Farm Carbon Calculator

What's new?

May Upgrade 2023

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Version 1.5.5 (May 2023)

Farm Carbon Calculator

We provide upgrades to the Farm Carbon Calculator on a regular basis, to ensure that we are reflecting the most recent science, and giving users the best experience.

Our latest upgrade showcases a raft of changes that will give our users more functionality and more accurate carbon reports.

Here we layout all the changes that have been made, and what you can expect in this latest version, from May 2023.

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1. Summary

- Each new report now **requires a start and end date.**
- More **livestock categories** are now available with more specific dairy, beef, sheep and swine categories. Emissions factors for livestock have been updated in line with the **UK GHG Inventory 2020**.
- Accounting for energy/ biofuels **exported to the grid** will yield 0 emissions in line with GHG protocol agricultural guidance 2014 (separate monitoring and documentation methods are required to estimate avoided emissions - guidance for grid-connected projects available here).
- Emissions factors for **Fuels, Materials, Distribution** updated in line with **GHG conversion factors 2022.**
- New sprays, including a new section on **molluscicides,** are now available**.**
- Additional **animal feeds** (including for calf rearing and feed supplements such as molasses) have been made available.
- A number of new **specific fertilisers** and **mineral amendments** are now available.

2. Updated emissions factors

These items in the Calculator have been updated in line with updates to reference databases and/ or in response to newly available scientific literature, of various Greenhouse Gas emissions factors.

Sprays have been reviewed and updated, according to the latest list of active sprays. The ordering of them makes it easier to work through.

Wine bottles are seeing significantly reduced emissions factors due to new data sources specific to their production.

Table 1. Items with updated GHG emissions factors for v1.5.5 (May 2023)

Items	Previous reference	Updated reference	Notes
Fuels			
Liquid fuels (except lubricant oil) **Solid fuels** **Gas fuels** **Cars & vans** **Contractor operations** **Hotel stays** **Public transport**	55	64	Factors updated in line with 2022 updates to UK GHG conversion factors for 1990-2020 N.B. no change to emissions factor from long or short haul flights from the UK, nor to heating oil

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Items	Previous reference	Updated reference	Notes
Biodiesel (used cooking oil)	55	64	Previously "Biodiesel"
Electricity exported to grid **Gas exported to grid**	61	61	Reinterpretation of guidance - these emissions factors have been given a value of 0. See note 1
Materials			
Mains water **Mains sewage treatment**	55	64	Factors updated in line with 2022 updates to UK GHG conversion factors for 1990-2020
Inputs			
Sprays - actual	40	40	All sprays have been reviewed and active ingredient content updated in line with the UK Pesticides register (accessed on 23/02/2023). See also new factors and note 2
Distribution			
Contracted road deliveries **Road deliveries** (own vehicle) **Air freight** **Rail freight** **Sea freight**	55	64	Factors updated in line with 2022 updates to UK GHG conversion factors for 1990-2020
Processing			
Wine bottles (glass)	2	15	Updated factor to use information specific to wine bottles, rather than glass in general
Mains water **Mains waste water**	55	64	Factors updated in line with 2022 updates to UK GHG conversion factors for 1990-2020

3. New emissions factors

In addition to the updated factors, these items in the Calculator are new or re-organised, offering users an increase in the range of inputs and processes to the business. In addition some new terminology gives a clearer understanding of what is meant or required on various input lines - especially in Livestock.

Table 2. Items added, or terms changed, for v1.5.5 (May 2023)

Items	Ref	Notes
Fuels		
Butane (by weight)	64	In addition to "Butane (by volume)"
Biodiesel (Hydrogenated vegetable oil)	64	In addition to "Biodiesel (used cooking oil)"
AdBlue	69	
Livestock		
Dairy cattle: • Dairy replacements (1+ years) • Calves (under 1 year) • Dairy beef (1+ years)	65 and 66	See table 4
Beef cattle: • Calves (under 1 year) • Beef cattle • Beef fattening heifers • Beef suckler cows • Fattening bulls (beef) • Beef replacement heifers • Beef fattening steers	65 and 66	See table 4
Sheep: • Replacement ewes	65 and 66	See table 4
Pigs: • Adult sows • Breeding gilts (female) • Adult boars • Piglets • Weaner pigs (under 20kg) • Weaner pigs (over 20kg)	65 and 66	See table 4

