LEAF Global Impacts Report 2022 - Appendix and Methods

About the Appendix

This document details the methods and data sources for the Global Impacts Report 2022.

Where external data sources are cited, data can be independently verified by accessing those sources.

All LEAF Marque inspections are carried out by LEAF Marque approved, independent Certification Bodies. These Certification Bodies are ISO 17065 accredited. They are responsible for accurately recording a business’ conformance with the Control Points set out in the LEAF Marque Standard as well as their certification decision in the LEAF Marque data system (therefore providing the LEAF Marque certificate status for a business).

The LEAF Marque Standard is available in several languages which are available on the LEAF website (http://www.leafuk.org/leaf/farmers/LEAFmarquecertification/standard.eb). The English version of the Standard is the definitive version and therefore any issues of interpretation from other translations need to be referred to the English version.

Where data has been provided by self-assessment, this has been sense-checked to identify and exclude anomalies, errors or inconsistencies. Sense-checking activities include, but are not limited to, a review of:

- language, where inconsistencies may arise due to language barriers or inconsistencies arising from translation into English (e.g. different crops)
- checking for duplicate accounts
- recategorising crops where they had been inputted as ‘other’ where there was already a specific crop category
- extremes of data; for example, amending excessively large figures and altering to include a more realistic figure based on farm size (e.g. see description for calculating Habitat Area on page 10.

It should be noted that it is a requirement of the LEAF Marque Standard v15.0 for a LEAF Marque certified business to complete the LEAF Sustainable Farming Review and to provide correct and up to date ‘farm details and production information’. As such, this information is reviewed by the auditor.

When citing elements of this report or using any of the data please acknowledge LEAF as the source and provide a download date and website link; or cite as: LEAF Global Impacts Report 2022.

For general enquiries, please contact: enquiries@leaf.eco

For technical issues related to the data, please contact: info@leafmarque.com

Sources of Data

The key data used in the LEAF’s Global Impacts Report 2022 includes information from the LEAF Audit, and the LEAF Sustainable Farming Review.
**LEAF Sustainable Farming Review**

The LEAF Sustainable Farming Review is an online self-assessment resource for LEAF members to support their implementation of Integrated Farm Management. The LEAF Sustainable Farming Review has an annual scope. The LEAF Sustainable Farming Review replaced the LEAF Audit in December 2014. The completion of the LEAF Sustainable Farming Review is a requirement of the LEAF Marque Standard (v12.0 onwards) and this completion is independently verified. However, the specific responses within the LEAF Sustainable Farming Review are self-assessed and not verified through third party inspection.

The LEAF Sustainable Farming Review is composed of around 90 principles based around the nine sections of Integrated Farm Management along with further guidance information and links to support the user. Each question must be answered in one of the following five ways: Fully Achieved; Considerable Progress; Some Progress; Not Started; or Not Applicable. Additionally, the user indicates which of the supporting practices, which are associated with the principle, they carry out. From the LEAF Sustainable Farming Review 2016 scope onwards, questions that required businesses to provide numerical detail on some areas of Integrated Farm Management were introduced. The answers to all questions are not pre-populated.

**Methods for the Global Impacts Reports 2022**

**Method A – Determining a LEAF Marque certified business**

A LEAF Marque certified business is defined as a business that is holding a LEAF charity membership number, holding a LEAF Marque membership status of ‘Current’ and holding a LEAF Marque certificate status of ‘FULL’ as of the 31st December for the year corresponding to the year of the data. Businesses that held a LEAF Marque membership status of ‘Grace’ were also included as this usually refers to businesses who hold a valid certificate but where payment to the certification body is outstanding. Businesses with a LEAF Marque membership status of ‘Closed and ‘Transferred Out’ and businesses with LEAF Membership Type of ‘Non-paying agent’ were sorted manually to confirm possible exclusions (e.g. duplications or expired certificates). Test companies and businesses with LEAF Marque membership status of ‘Applied’ and ‘Registered’ were excluded.

This definition of a LEAF Marque certified business is also used to determine further statistics and maps for the Global Impacts Report 2022.

**Method B – Determining crop area and number of livestock units for LEAF Marque certified businesses**

Determining the crop area and number of livestock units for LEAF Marque certified businesses required the number of LEAF Marque certified businesses (see **Method A – Determining a LEAF Marque certified business**) in a certain year alongside aspects of Production Information. Production Information, which includes farm details (including country), crop class, crop enterprise and areas of crop, is self-assessed by all LEAF members however it is a requirement of LEAF Marque certification for businesses to provide correct and up to date production information. This is annually confirmed during their completion of the LEAF Sustainable Farming Review and verified during the LEAF Marque inspection process. While this is a self-assessment tool, answers are sense-checked as described earlier (i.e. including reviewing language and extremes of data).

