.6 GtCO<sub>2</sub>e yr<sup>-1</sup>:</b>  3.6 from deforestation 0.7 from conversion of peatlands 0.3 from coastal wetlands	"Maximum additional" mitigation potential by 2030 from Griscom et al. (2017). <sup>31</sup> Estimate is constrained to be consistent with meeting human needs for food and fibre.
<b>Improve agriculture:</b> Reduce CH <sub>4</sub> and N <sub>2</sub> O emissions from enteric fermentation, fertiliser management, improved inorganic fertiliser production, water and residue management of rice fields, and manure management.	<b>1.0 GtCO<sub>2</sub>e yr<sup>-1</sup></b>	"Needed mitigation" from Wollenberg et al. (2017) <sup>32</sup> and "feasible mitigation at \$25/tCO <sub>2</sub> e" from Frank et al. (2017). <sup>33</sup>  This figure is used by the EU TEG to develop their trajectory
<b>Shift diets:</b> Shift to plant-based diets through public health policies, consumer campaigns, development of novel foods	<b>0.9 GtCO<sub>2</sub>e yr<sup>-1</sup></b>	"Plausible scenario" from Hawken (2017) <sup>34</sup> where 50% of the global population will adopt a plant-rich diet by 2050.
<b>Reduce food waste:</b> campaigns, policies, supply chain technology, food labelling, waste to biogas Reduce food loss: improve handling & storage practices	<b>0.9 GtCO<sub>2</sub>e yr<sup>-1</sup></b>	Plausible scenario" from Hawken (2017) <sup>35</sup> where 50% reduction in total global food loss and wastage is achieved by 2050.

<sup>31</sup> Griscom et al. (2017) [Natural climate solutions](#)

<sup>32</sup> Wollenberg et al. (2016) [Reducing emissions from agriculture to meet the 2 °C target](#)

<sup>33</sup> Frank et al. (2017) [Reducing greenhouse gas emissions in agriculture without compromising food security?](#)

<sup>34</sup> Hawken, P. (2017) Project Drawdown: [The most comprehensive plan ever proposed to reverse global warming](#). (Penguin Books)

<sup>35</sup> *ibid*



Mitigation wedge	Mitigation potential	Source
Restoration: Restore forests, coastal wetlands and drained peatlands.	<b>3.6 GtCO<sub>2</sub>e yr<sup>-1</sup>:</b>  3.0 from reforestation 0.4 from peatland restoration 0.2 from coastal wetland restoration  *SBTi-FLAG reduces this <sup>36</sup> to 1.69 GtCO <sub>2</sub> e yr <sup>-1</sup>	"Cost effective" mitigation at <\$100/tCO <sub>2</sub> in 2030 from Griscom et al. (2017). <sup>37</sup> Estimate is constrained to be consistent with meeting human needs for food and fibre
Improve sustainable forest management and agroforestry Optimising rotation lengths, reduced-impact logging, improved plantations, forest fire management, certification, integration of agroforestry into agricultural and grazing lands	<b>1.6 GtCO<sub>2</sub>e yr<sup>-1</sup></b>  0.9 from natural forest management 0.3 from improved plantations 0.4 from trees in cropland	"Cost effective" mitigation at <\$100/tCO <sub>2</sub> in 2030 from Griscom et al. (2017). <sup>38</sup> Estimate is constrained to be consistent with meeting human needs for food and fibre
Enhance soil carbon sequestration in agriculture and apply biochar: Erosion control, use of larger root plants, reduced tillage, cover cropping, restoration of degraded soils, biochar amendments	<b>1.3 GtCO<sub>2</sub>e yr<sup>-1</sup></b>  0.8 from agriculture soil carbon enhancement 0.5 from biochar	"Plausible scenario" from Hawken (2017) <sup>39</sup> adopting regenerative agriculture practices on 407Mha by 2050 to sequester carbon. To be conservative, mitigation potential of other SCS activities from Hawken (2017) is excluded.  "Sustainable global NET potential" of biochar from Fuss (2018). <sup>40</sup> Lowest estimate in the range of 0.5-2 GtCO <sub>2</sub> yr <sup>-1</sup>

<sup>36</sup> Total Roe et al., 2019 potential is 3.6 GtCO<sub>2</sub>e per year but SBTi-FLAG reduces this to reflect estimated share restoring forests in the corporate supply chain.

<sup>37</sup> Griscom et al. (2017) [Natural climate solutions](#)

<sup>38</sup> *ibid*

<sup>39</sup> Hawken, P. (2017) Project Drawdown: [The most comprehensive plan ever proposed to reverse global warming](#). (Penguin Books)

<sup>40</sup> Fuss et al. (2018) [Negative emissions—Part 2: Costs, potentials and side effects](#)



## Annex 2: CCC abatement measures

The CCC commissioned the Scottish Rural College (SRUC)<sup>41</sup> to assess the technical potential and cost effectiveness of agricultural non-CO<sub>2</sub> emissions in the UK (for various CCC scenarios). Based on SRUC modelling, the CCC recommends the deployment of 18 measures which could reduce annual emissions by **4.4 MtCO<sub>2</sub>e** by **2035** under the CCC's Balanced Net Zero Pathway.

### Measures include:

- Livestock measures: e.g. feed additives and improving health of livestock.
- Crop and soil measures: e.g. cover crops and integrating legumes.
- Waste and manure management: e.g. installing anaerobic digesters and covering slurry tanks.

Further abatement savings are attributed to:

- **Low carbon machinery:** biofuels and electrification options are taken up from the mid-2020s and hydrogen from 2030 - and later phase-out of biofuels, delivering annual abatement of almost **1 MtCO<sub>2</sub>e** by **2035**
- **Diet change:** 20% shift away from meat and dairy products by 2030, with a further 15% reduction of meat products by 2050. Resulting in a reduction in livestock numbers and grassland area, delivering annual abatement of **7 MtCO<sub>2</sub>e** by **2035**.
- Food waste reduction: 50% reduction in food waste by 2030 and 60% by 2050, reducing emissions by almost **1 MtCO<sub>2</sub>e** by **2035**.

The abatement savings from land-use, land use change, and forestry (LULUCF) sources and sinks, categorised as “forestry” and “peat” in the CCC dataset, are not disaggregated by agricultural and non-agricultural land. As a result, these savings cannot be modelled into the trajectory.

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<sup>41</sup> Scottish Rural College (2020): [Non-CO<sub>2</sub> abatement in the UK agricultural sector by 2050](#)

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