Items	Ref	Notes
• Finishing pig (porker) • Finishing pig (cutter) • Bacon pigs • Barren sows for fattening		
Calf rearing: • Milk powder • Milk replacer powders • Calf pellets	18, 67 and 68	
Supplements: • Molasses • Envirolac • Megalac • Novapro	18 and 72	
Crops & Fertility		
Lime & mineral fertilisers: • Phosphoric acid • Potassium sulfate • Sulfuric acid	 73 57 74	
Inputs		
Specific fertilisers: • Origin CAN • Origin 14-14-21 + 7SO3 + 0.02B • Origin 16-16-16 + 7SO3 + 0.02B • Origin 10-10-20 + 7SO3 + 0.02B	 75 76 77 78	Footprints provided by Origin and application emissions calculated
Sprays - actual: • Over 300 sprays included • NEW molluscicides	40	Active ingredient contents sourced from the UK Pesticides register (accessed on 23/02/2023). See also note 2
Sequestration		
Countryside stewardship: • HLS schemes	63	Based on proxy data for equivalent mid-level CSS options
Uncultivated peatland: • Near Natural Peatland • Drained Peatland • Modified Peatland • Actively Eroding Peatland	70	Emissions from different states of peatland in line with Peatland Carbon Code

4. Improved user features and guidance

Some other improvements have been included for Calculator v1.5.5. These include renaming items and fixing bugs.

Table 3. Other items and features that are improved for v1.5.5 (May 2023)

Section	Feature	Notes
Nitrogen balance	Milk (N out) Custom blend fertiliser (N in and N out)	N balance tool updated to include N contained in milk as a product and custom blend fertiliser as an input A number of bugs have been fixed in the N balance tool thanks to the efforts of our community of users. See also note 4 and table 5.
Crops & Fertility	Grapes	Grapes have been added without an emissions factor to permit logging of yield (as with other perennial fruit crops). For wineries, it is also possible to add grapes as a direct emissions entry (where data is available from the supplier) under "Processing".
Crops & Fertility	Running of AD plant Fugitive methane loss	Units have been changed to "Tonnes (imported feedstock)" to meet the assumptions of the underlying calculations. We hope to expand our options around anaerobic digestion in the near future to include more nuance. See also information on export of biogas and electricity to the grid.
Crops & Fertility	Lucerne (Alfalfa)	"Alfalfa" renamed to "Lucerne (Alfalfa)"
Inputs	YaraBela Axan 27	Previously mis-named "YaraBela Extran 27"

5. Notes

1. According to GHG protocol Agricultural guidance [**61** p75], these cannot be included in scopes (separate monitoring and reporting is required to evidence GHG reductions and is dependent on the energy replaced within the National grid).
2. Some sprays have been removed where they are no longer licensed for sale and use in the UK. These spray items will remain on reports produced or dated prior to 17/04/2023.
3. We have updated our livestock categories as an interim measure to improve the nuance available for livestock in the Calculator. Table 4 shows the new categories with a brief

description and how they relate to the previous categories (Other livestock categories remain unchanged). The underlying emissions factors for these come from updates to the UK GHG inventory [**65** & **66**] including increases in estimated rates of enteric emissions of methane and nitrogen excretion for most types of livestock.

4. The N balance calculation considers the input information outlined in table 5. Please note that N fixation by legume crops and green manures is no longer included in N calculations in line with changes to the IPCC's approach and guidance as of 2019 [**52** chapter 11 p6].

Table 4. Alterations to Livestock categories for Calculator v1.5.5 (May 2023)

The categories in bold on the left appear in v1.5.5 of the Farm Carbon Calculator. Please see notes in the data collection spreadsheet for guidance on completing this section of the Calculator (including how to estimate average head of animals in each category over the 12 month reporting period). Emissions factors that the calculations are based on are determined by UK GHG inventory and IPCC livestock categories. Since the **sex and age of the animal** affects their metabolism, and therefore their enteric methane (CH4) emissions and excretion rate, livestock are separated by these characteristics in order to improve the estimates of GHG emissions, which are inherently variable. **Lactation and pregnancy** also alter an animal's GHG emissions so livestock are also separated based on this trait.

Within the Calculator, it is possible to simply enter the **average head of livestock** in each applicable category for the most basic estimation of GHG emissions. In this case, where no liveweight is entered, a **default liveweight** is used (for categories of growing livestock, e.g. calves, this is a midpoint weight within the age-range, to take account of growth across the 12 month reporting period).