Due to updates to the way data was collected in product information on the LEAF Sustainable Farming Review at the beginning of 2020, production data was missing for 110 farmers who had filled in the information before the changes were made. In these circumstances, data from 2019 was used instead.
**Product Information** In 2019 categorisation of crops changed to:

Combinable Crops: products originating from crops which are commonly designated as producing either “grain”, “pulses”, “fodder” or “extracts” (e.g. oil, sugar, starch, etc.), for cooked or processed consumption by humans or animals, or for use in industry.

Fruit & Vegetables: products originating from plants which are commonly designated as producing either fruit, vegetables, salads, edible roots, bulbs, tubers, nuts, spices or herbs, for fresh, cooked or processed consumption by humans. It includes leguminous crops that are harvested green (e.g. green peas, green beans), mushrooms, and hops (hop cones for brewing, hop shoots for consumption).

Flowers & Ornamentals: plants which are grown for ornamental, not edible purposes.

Livestock: all animals reared or kept for: human consumption, by-products utilisation for human consumption, and any other animal needed to facilitate this process (e.g. breeding stock).

For further information about product classification, refer to the [LEAF Product List Guidance Document](#).

Unless otherwise stated, the data shows the total crop area of each business class (e.g. Combinable Crops, Fruit and Vegetables, or Flowers and Ornamentals), or enterprise (not farm business area) of LEAF Marque certified members based on our Product List of certifiable products.

This method is used to create hectares of crop on LEAF Marque businesses around the globe and in certain countries (page 5), the number of countries with LEAF Marque certified businesses (page 5), the area of certain crop classes (page 5 and 6), number and area of crop and livestock enterprises (pages 6 and 9) in the Global Impacts Report 2022.

Due to the change in the way data was collected in 2020 (aligned with the Product List), grass is no longer included within LEAF Marque crops because it does not meet the definition of a Product (see LEAF Product List) and is therefore not listed on a business’ LEAF Marque certificate. As a whole farm system, LEAF recognises the global and agroecological significance of grass as a crop: In 2022, grass was calculated for 2020 and 2021 figures from LEAF members - linked LEAF Marque members data for areas of Short-Term Grassland (0-5 years) and Long-Term Grassland (5+ years). In 2021 there was approximately 24,637 (16,054 Long-Term, 8,173 Short-Term, 409.98 Other). This is a significant increase since 2019, which may be partly attributed to the difference in the data categorisation and interpretation.

For more information about determining statistics relating to crop area and number of livestock units for LEAF Marque certified businesses, please contact LEAF.

**Mapping Methods**

In order to show where LEAF Marque certified businesses operate around the world, all LEAF Marque certified businesses were mapped (see pages 5 and 6 in the Global Impacts Report 2022). A vector file map was downloaded from [https://freevectormaps.com/world-maps/WRLD-EPS-01-0006](https://freevectormaps.com/world-maps/WRLD-EPS-01-0006) and Adobe Photoshop was used to colour in the areas that corresponded to countries of LEAF Marque certified businesses.
Method C – Determining UK LEAF Marque crop area and livestock population as a proportion of all UK crop area and livestock population

To present the proportion of UK LEAF Marque production compared to all UK production, crop area and number of livestock units for UK LEAF Marque certified businesses only (see Method B – Determining crop area and number of livestock units for LEAF Marque certified businesses) was compared to Defra statistics. Analysis was performed using the most up-to-date information available from Defra:

- Defra Horticulture statistics (July 2020 – June 2021)
- Defra UK Livestock Population statistics (July 2020 – June 2021)

It should be noted that all Defra Horticulture or fruit & vegetable data here excludes potatoes (therefore when compared to Defra we also excluded potatoes). Since introduction of the LEAF Product List in August 2019, data for LEAF Marque certified businesses distinguishes between processed and frozen peas (included in Combinable Crops) and leguminous crops which are harvested green (in Fruit & Vegetables).

The proportion of UK LEAF Marque production out of all UK production can be seen for fruit and vegetables on page 6 of the Global Impacts Report 2022. Proportions of UK cereal, potato and livestock production have not been presented and can instead be accessed on request from LEAF.

Method D – Determining Impact Indicators for LEAF Marque certified businesses

Aligned with the LEAF Marque Intended Impacts, the Impact Indicators presented in Global Impacts Report 2022 demonstrate how LEAF Marque certified businesses are increasing the implementation of more environmentally sustainable and regenerative farming practices through Integrated Farm Management (IFM).

Data provided in relation to the indicators is, in part, taken from the answers LEAF Marque businesses have provided in the LEAF Sustainable Farming Review or LEAF Audit alongside Production Information (see Method B – Determining crop area and number of livestock units for LEAF Marque certified businesses). It is a requirement of LEAF Marque certification, from 2015 (LEAF Marque Standard v12.0 onwards), for businesses to complete the LEAF Sustainable Farming Review. While this is a self-assessment tool, answers are sense-checked as described earlier (i.e. including reviewing language and extremes of data).

Due to changes in the way data was gathered following introduction of the LEAF Product List in 2019, details for Protected Cropping were no longer recorded in the same way. This resulted in a loss of some crops from Protected Vegetables (i.e. sweet peppers and others, see below). In 2022 data was used from LEAF Marque - Linked LEAF Marque Members 2021 data. Sense-checking was carried out for:

- Cucumber
- Chilies
- Capsicum
- Tomatoes

The lowest figure from either “Hectare” (from Product Information) or “Protected Cropping” columns in LEAF Marque - Linked LEAF Marque Members 2021 data was used to calculate the hectares for protected cropping. Totals for mushrooms were included irrespective of what is stated in “Protected Cropping” column (LEAF definition of Protected Crops, all mushrooms are classed as Protected Cropping).
Some businesses may be solely protected cropping or both for some crops. For example, businesses state they have 20 hectares of strawberries and 6 ha of protected cropping. From this, it is surmised that they have both field-grown and protected cropping enterprises. The lowest number from either the “Enterprise” data (that detailed crops grown from Product Information), or “Protected Cropping area” column was used to ensure numbers were not inflated.

The questions and practices used to develop the Intended Impact Indicators are kept consistent where possible, however best practice and the LEAF Marque Standard has evolved over time, so some additional supporting practices have been added to the LEAF Sustainable Farming Review. For more information on the individual questions and/or practices used please contact LEAF.

**Impact Indicators for 2021**

Impact Indicators containing 2021 figures were established using a combination of LEAF Marque certified business’ production information and the answers provided in the LEAF Sustainable Farming Review to questions, practices, and metrics.

In line with Intended Impacts that were published in the Monitoring and Evaluation Summary [June 2021], additional Intended Impacts were included (below). Percentages were calculated from number of LEAF Marque certified businesses (Method B - Determining crop area and number of livestock units for LEAF Marque certified businesses) that ticked the corresponding practice(s) in 2021 for statistics presented in the Global Impacts Report 2022 on:

The “Improved Positive Action for Climate Through Reduced Carbon” Indicator used select Indicators reported in infographic format (presented on page 7). LEAF defines those businesses that, according to the LEAF Sustainable Farming Review 2021:

- **Improve soil quality:**
  - Consider themselves to be Fully Achieving or making Considerable Progress towards the statement:
    - “We improve soil quality”

- **Protect and enhance tree cover:**
  - Are businesses that consider themselves to be meeting at least 2 of the practices:
    - “Protect and enhance forest cover” AND/OR
    - “Retain all in field trees” AND/OR
    - “Avoid deep cultivation under in-field trees” AND/OR
    - “Have a variety of native trees species of a range of ages”

- **Seek to optimise Carbon capture and sequestration:**
  - Are businesses that consider themselves to be meeting the practice:
    - “Seek to preserve carbon sinks, maintain forests and areas of vegetation which natural absorb CO2” OR
    - “Seek to preserve the ability of the soil to store carbon”
Use a Carbon footprint Tool:

- The figure is calculated from number and percentage of LEAF Marque certified businesses who provided data in the LEAF Sustainable Farming Review 2021 question PC.PD.01.

Have one or more types of renewable energy generation on-farm:

- The figure is calculated from number and percentage of LEAF Marque certified businesses who provided data in the LEAF Sustainable Farming Review question EE.EQ.04.