For a more comprehensive estimation of GHG emissions, we recommended creating multiple entries for each category with **user-input liveweights** - this will give a more accurate estimate of GHG emissions. Furthermore, by inputting information on **dry matter intake (DMI) per head per year**, users can improve the accuracy of GHG emissions estimation.

A Tier 2 (UK-specific) methodology is employed to calculate livestock GHG emissions for cattle, sheep, and pigs. Poultry calculations undergo a Tier 2 calculation but with a zero value for enteric emissions while goats, horses and deer are treated with a Tier 1 (international) methodology.

The livestock categories for "Other livestock" have not been altered but their underlying emissions factors have been updated in v1.5.5.

In this way, the Calculator's Livestock section is customisable for a range of livestock production systems, whilst relying on the generic livestock categories underpinned by the IPCC and UK GHG Inventory guidance.

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New title	Description	Previous equivalent title (UK GHG Inventory categories)
Dairy cattle		
Dairy cows	Lactating, "dry" or in-calf dairy cows	Dairy cows
Dairy heifers	First pregnancy or first lactation dairy cattle under 3 years of age	Dairy heifers
Dairy replacements (1+ years)	1-3 year old female cattle to join the dairy herd who are not in-calf or lactating	Dairy replacement >1year
Calves (under 1 year)	Cattle under 1 year old	Dairy calves
Dairy beef (1+ years)	Dairy breeds not lactating but finished for beef (over 1 year old)	Dairy replacement >1year
Bulls for breeding	Dairy or beef breeding bulls	Bulls for breeding
Beef cattle		
Calves (under 1 year)	Cattle under 1 year old (male or female)	Dairy calves < 1 year
Beef cattle	12-18 months cattle for finishing (male or female)	Beef cows - growing cattle
Beef finishing heifers	18-30 months heifers for slaughter	Beef females for slaughter
Beef suckler cows	Lactating, "dry" or in-calf beef suckler cows	Dairy cows
Bulls for breeding	Dairy or beef breeding bulls	Bulls for breeding
Finishing bulls (beef)	Bull for beef 12+ months (e.g. cereal-fed)	Cereal fed bull
Beef replacement heifers	First pregnancy or first lactation beef suckler cows under 3 years of age	Heifers for breeding
Beef finishing steers	12-24 months steers for slaughter	Steers
Pigs		
Adult sows	Sows (including sows in pig, sows being suckled and dry sows being kept for further breeding)	(Breeding pigs >50kg)

New title	Description	Previous equivalent title (UK GHG Inventory categories)
Breeding gilts (female)	Gilts (including gilts in pig and gilts not yet in pig)	(Breeding pigs >50kg)
Adult boars	Boars for service	(Breeding pigs >50kg)
Piglets	Pigs under 20 kg	
Weaner pigs (under 20kg)	Piglets over 20 kg	
Growing pigs (over 20kg)	Finishing swine 20-80 kg	(Pigs - weaners >20kg)
Finishing pig (porker)	Finishing swine 20-80 kg	(Fattening and other pigs >50kg)
Finishing pig (cutter)	Finishing swine 80+ kg	(Fattening and other pigs >50kg)
Bacon pigs	Finishing swine 80+ kg	(Fattening and other pigs >50kg)
Barren sows for finishing	Barren sows for finishing 80kg+	(Fattening and other pigs >50kg)
Sheep		
Ewes	Female sheep 1+ years	Ewes
Replacement ewes	Female sheep 1+ years	Ewes
Rams or tups	Male sheep 1+ years	Rams
Lambs	Sheep under 1 year old	Lambs

Table 5. User input categories involved in the calculations for the N balance tool

Category in Calculator	N in	N out (as N and/ or N_2O)
Inputs > Fertiliser	Fertilisers containing N	Fertiliser emissions
Crops > Organic fertility sources	Bought-in organic manures or AD digestate	Emissions from bought-in fertility sources applied
Crops > Agricultural crops Crops > Horticultural vegetable crops	Seed	Crops sold and Crop residue emissions

Category in Calculator	N in	N out (as N and/ or N_2O)
Livestock > Animal feed	Animal feeds	
Livestock > Livestock	Animals purchased	Animals sold Milk sold Livestock manure emissions

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