The “Increased Implementation of Regenerative Practices” Indicator used select Indicators reported in infographic format (presented on page 7 of the Global Impacts Report 2022) in 2022. LEAF defines those businesses that, according to the LEAF Sustainable Farming Review 2021:

Keep living roots in the soil:

- Are businesses that consider themselves to be meeting the practice:
  - “Use cover crops on areas prone to erosion leaching and run-off” OR
  - “Incorporate cover crops into the soil”

Keep soil covered:

- Are businesses that consider themselves to be meeting the practice:
  - “Leave land rough cultivated or in stubble preferably with a cover of chopped straw after harvest on high erosion risk land” OR
  - “Aim to cover land with year-round vegetation”

Limit soil disturbance:

- Are businesses that consider themselves to be meeting the practice:
  - Use Minimum Tillage at some point in the rotation OR
  - Use Zero Tillage at some point in the rotation OR
  - Use Strip Tillage at some point in the rotation

Grow a diverse range of crops:

- Are businesses that consider themselves to be meeting the practice:
  - “Plan cropping to minimise environmental impact” OR
  - “Include cover crops in our cropping” OR
  - “Aim to cover land with year-round vegetation”

Have an Integrated Farm Management Policy:

- Consider themselves to be Fully Achieving or making Considerable Progress to the following statement:
  - “We have an Integrated Farm Management Policy” (NB: businesses that also answered Some Progress may also meet requirements to be certified but this is not captured here).
Encourage and maintain biodiversity:

- Are businesses that consider themselves to be meeting both practices:
  - “Have a minimum of 5% farm area available for habitat management not used for cropping and food production” AND
  - “Retain natural habitats”

Integrate livestock:

- To calculate the accurate number of livestock farmers, businesses that answered Fully Achieved, Considerable Progress, Some Progress or Not Started were identified to differentiate from businesses that did not answer the livestock section in the LEAF Sustainable Farming Review 2021. LEAF defines businesses that integrate livestock that, according to the LEAF Sustainable Farming Review 2021, consider themselves to be meeting any one of the following practices:
  - “Graze our cover crops or leys with livestock” OR
  - “Use rotational paddock grazing to optimise livestock and pasture performance” OR
  - “Use managed intensive rotational grazing (MIRG) to optimise livestock and pasture performance” OR
  - “Use mob grazing to optimise livestock and pasture performance”

The “Optimised and Integrated Livestock Health, Performance and Environmental” Indicator used select Indicators reported in infographic format (presented on page 9 of the Global Impacts Report 2022) that were compiled in 2022. LEAF defines those businesses that, according to the LEAF Sustainable Farming Review 2021:

- Consider themselves to be Fully Achieving towards the statement:
  - “Optimising livestock performance without compromising animal welfare”*
- Who consider themselves to be doing the following practice:
  - “Our livestock feed rations are appropriate”
- Who consider themselves to be doing the following practice:
  - “We carefully manage our grazing”

*NB: Businesses that consider themselves to be making Considerable Progress or Some Progress may also be meeting criteria to be certified but this is not captured here.

Data shows the total crop area (not farm business area) or percentage of LEAF Marque certified businesses (Method B - Determining crop area and number of livestock units for LEAF Marque certified businesses) that ticked the corresponding practice(s) in 2021 for statistics presented in Global Impacts Report 2022 on:

- Percentage of LEAF Marque certified businesses that have a general policy to increase soil organic matter (page 7)
- Percentage of LEAF Marque certified businesses working with others in the catchment to improve water quality and water management (page 8)
- Percentage of LEAF Marque certified businesses with livestock that are carrying antibiotic best practice (page 9)
- Hectares of crop on LEAF Marque certified businesses where steps are taken to minimise damage to beneficial species and non-target organisms (page 10)
• Percentage of staff on LEAF Marque businesses that have an appropriate awareness of IFM (page 11)
• Percentage of LEAF Marque certified businesses that engaged with a wider audience (page 11)
• Percentage of LEAF Marque certified businesses that hosted farm visits (page 11)

The Integrated Pest Management Best Practice metric (presented on page 8 of Global Impacts Report 2022) was designed in 2017. LEAF defines the 8 aspects of IPM Best Practice as those businesses that, according to the LEAF Sustainable Farming Review 2021:

• Consider themselves to be Fully Achieving or making Considerable Progress towards all the following statements:
  o “We have a Crop Health and Protection Policy”
  o “We assess crop health regularly”
  o “We use a range of crop protection measures”
• AND consider themselves to be meeting the practice: “Carry out a regular programme of crop walking”
• AND IF they considered the practice “We do not use PPPs” to be false for their business (i.e. the business uses pesticides) then they must also meet all the following criteria:
  o Fully Achieved or making Considerable Progress towards “We base PPP application based on evidence of need”
  o Consider themselves to “Include PPP strategy such as product choice, dose rate and effect on beneficial species”
  o Consider themselves to be doing at least 4 of the following practices:
    ▪ “Include a resistance management strategy”
    ▪ “Review and update the Policy annually”
    ▪ “Map areas where heavy infestations occur regularly and patch spray”
    ▪ “Use biological control measures”
    ▪ “Use economic thresholds for spraying decisions”
    ▪ “Use selective rather than broad spectrum plant protection products where possible and practical”

The Waste Management Best Practice metric (presented on page 9 of Global Impacts Report 2022) was designed in 2016. LEAF defines Waste Management Best Practice as those businesses that, according to the LEAF Sustainable Farming Review of the corresponding year:

• Consider themselves to be Fully Achieving or making Considerable Progress towards all the following statements:
  o “We reduce possible wastes”
  o “We reuse our by-products effectively”
  o “We recycle or carefully dispose of wastes”
• AND consider themselves to be doing at least 4 of the following practices:
  o “Comply with waste disposal legislative requirements”
  o “Plan purchase of goods in detail to reduce wastage”
  o “Consider whether suppliers will accept return of packaging and containers for recycling/disposal”
  o “Consider ease of recycling/disposal of packaging when comparing goods for purchase”
  o “Recycle, or dispose of, all wastes which cannot be used in our business”
• “Ensure that wastes are disposed of without risk to water quality and the wider environment”

- Those businesses that considered “We reuse our by-products effectively” to be “N/A” to their business but they met all other requirements were also included.

The Antibiotic Best Practice Metric (presented on page 27 of Global Impacts Report 2021) was designed in 2020. LEAF defines Antibiotic Best Practice as those business that, according to the LEAF Sustainable Farming Review of the corresponding year:

- Consider themselves to be Fully Achieving or making Considerable Progress towards all the following statements:
  - “We have a Livestock Health Plan”
  - “We have high standards of animal welfare”
  - “We carefully manage veterinary medicine use”
- AND consider themselves to be meeting the practices “We treat sick and injured animals promptly correctly”
- AND “We strictly observe withdrawal periods for the protection of human and animal health”
- AND IF they consider themselves to be doing at least 1 of the following practices related to biosecurity:
  - “Use LEAF’s Simply Sustainable Biosecurity to help develop our strategy for biosecurity”
  - “Observe strict biosecurity for movements one and off farm”
  - “Test stock at appropriate intervals to ensure there are no disease carriers”
- AND IF they consider themselves to be doing at least 4 of the following practices:
  - “Consider appropriate levels of preventative treatment”
  - “Consider keeping a record of animals that are antibiotic-free”
  - “Only use veterinary medicines as part of Livestock Health Plan for the control or treatment of disease”
  - “Record all details for all treatments”
  - “Take steps to prevent veterinary medicine resistance build-up”
  - “Use narrow spectrum antibiotics where possible”

The creation of new questions in the LEAF Sustainable Farming Review that captured quantitative data was only available from 2016 onwards. Data was calculated from LEAF Marque certified businesses who provided data for the Impact Indicators related to the following questions:

- Percentage of LEAF Marque certified businesses that measure nitrogen efficiency per tonne product (page 7)
- Percentage of LEAF Marque certified businesses that provided their most recent soil organic matter % record (page 7)
- Percentage of LEAF Marque certified businesses that used a Carbon Footprint Tool (pages 7 and 8)
- Percentage of LEAF Marque certified businesses have one or more types of renewable energy generation on-farm (pages 7 and 8)
- Average habitat area on LEAF Marque certified businesses (page 10)
- Metres of hedges (page 10)
- In-field trees (page 10)
• Ponds (page 10)
• Metres of Habitat Banks (page 10)
• Metres of non-hedge boundaries (page 10)
• Number of reservoirs that benefited biodiversity (page 10)
• Staff on LEAF Marque certified businesses who have appropriate awareness of IFM (page 11)
• Businesses that engaged with a wider audience through social media, websites and written media (page 11)
• The number of on and off farm events to a variety of audiences (page 11)

It should be noted that Habitat Area (page 10) was calculated as a percentage of “Total Farmed Area”, with those businesses that resulted in habitat area <0.0001% or >100% were excluded from the data.

As of 2022 both Habitat Area calculated both as FARM area and FARMED area are reported in the internal Data Book to distinguish between in-field habitats (e.g. beetle banks and wider margins as part of stewardship schemes) and overall habitat areas (such as scrub or water bodies that cannot be farmed) but that are vital habitats as part of the mosaic of our farmed landscapes because both are relevant.

For more statistics relating to the LEAF Sustainable Farming Review please contact LEAF.

**Supplementary Tables and Figures**

Please see contact LEAF if you require more supplementary tables and figures.